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PART SEVEN

GRE Resources

APPENDIX A

Kaplan's Word Groups

The following lists contain a lot of common GRE words grouped together by meaning. Make flashcards from these lists and look over your cards a few times a week from now until the day of the test. Look over the word group lists once or twice a week for 30 seconds every week until the test. If you don't have much time until the exam date, look over your lists more frequently. Then, by the day of the test, you should have a rough idea of what most of the words on your lists mean.

Note: The categories in which these words are listed are *general* and should *not* be interpreted as the exact definitions of the words.

Abbreviated Communication
- abridge
- compendium
- cursory
- curtail
- syllabus
- synopsis
- terse

Act Quickly
- abrupt
- apace
- headlong
- impetuous
- precipitate

Assist
- abet
- advocate
- ancillary
- bolster
- corroborate
- countenance
- espouse
- mainstay
- munificent
- proponent
- stalwart
- sustenance

Bad Mood
- bilious
- dudgeon
- irascible
- pettish
- petulant
- pique
- querulous
- umbrage
- waspish

Beginner/Amateur
- dilettante
- fledgling
- neophyte
- novitiate
- proselyte
- tyro

Beginning/Young
- burgeoning
- callow
- engender
- inchoate
- inciplent
- nascent

Biting (as in wit or temperament)
- acerbic
- acidulous
- acrimonious
- asperity
- caustic
- mordacious
- mordant
- trenchant

Bold
- audacious
- courageous
- dauntless

Boring
banal
fatuous
hackneyed
insipid
mundane
pedestrian
platitude
prosaic
quotidian
trite

Carousal
bacchanalian
debauchery
depraved
dissipated
iniquity
libertine
libidinous
licentious
reprobate
ribald
salacious
sordid
turpitude

Changing Quickly
capricious
mercurial
volatile

Copy
counterpart
emulate
facsimile
factitious
paradigm
precursor
quintessence
simulated
vicarious

Criticize/Criticism
aspersion
belittle
berate
calumny
castigate
decry
defamation
denounce
deride/derisive
diatribe
disparage
excoriate
gainsay
harangue
impugn
inveigh
lambaste
objurgate
obloquy
opprobrium
pillory
rebuke
remonstrate
reprehend
reprove
revile
tirade
vituperate

Death/Mourning
bereave
cadaver
defunct
demise
dolorous
elegy
knell
lament
macabre
moribund
obsequies
sepulchral
wraith

Denying of Self
abnegate
abstain
ascetic
spartan
stoic
temperate

Dictatorial
authoritarian
despotic
dogmatic
hegemonic (hegemony)
imperious
peremptory
tyrannical

Difficult to Understand
abstruse
ambiguous
arcane
bemusing
cryptic
enigmatic
esoteric
inscrutable
obscure
opaque
paradoxical
perplexing
recondite
turbid

Disgusting/Offensive
defile
fetid
invidious
noisome
odious
putrid
rebarbative

Easy to Understand
articulate
cogent
eloquent
evident
limpid
lucid
pellucid

Eccentric/Dissimilar
aberrant
anachronism
anomalous
discrete
eclectic
esoteric
iconoclast

Embarrass
abash
chagrin
compunction
contrition
diffidence
expiate
foible
gaucherie
rue

Equal
equitable
equity
tantamount

Falsehood
apocryphal
canard
chicanery
dissemble
duplicity
equivocate
erroneous
ersatz
fallacious
feigned
guile
mendacious/ mendacity
perfidy
prevaricate
specious
spurious

Family
conjugal
consanguine
distaff
endogamous
filial
fratricide
progenitor
scion

Favoring/Not Impartial
ardor/ardent
doctrinaire
fervid
partisan
tendentious
zealot

Forgive
absolve
acquit
exculpate
exonerate
expiate
palliate
redress
vindicate

Funny
chortle
droll
facetious
flippant
gibe
jocular
levity
ludicrous
raillery
riposte
simper

Gaps/Openings
abatement
aperture
fissure
hiatus
interregnum
interstice
lull
orifice
rent
respite
rift

Generous/Kind
altruistic
beneficent
clement
largess
magnanimous
munificent
philanthropic
unstinting

Greedy
avaricious
covetous
mercenary
miserly
penurious
rapacious
venal

Hard-hearted
asperity
baleful
dour
fell
malevolent
mordant
sardonic
scathing
truculent
vitriolic
vituperation

Harmful
baleful
baneful
deleterious
inimical
injurious
insidious
minatory
perfidious
pernicious

Harsh-Sounding
cacophony
din
dissonant
raucous
strident

Hatred
abhorrence
anathema
antagonism
antipathy
detestation
enmity
loathing
malice
odium
rancor

Healthy
beneficial
salubrious
salutary
Hesitate
dither
oscillate
teeter
vacillate
waver

Hostile
antithetic
churlish
curmudgeon
irascible
malevolent
misanthropic
truculent
vindictive

Innocent/ Inexperienced
credulous
gullible
ingenuous
naive
novitiate
tyro

Insincere
disingenuous
dissemble
fulsome
ostensible
unctuous

Investigate
appraise
ascertain
assay
descry
peruse

Lazy/Sluggish
indolent
inert
lackadaisical
languid
lassitude
lethargic
phlegmatic
quiescent
slothful
torpid

Luck
adventitious
amulet
auspicious
fortuitous
kismet
optimum
portentous
propitiate
propitious
providential
talisman

Nag
admonish
belabor
cavil
enjoin
exhort
harangue
hector
martinet
remonstrate
reproof

Nasty
fetid
noisome
noxious

Not a Straight Line
askance
awry
careen
carom
circuitous
circumvent
gyrate
labyrinth
meander
oblique
serrated
sidle
sinuous
undulating
vortex

Overblown/Wordy
bombastic
circumlocution
garrulous
grandiloquent
loquacious
periphrastic
prolix
rhetoric
turgid
verbose

Pacify/Satisfy
ameliorate
appease
assuage
defer
mitigate
mollify
placate
propitiate
satiate
slake
soothe

Pleasant-Sounding
euphonious
harmonious
melodious
sonorous

Poor
destitute
esurient
impecunious
indigent

Praise
acclaim
accolade
aggrandize
encomium
eulogize
extol
fawn
laud/laudatory
venerate/veneration

Predict
augur
auspice
fey
harbinger
portentous
presage
prescient
prognosticate

Prevent/Obstruct
discomfort
encumber
fetter
forfend
hinder
impede
inhibit
occlude

Smart/Learned
astute
canny
erudite
perspicacious

Sorrow
disconsolate
doleful
dolor
elegiac
forlorn
lament
lugubrious
melancholy
morose
plaintive
threnody

Stubborn
implacable
inexorable
intractable
intransigent
obdurate
obstinate
recalcitrant
refractory
renitent
untoward
vexing

Terse
compendious
curt
laconic
pithy
succinct
taciturn

Time/Order/Duration
anachronism
antecede
antedate
anterior
archaic
diurnal
eon
ephemeral
epoch
fortnight
millennium
penultimate
synchronous
temporal

Timid/Timidity
craven
diffident
pusillanimous
recreant
timorous
trepidation

Truth
candor/candid
fealty
frankness
indisputable
indubitable
legitimate
probity
sincere
veracious
verity

Unusual
aberration
anomaly
iconoclast
idiosyncrasy

Walking About
ambulatory
itinerant
peripatetic

Wandering
discursive
expatiate
forage
itinerant
peregrination
peripatetic
sojourn

Weaken
adulterate
enervate
exacerbate
inhibit
obviate
stultify
undermine
vitiate

Wisdom
adage
aphorism
apothegm
axiom
bromide
dictum
epigram
platitude
sententious
truism

Withdrawal/Retreat
abeyance
abjure
abnegation
abortive
abrogate
decamp
demur
recant
recidivism
remission
renege
rescind
retrograde

APPENDIX B

Kaplan's Root List

Kaplan's Root List can boost your knowledge of GRE-level words, and that can help you get more questions right. No one can predict exactly which words will show up on your test, but there are certain words that the test makers favor. The Root List gives you the component parts of many typical GRE words. Knowing these words can help you because you may run across them on your GRE. Also, becoming comfortable with the types of words that pop up will reduce your anxiety about the test.

Knowing roots can help you in two more ways. First, instead of learning one word at a time, you can learn a whole group of words that contain a certain root. They'll be related in meaning, so if you remember one, it will be easier for you to remember others. Second, roots can often help you decode an unknown GRE word. If you recognize a familiar root, you could get a good enough grasp of the word to answer the question.

A: without
amoral: neither moral nor immoral
atheist: one who does not believe in God
atypical: not typical
anonymous: of unknown authorship or origin
apathy: lack of interest or emotion
atrophy: the wasting away of body tissue
anomaly: an irregularity
agnostic: one who questions the existence of God

AB/ABS: off, away from, apart, down
abduct: to take by force
abhor: to hate, detest
abolish: to do away with, make void
abstract: conceived apart from concrete realities, specific objects, or actual instances
abnormal: deviating from a standard
abdicate: to renounce or relinquish a throne
abstinence: forbearance from any indulgence of appetite
abstruse: hard to understand; secret, hidden

AC/ACR: sharp, bitter
acid: something that is sharp, sour, or ill-natured
acute: sharp at the end; ending in a point
acerbic: sour or astringent in taste; harsh in temper
acrid: sharp or biting to the taste or smell
acrimonious: caustic, stinging, or bitter in nature
exacerbate: to increase bitterness or violence; aggravate

ACT/AG: to do; to drive; to force; to lead
agile: quick and well-coordinated in movement; active, lively
agitate: to move or force into violent, irregular action
litigate: to make the subject of a lawsuit
prodigal: wastefully or recklessly extravagant
pedagogue: a teacher
synagogue: a gathering or congregation of Jews for the purpose of religious worship

AD/AL: to, toward, near
adapt: adjust or modify fittingly
adjacent: near, close, or contiguous; adjoining
addict: to give oneself over, as to a habit or pursuit
admire: to regard with wonder, pleasure, and approval
address: to direct a speech or written statement to
adhere: to stick fast; cleave; cling
adjoin: to be close or in contact with
advocate: to plead in favor of

AL/ALI/ALTER: other, another
alternative: a possible choice
alias: an assumed name; another name
alibi: the defense by an accused person that he or she was verifiably elsewhere at the time of the crime with which he or she is charged
alien: one born in another country; a foreigner
alter ego: the second self; a substitute or deputy
altruist: a person unselfishly concerned for the welfare of others
allegory: figurative treatment of one subject under the guise of another

AM: love
amateur: a person who engages in an activity for pleasure rather than financial or professional gain
amatory: of or pertaining to lovers or lovemaking
amenity: agreeable ways or manners
amorous: inclined to love, esp. sexual love
enamored: inflamed with love; charmed; captivated
amity: friendship; peaceful harmony
inamorata: a female lover
amiable: having or showing agreeable personal qualities
amicable: characterized by exhibiting good will

AMB: to go; to walk
ambient: moving freely; circulating
ambitious: desirous of achieving or obtaining power
preamble: an introductory statement
ambassador: an authorized messenger or representative
ambulance: a wheeled vehicle equipped for carrying sick people, usually to a hospital
ambulatory: of, pertaining to, or capable of walking
ambush: the act of lying concealed so as to attack by surprise
perambulator: one who makes a tour of inspection on foot

AMBI/AMPH: both, more than one, around
ambiguous: open to various interpretations
amphibian: any cold-blooded vertebrate, the larva of which is aquatic and the adult of which is terrestrial; a person or thing having a twofold nature

ambidextrous: able to use both hands equally well

ANIM: of the life, mind, soul, spirit
unanimous: in complete accord
animosity: a feeling of ill will or enmity
animus: hostile feeling or attitude
equanimity: mental or emotional stability, especially under tension
magnanimous: generous in forgiving an insult or injury

ANNUI/ENNI: year
annual: of, for, or pertaining to a year; yearly
anniversary: the yearly recurrence of the date of a past event
annuity: a specified income payable at stated intervals
perennial: lasting for an indefinite amount of time
annals: a record of events, esp. a yearly record

ANTE: before
anterior: placed before
antecedent: existing, being, or going before
antedate: precede in time
antebellum: before the war (especially the American Civil War)
antediluvian: belonging to the period before the biblical flood; very old or old-fashioned

ANTHRO/ANDR: man, human
anthropology: the science that deals with the origins of humankind
android: robot; mechanical man
misanthrope: one who hates humans or humanity
philanderer: one who carries on flirtations
androgynous: being both male and female
androgen: any substance that promotes masculine characteristics
anthropocentric: regarding humanity as the central fact of the universe

ANTI: against
antibody: a protein naturally existing in blood serum that reacts to overcome the toxic effects of an antigen
antidote: a remedy for counteracting the effects of poison, disease, etc.
antiseptic: free from germs; particularly clean or neat
antipathy: aversion
antipodal: on the opposite side of the globe

APO: away
apology: an expression of one's regret or sorrow for having wronged another
apostle: one of the 12 disciples sent forth by Jesus to preach the gospel
apocalypse: revelation; discovery; disclosure
apogee: the highest or most distant point
apocryphal: of doubtful authorship or authenticity
apostasy: a total desertion of one's religion, principles, party, cause, etc.

ARCH/ARCHI/ARCHY: chief, principal, ruler
architect: the devisor, maker, or planner of anything
archenemy: chief enemy
monarchy: a government in which the supreme power is lodged in a sovereign
anarchy: a state or society without government or law
oligarchy: a state or society ruled by a select group

AUTO: self
automatic: self-moving or self-acting
autocrat: an absolute ruler
autonomy: independence or freedom

BE: to be; to have a particular quality; to exist
belittle: to regard something as less impressive than it apparently is
bemoan: to express pity for
bewilder: to confuse or puzzle completely
belie: to misrepresent; to contradict

BEL/BEL: war
antebellum: before the war
rebel: a person who resists authority, control, or tradition
belligerent: warlike, given to waging war

BEN/BON: good
benefit: anything advantageous to a person or thing
benign: having a kindly disposition
benediction: act of uttering a blessing
benevolent: desiring to do good to others
bonus: something given over and above what is due
bona fide: in good faith; without fraud

BI: twice, double
binocular: involving two eyes
biennial: happening every two years

bilateral: pertaining to or affecting two or both sides
bilingual: able to speak one's native language and another with equal facility
bipartisan: representing two parties

CAD/CID: to fall; to happen by chance
accident: happening by chance; unexpected
coincidence: a striking occurrence of two or more events at one time, apparently by chance
decadent: decaying; deteriorating
cascade: a waterfall descending over a steep surface
recidivist: one who repeatedly relapses, as into crime

CANT/CENT/CHANT: to sing
accent: prominence of a syllable in terms of pronunciation
chant: a song; singing
enchant: to subject to magical influence; bewitch
recant: to withdraw or disavow a statement
incantation: the chanting of words purporting to have magical power
incentive: that which incites action

CAP/CIP/CEPT: to take; to get
capture: to take by force or stratagem
anticipate: to realize beforehand; foretaste or foresee
susceptible: capable of receiving, admitting, undergoing, or being affected by something
emancipate: to free from restraint
percipient: having perception; discerning; discriminating
precept: a commandment or direction given as a rule of conduct

CAP/CAPIT/CIPIT: head, headlong
capital: the city or town that is the official seat of government
disciple: one who is a pupil of the doctrines of another
precipitate: to hasten the occurrence of; to bring about prematurely
precipice: a cliff with a vertical face
capitulate: to surrender unconditionally or on stipulated terms
caption: a heading or title

CARD/CORD/COUR: heart
cardiac: pertaining to the heart
encourage: to inspire with spirit or confidence
concord: agreement; peace, amity
discord: lack of harmony between persons or things
concordance: agreement, concord, harmony

CARN: flesh
carnivorous: eating flesh
carnage: the slaughter of a great number of people
carnival: a traveling amusement show
reincarnation: rebirth of a soul in a new body
incarnation: a being invested with a bodily form

CAST/CHAST: cut
cast: to throw or hurl; fling
caste: a hereditary social group, limited to people of the same rank
castigate: to punish in order to correct
chastise: to discipline, esp. by corporal punishment
chaste: free from obscenity; decent

CED/CEED/CESS: to go; to yield; to stop
antecedent: existing, being, or going before
concede: to acknowledge as true, just, or proper; admit
predecessor: one who comes before another in an office, position, etc.
cessation: a temporary or complete discontinuance
incessant: without stop

CENTR: center
concentrate: to bring to a common center; to converge, to direct toward one point
eccentric: off-center
concentric: having a common center, as in circles or spheres
centrifuge: an apparatus that rotates at high speed that separates substances of different densities using centrifugal force
centrist: of or pertaining to moderate political or social ideas

CERN/CERT/CRET/CRIM/CRIT: to separate; to judge; to distinguish; to decide
discrete: detached from others, separate
ascertain: to make sure of; to determine
certitude: freedom from doubt
discreet: judicious in one's conduct of speech, esp. with regard to maintaining silence about something of a delicate nature
hypocrite: a person who pretends to have beliefs that she does not

criterion: a standard of judgment or criticism

CHRON: time
synchronize: to occur at the same time or agree in time
chronology: the sequential order in which past events occurred
anachronism: an obsolete or archaic form
chronic: constant, habitual
chronometer: a time piece with a mechanism to adjust for accuracy

CIRCU: around, on all sides
circumference: the outer boundary of a circular area
circumstances: the existing conditions or state of affairs surrounding and affecting an agent
circuit: the act of going or moving around
circumambulate: to walk about or around
circuitous: roundabout, indirect

CIS: to cut
scissors: cutting instrument for paper
precise: definitely stated or defined
exorcise: to seek to expel an evil spirit by ceremony
incision: a cut, gash, or notch
incisive: penetrating, cutting

CLA/CLO/CLU: shut, close
conclude: to bring to an end; finish; to terminate
claustrophobia: an abnormal fear of enclosed places
disclose: to make known, reveal, or uncover
exclusive: not admitting of something else; shutting out others
cloister: a courtyard bordered with covered walks, esp. in a religious institution
preclude: to prevent the presence, existence, or occurrence of

CLAIM/CLAM: to shout; to cry out
exclaim: to cry out or speak suddenly and vehemently
proclaim: to announce or declare in an official way
clamor: a loud uproar
disclaim: to deny interest in or connection with
reclaim: to claim or demand the return of a right or possession

CLI: to lean toward
decline: to cause to slope or incline downward
recline: to lean back
climax: the most intense point in the development of something
proclivity: inclination, bias
disinclination: aversion, distaste

CO/COL/COM/CON: with, together
connect: to bind or fasten together
coerce: to compel by force, intimidation, or authority
compatible: capable of existing together in harmony
collide: to strike one another with a forceful impact
collaborate: to work with another, cooperate
conciliate: to placate, win over
commensurate: suitable in measure, proportionate

COUR/CUR: running; a course
recur: to happen again
curriculum: the regular course of study
courier: a messenger traveling in haste who bears news
excursion: a short journey or trip
cursive: handwriting in flowing strokes with the letters joined together
concur: to accord in opinion; agree
incursion: a hostile entrance into a place, esp. suddenly
cursory: going rapidly over something; hasty; superficial

CRE/CRESC/CRET: to grow
accrue: to be added as a matter of periodic gain
creation: the act of producing or causing to exist
increase: to make greater in any respect
increment: something added or gained; an addition or increase
accretion: an increase by natural growth

CRED: to believe; to trust
incredible: unbelievable
credentials: anything that provides the basis for belief
credo: any formula of belief
credulity: willingness to believe or trust too readily
credit: trustworthiness

CRYP: hidden
crypt: a subterranean chamber or vault
apocryphal: of doubtful authorship or authenticity
cryptology: the science of interpreting secret writings, codes, ciphers, and the like
cryptography: procedures of making and using

secret writing

CUB/CUMB: to lie down

cubicle: any small space or compartment that is partitioned off
succumb: to give away to superior force; yield
incubate: to sit upon for the purpose of hatching
incumbent: holding an indicated position
recumbent: lying down; reclining; leaning

CULP: blame

culprit: a person guilty for an offense
culpable: deserving blame or censure
inculpate: to charge with fault
mea culpa: through my fault; my fault

DAC/DOC: to teach

doctor: someone licensed to practice medicine; a learned person
doctrine: a particular principle advocated, as of a government or religion
indoctrinate: to imbue a person with learning
docile: easily managed or handled; tractable
didactic: intended for instruction

DE: away, off, down, completely, reversal

descend: to move from a higher to a lower place
decipher: to make out the meaning; to interpret
defile: to make foul, dirty, or unclean
defame: to attack the good name or reputation of
deferential: respectful; to yield to judgment
delineate: to trace the outline of; sketch or trace in outline

DEM: people

democracy: government by the people
epidemic: affecting at the same time a large number of people, and spreading from person to person
endemic: peculiar to a particular people or locality
pandemic: general, universal
demographics: vital and social statistics of populations

DI/DIA: apart, through

dialogue: conversation between two or more persons
diagnose: to determine the identity of something from the symptoms
dilate: to make wider or larger; to cause to expand
dilatory: inclined to delay or procrastinate
dichotomy: division into two parts, kinds, etc.

DIC/DICT/DIT: to say; to tell; to use words

dictionary: a book containing a selection of the words of a language
predict: to tell in advance
verdict: judgment, decree
interdict: to forbid; prohibit

DIGN: worth

dignity: nobility or elevation of character; worthiness
dignitary: a person who holds a high rank or office
deign: to think fit or in accordance with one's dignity
condign: well deserved; fitting; adequate
disdain: to look upon or treat with contempt

DIS/DIF: away from, apart, reversal, not

disperse: to drive or send off in various directions
disseminate: to scatter or spread widely; promulgate
dissipate: to scatter wastefully
dissuade: to deter by advice or persuasion
diffuse: to pour out and spread, as in a fluid

DOG/DOX: opinion

orthodox: sound or correct in opinion or doctrine
paradox: an opinion or statement contrary to accepted opinion
dogma: a system of tenets, as of a church

DOL: suffer, pain

condolence: expression of sympathy with one who is suffering
indolence: a state of being lazy or slothful
doleful: sorrowful, mournful
dolorous: full of pain or sorrow, grievous

DON/DOT/DOW: to give

donate: to present as a gift or contribution
pardon: kind indulgence, forgiveness
antidote: something that prevents or counteracts ill effects
anecdote: a short narrative about an interesting event
endow: to provide with a permanent fund

DUB: doubt

dubious: doubtful
dubiety: doubtfulness
indubitable: unquestionable

DUC/DUCT: to lead

abduct: to carry off or lead away
conduct: personal behavior, way of acting

conducive: contributive, helpful
induce: to lead or move by influence
induct: to install in a position with formal ceremonies
produce: to bring into existence; give cause to

DUR: hard

endure: to hold out against; to sustain without yielding
durable: able to resist decay
duress: compulsion by threat, coercion
dour: sullen, gloomy
duration: the length of time something exists

DYS: faulty, abnormal

dystrophy: faulty or inadequate nutrition or development
dyspepsia: impaired digestion
dyslexia: an impairment of the ability to read due to a brain defect
dysfunctional: poorly functioning

E/EF/EX: out, out of, from, former, completely

evade: to escape from, avoid
exclude: to shut out; to leave out
extricate: to disentangle, release
exonerate: to free or declare free from blame
expire: to come to an end, cease to be valid
efface: to rub or wipe out; surpass, eclipse

EPI: upon

epidemic: affecting a large number of people at the same time and spreading from person to person
epilogue: a concluding part added to a literary work
epidermis: the outer layer of the skin
epigram: a witty or pointed saying tersely expressed
epithet: a word or phrase, used invectively as a term of abuse

EQU: equal, even

equation: the act of making equal
adequate: equal to the requirement or occasion
equidistant: equally distant
iniquity: gross injustice; wickedness

ERR: to wander

err: to go astray in thought or belief, to be mistaken
error: a deviation from accuracy or correctness
erratic: deviating from the proper or usual course in conduct
arrant: downright, thorough, notorious

ESCE: becoming

adolescent: between childhood and adulthood
obsolescent: becoming obsolete
incandescent: glowing with heat, shining
convalescent: recovering from illness
reminiscent: reminding or suggestive of

EU: good, well

euphemism: pleasant-sounding term for something unpleasant
eulogy: speech or writing in praise or commendation
eugenics: improvement of qualities of race by control of inherited characteristics
euthanasia: killing a person painlessly, usually one who has an incurable, painful disease
euphony: pleasantness of sound

EXTRA: outside, beyond

extraordinary: beyond the ordinary
extract: to take out, obtain against a person's will
extradite: to hand over (person accused of crime) to state where crime was committed
extrasensory: derived by means other than known senses
extrapolate: to estimate (unknown facts or values) from known data

FAB/FAM: speak

fable: fictional tale, esp. legendary
affable: friendly, courteous
ineffable: too great for description in words; that which must not be uttered
famous: well known, celebrated
defame: attack good name of

FAC/FIC/FIG/FAIT/FEIT/FY: to do; to make

factory: building for manufacture of goods
faction: small dissenting group within larger one, esp. in politics
deficient: incomplete or insufficient
prolific: producing many offspring or much output
configuration: manner of arrangement, shape
ratify: to confirm or accept by formal consent
effigy: sculpture or model of person
counterfeit: imitation, forgery

FER: to bring; to carry; to bear

offer: to present for acceptance, refusal, or consideration

confer: to grant, bestow
referendum: to vote on political question open to the entire electorate
proffer: to offer
proliferate: to reproduce; produce rapidly

FERV: to boil; to bubble
fervor: passion, zeal
fervid: ardent, intense
effervescent: with the quality of giving off bubbles of gas

FID: faith, trust
confide: to entrust with a secret
affidavit: written statement on oath
fidelity: faithfulness, loyalty
fiduciary: of a trust; held or given in trust
infidel: disbeliever in the supposed true religion

FIN: end
final: at the end; coming last
confine: to keep or restrict within certain limits; imprison
definitive: decisive, unconditional, final
infinite: boundless; endless
infinitesimal: infinitely or very small

FLAG/FLAM: to burn
flammable: easily set on fire
flambeau: a lighted torch
flagrant: blatant, scandalous
conflagration: a large destructive fire

FLECT/FLEX: to bend
deflect: to bend or turn aside from a purpose
flexible: able to bend without breaking
inflect: to change or vary pitch of
reflect: to throw back
genuflect: to bend knee, esp. in worship

FLU/FLUX: to flow
fluid: substance, esp. gas or liquid, capable of flowing freely
fluctuation: something that varies, rising and falling
effluence: flowing out of (light, electricity, etc.)
confluence: merging into one
mellifluous: pleasing, musical

FORE: before
foresight: care or provision for future
foreshadow: be warning or indication of (future event)
forestall: to prevent by advance action
forthright: straightforward, outspoken, decisive

FORT: chance
fortune: chance or luck in human affairs
fortunate: lucky, auspicious
fortuitous: happening by luck

FORT: strength
fortify: to provide with fortifications; strengthen
fortissimo: very loud
forte: strong point; something a person does well

FRA/FRAC/FRAG/FRING: to break
fracture: breakage, esp. of a bone
fragment: a part broken off
fractious: irritable, peevish
refractory: stubborn, unmanageable, rebellious
infringe: to break or violate (a law, etc.)

FUS: to pour
profuse: lavish, extravagant, copious
fusillade: continuous discharge of firearms or outburst of criticism
suffuse: to spread throughout or over from within
diffuse: to spread widely or thinly
infusion: infusing; liquid extract so obtained

GEN: birth, creation, race, kind
generous: giving or given freely
genetics: study of heredity and variation among animals and plants
gender: classification roughly corresponding to the two sexes and sexlessness
carcinogenic: producing cancer
congenital: existing or as such from birth
progeny: offspring, descendants
miscegenation: interbreeding of races

GN/GNO: know
agnostic: person who believes that the existence of God is not provable
ignore: to refuse to take notice of
ignoramus: a person lacking knowledge, uninformed
recognize: to identify as already known
incognito: with one's name or identity concealed
prognosis: to forecast, especially of disease
diagnose: to make an identification of disease or fault from symptoms

GRAD/GRESS: to step
progress: forward movement
aggressive: given to hostile act or feeling
degrade: to humiliate, dishonor, reduce to lower rank
digress: to depart from main subject
egress: going out; way out
regress: to move backward, revert to an earlier state

GRAT: pleasing
grateful: thankful
ingratiate: to bring oneself into favor
gratuity: money given for good service
gracious: kindly, esp. to inferiors; merciful

HER/HES: to stick
coherent: logically consistent; having waves in phase and of one wavelength
adhesive: tending to remain in memory; sticky; an adhesive substance
inherent: involved in the constitution or essential character of something
adherent: able to adhere; believer or advocate of a particular thing
heredity: the qualities genetically derived from one's ancestors and the transmission of those qualities

(H)ETERO: different
heterosexual: of or pertaining to sexual orientation toward members of the opposite sex; relating to different sexes
heterogeneous: of other origin: not originating in the body
heterodox: different from acknowledged standard; holding unorthodox opinions or doctrines

(H)OM: same
homogeneous: of the same or a similar kind of nature; of uniform structure of composition throughout
homonym: one of two or more words spelled and pronounced alike but different in meaning
homosexual: of, relating to, or exhibiting sexual desire toward a member of one's own sex
anomaly: deviation from the common rule
homeostasis: a relatively stable state of equilibrium

HYPER: over, excessive
hyperactive: excessively active
hyperbole: purposeful exaggeration for effect
hyperglycemia: an abnormally high concentration of sugar in the blood

HYPO: under, beneath, less than
hypodermic: relating to the parts beneath the skin
hypochondriac: one affected by extreme depression of mind or spirits often centered on imaginary physical ailments
hypocritical: affecting virtues or qualities one does not have
hypothesis: assumption subject to proof

IDIO: one's own
idiot: an utterly stupid person
idiom: a language, dialect, or style of speaking particular to a people
idiosyncrasy: peculiarity of temperament; eccentricity

IM/IN/EM/EN: in, into
embrace: to clasp in the arms; to include or contain
enclose: to close in on all sides
intrinsic: belonging to a thing by its very nature
influx: the act of flowing in; inflow
implicit: not expressly stated; implied
incarnate: given a bodily, esp. a human, form
indigenous: native; innate, natural

IM/IN: not, without
inactive: not active
innocuous: not harmful or injurious
indolence: showing a disposition to avoid exertion; slothful
impartial: not partial or biased; just
indigent: deficient in what is requisite

INTER: between, among
interstate: connecting or jointly involving states
interim: a temporary or provisional arrangement; meantime
interloper: one who intrudes in the domain of others
intermittent: stopping or ceasing for a time
intersperse: to scatter here and there

JECT: to throw; to throw down
inject: to place (quality, etc.) where needed in something
dejected: sad, depressed
eject: to throw out, expel
conjecture: formation of opinion on incomplete information
abject: utterly hopeless, humiliating, or wretched

JOIN/JUNCT: to meet; to join
junction: the act of joining; combining
adjoin: to be next to and joined with
subjugate: to conquer
rejoinder: to reply, retort
junta: (usually military) clique taking power after a coup d'état

JUR: to swear
perjury: willful lying while on oath
abjure: to renounce on oath
adjure: to beg or command

LAV/LUT/LUV: to wash
lavatory: a room with equipment for washing hands and face
dilute: to make thinner or weaker by the addition of water
pollute: to make foul or unclean
deluge: a great flood of water
antediluvian: before the biblical flood; extremely old
ablution: act of cleansing

LECT/LEG: to select, to choose
collect: to gather together or assemble
elect: to choose; to decide
select: to choose with care
eclectic: selecting ideas, etc. from various sources
predilection: preference, liking

LEV: lift, light, rise
relieve: to mitigate; to free from a burden
alleviate: to make easier to endure, lessen
relevant: bearing on or pertinent to information at hand
levee: embankment against river flooding
levitate: to rise in the air or cause to rise
levity: humor, frivolity, gaiety

LOC/LOG/LOQU: word, speech
dialogue: conversation, esp. in a literary work
elocution: art of clear and expressive speaking
prologue: introduction to poem, play, etc.
eulogy: speech or writing in praise of someone
colloquial: of ordinary or familiar conversation
grandiloquent: pompous or inflated in language
loquacious: talkative

LUC/LUM/LUS: light
illustrate: to make intelligible with examples or analogies
illuminate: to supply or brighten with light
illustrious: highly distinguished
translucent: permitting light to pass through
lackluster: lacking brilliance or radiance
lucid: easily understood, intelligible
luminous: bright, brilliant, glowing

LUD/LUS: to play
allude: to refer casually or indirectly
illusion: something that deceives by producing a false impression of reality
ludicrous: ridiculous, laughable
delude: to mislead the mind or judgment of, deceive
elude: to avoid capture or escape defection by
prelude: a preliminary to an action, event, etc.

MAG/MAJ/MAX: big
magnify: to increase the apparent size of
magnitude: greatness of size, extent, or dimensions
maximum: the highest amount, value, or degree attained
magnate: a powerful or influential person
magnanimous: generous in forgiving an insult or injury
maxim: an expression of general truth or principle

MAL/MALE: bad, ill, evil, wrong
malfunction: failure to function properly
malicious: full of or showing malice
malign: to speak harmful untruths about, to slander
malady: a disorder or disease of the body
maladroit: clumsy, tactless
malapropism: humorous misuse of a word
malfeasance: misconduct or wrongdoing often committed by a public official
malediction: a curse

MAN: hand
manual: operated by hand
manufacture: to make by hand or machinery
emancipate: to free from bondage
manifest: readily perceived by the eye or the understanding
mandate: an authoritative order or command

MIN: small
minute: a unit of time equal to one-sixtieth of an hour, or sixty seconds
minutiae: small or trivial details
miniature: a copy or model that represents something in greatly reduced size
diminish: to lessen
diminution: the act or process of diminishing

MIN: to project, to hang over
eminent: towering above others; projecting
imminent: about to occur; impending
prominent: projecting outward
preeminent: superior to or notable above all others
minatory: menacing, threatening

MIS/MIT: to send
transmit: to send from one person, thing, or place to another
emissary: a messenger or agent sent to represent the interests of another
intermittent: stopping and starting at intervals
remit: to send money
remission: a lessening of intensity or degree

MISC: mixed
miscellaneous: made up of a variety of parts or ingredients
miscegenation: the interbreeding of races, esp. marriage between white and nonwhite persons
promiscuous: consisting of diverse and unrelated parts or individuals

MON/MONIT: to remind; to warn
monument: a structure, such as a building, tower, or sculpture, erected as a memorial
monitor: one that admonishes, cautions, or reminds
summon: to call together; convene
admonish: to counsel against something; caution
remonstrate: to say or plead in protect, objection, or reproof
premonition: forewarning, presentiment

MORPH: shape
amorphous: without definite form; lacking a specific shape
metamorphosis: a transformation, as by magic or sorcery
anthropomorphism: attribution of human characteristics to inanimate objects, animals, or natural phenomena

MORT: death
immortal: not subject to death
morbid: susceptible to preoccupation with unwholesome matters
moribund: dying, decaying

MUT: change
commute: to substitute; exchange; interchange
mutation: the process of being changed
transmutation: the act of changing from one form into another
permutation: a complete change; transformation
immutable: unchangeable, invariable

NAT/NAS/NAI: to be born
natural: present due to nature, not to artificial or man-made means
native: belonging to one by nature; inborn; innate
naive: lacking worldliness and sophistication; artless
cognate: related by blood; having a common ancestor
renaissance: rebirth, esp. referring to culture
nascent: starting to develop

NIC/NOC/NOX: harm
innocent: uncorrupted by evil, malice, or wrongdoing
noxious: injurious or harmful to health or morals
obnoxious: highly disagreeable or offensive
innocuous: having no adverse effect; harmless

NOM: rule, order
astronomy: the scientific study of the universe beyond the earth
economy: the careful or thrifty use of resources, as of income, materials, or labor
gastronomy: the art or science of good eating
taxonomy: the science, laws, or principles of classification
autonomy: independence, self-governance

NOM/NYM/NOUN/NOWN: name
synonym: a word having a meaning similar to that of another word of the same language
anonymous: having an unknown or unacknowledged name
nominal: existing in name only; negligible
nominate: to propose by name as a candidate
nomenclature: a system of names; systematic naming
acronym: a word formed from the initial letters of a name

NOUNC/NUNC: to announce
announce: to proclaim
pronounce: to articulate
renounce: to give up, especially by formal announcement

NOV/NEO/NOU: new

novice: a person new to any field or activity
renovate: to restore to an earlier condition
innovate: to begin or introduce something new
neologism: a newly coined word, phrase, or expression
neophyte: a recent convert
nouveau riche: one who has lately become rich

OB/OC/OF/OP: toward, to, against, over

obese: extremely fat, corpulent
obstinate: stubbornly adhering to an idea, inflexible
obstruct: to block or fill with obstacles
oblique: having a slanting or sloping direction
obstreperous: noisily defiant, unruly
obtuse: not sharp, pointed, or acute in any form
obfuscate: to render indistinct or dim; darken
obsequious: overly submissive

OMNI: all

omnibus: an anthology of the works of one author or of writings on related subjects
omnipresent: everywhere at one time
omnipotent: all powerful
omniscient: having infinite knowledge

PAC/PEAC: peace

appease: to bring peace to
pacify: to ease the anger or agitation of
pacifier: something or someone that eases the anger or agitation of
pact: a formal agreement, as between nations

PAN: all, everyone

panorama: an unobstructed and wide view of an extensive area
panegyric: formal or elaborate praise at an assembly
panoply: a wide-ranging and impressive array or display
pantheon: a public building containing tombs or memorials of the illustrious dead of a nation
pandemic: widespread, general, universal

PAR: equal

par: an equality in value or standing
parity: equally, as in amount, status, or character
apartheid: any system or caste that separates people according to race, etc.
disparage: to belittle, speak disrespectfully about
disparate: essentially different

PARA: next to, beside

parallel: extending in the same direction
parasite: an organism that lives on or within a plant or animal of another species, from which it obtains nutrients
parody: to imitate for purposes of satire
parable: a short, allegorical story designed to illustrate a moral lesson or religious principle
paragon: a model of excellence
paranoid: suffering from a baseless distrust of others

PAS/PAT/ PATH: feeling, suffering, disease

sympathy: harmony or agreement in feeling
empathy: the identification with the feelings or thoughts of others
compassion: a feeling of deep sympathy for someone struck by misfortune, accompanied by a desire to alleviate suffering
dispassionate: devoid of personal feeling or bias
impassive: showing or feeling no emotion
sociopath: a person whose behavior is antisocial and who lacks a sense of moral responsibility
pathogenic: causing disease

PAU/PO/POV/PU: few, little, poor

poverty: the condition of being poor
paucity: smallness of quantity; scarcity; scantiness
pauper: a person without any personal means of support
impoverish: to deplete
pusillanimous: lacking courage or resolution
puerile: childish, immature

PED: child, education

pedagogue: a teacher
pediatrician: a doctor who primarily has children as patients
pedant: one who displays learning ostentatiously
encyclopedia: book or set of books containing articles on various topics, covering all branches of knowledge or of one particular subject

PED/POD: foot

pedal: a foot-operated lever or part used to control
pedestrian: a person who travels on foot
expedite: to speed up the progress of
impede: to retard progress by means of obstacles or hindrances
podium: a small platform for an orchestra conductor, speaker, etc.

antipodes: places diametrically opposite each other on the globe

PEN/PUN: to pay; to compensate

penal: of or pertaining to punishment, as for crimes
penalty: a punishment imposed for a violation of law or rule
punitive: serving for, concerned with, or inflicting punishment
penance: a punishment undergone to express regret for a sin
penitent: contrite

PEND/PENS: to hang; to weight; to pay

depend: to rely; to place trust in
stipend: a periodic payment; fixed or regular pay
compensate: to counterbalance, offset
indispensable: absolutely necessary, essential, or requisite
appendix: supplementary material at the end of a text
appendage: a limb or other subsidiary part that diverges from the central structure

PER: completely

persistent: lasting or enduring tenaciously
perforate: to make a way through or into something
perplex: to cause to be puzzled or bewildered over what is not understood
peruse: to read with thoroughness or care
perfunctory: performed merely as routine duty
pertinacious: resolute
perspicacious: shrewd, astute

PERI: around

perimeter: the border or outer boundary of a two-dimensional figure
periscope: an optical instrument for seeing objects in an obstructed field of vision
peripatetic: walking or traveling about; itinerant

PET/PIT: to go; to seek; to strive

appetite: a desire for food or drink
compete: to strive to outdo another for acknowledgment
petition: a formally drawn request soliciting some benefit
centripetal: moving toward the center
impetuous: characterized by sudden or rash action or emotion
petulant: showing sudden irritation, esp. over some annoyance

PHIL: love

philosophy: the rational investigation of the truths and principles of being, knowledge, or conduct
philatelist: one who loves or collects postage stamps
philology: the study of literary texts to establish their authenticity and determine their meaning
bibliophile: one who loves or collects books

PLAC: to please

placid: pleasantly calm or peaceful
placebo: a substance with no pharmacological effect which acts to placate a patient who believes it to be a medicine
implacable: unable to be pleased
complacent: self-satisfied, unconcerned
complaisant: inclined or disposed to please

PLE: to fill

complete: having all parts or elements
deplete: to decrease seriously or exhaust the supply of
supplement: something added to supply a deficiency
implement: an instrument, tool, or utensil for accomplishing work
replete: abundantly supplied
plethora: excess, overabundance

PLEX/PLIC/PLY: to fold, twist, tangle, or bend

complex: composed of many interconnected parts
replica: any close copy or reproduction
implicit: not expressly stated, implied
implicate: to show to be involved, usually in an incriminating manner
duplicity: deceitfulness in speech or conduct, double-dealing
supplicate: to make humble and earnest entreaty

PON/POS/POUND: to put; to place

component: a constituent part, elemental ingredient
expose: to lay open to danger, attack, or harm
expound: to set forth in detail
juxtapose: to place close together or side by side, esp. for contract
repository: a receptacle or place where things are deposited

PORT: to carry

import: to bring in from a foreign country
export: to transmit abroad
portable: easily carried

deportment: conduct, behavior
disport: to divert or amuse oneself
importune: to urge or press with excessive persistence

POST: after
posthumous: after death
posterior: situated at the rear
posterity: succeeding in future generations collectively
post facto: after the fact

PRE: before
precarious: dependent on circumstances beyond one's control
precocious: unusually advanced or mature in mental development or talent
premonition: a feeling of anticipation over a future event
presentiment: foreboding
precedent: an act that serves as an example for subsequent situations
precept: a commandment given as a rule of action or conduct

PREHEND/PRISE: to take; to get; to seize
surprise: to strike with an unexpected feeling of wonder or astonishment
enterprise: a project undertaken
reprehensible: deserving rebuke or censure
comprise: to include or contain
reprisals: retaliation against an enemy
apprehend: to take into custody

PRO: much, for, a lot
prolific: highly fruitful
profuse: spending or giving freely
prodigal: wastefully or recklessly extravagant
prodigious: extraordinary in size, amount, or extent
proselytize: to convert or attempt to recruit
propound: to set forth for consideration
provident: having or showing foresight

PROB: to prove; to test
probe: to search or examine thoroughly
approbation: praise, consideration
opprobrium: the disgrace incurred by shameful conduct
reprobate: a depraved or wicked person
problematic: questionable
probity: honesty, high-mindedness

PUG: to fight
pugnacious: to quarrel or fight readily
impugn: to challenge as false
repugnant: objectionable or offensive
pugilist: a fighter or boxer

PUNC/PUNG/POIGN: to point; to prick
point: a sharp or tapering end
puncture: the act of piercing
pungent: caustic or sharply expressive
compunction: a feeling of uneasiness for doing wrong
punctilious: strict or exact in the observance of formalities
expunge: to erase, eliminate completely

QUE/QUIS: to seek
acquire: to come into possession of
exquisite: of special beauty or charm
conquest: vanquishment
inquisitive: given to research, eager for knowledge
query: a question, inquiry
querulous: full of complaints
perquisite: a gratuity, tip

QUI: quiet
quiet: making little or no sound
disquiet: lack of calm or peace
tranquil: free from commotion or tumult
acquiesce: to comply, give in
quiescence: the condition of being at rest, still, inactive

RID/RIS: to laugh
riddle: a conundrum
derision: the act of mockery
risible: causing laughter

ROG: to ask
interrogate: to ask questions of, esp. formally
arrogant: making claims to superior importance or rights
abrogate: to abolish by formal means
surrogate: a person appointed to act for another
derogatory: belittling, disparaging
arrogate: to claim unwarrantably or presumptuously

SACR/SANCT/SECR: sacred
sacred: devoted or dedicated to a deity or religious purpose
sacrifice: the offering of some living or inanimate thing to a deity in homage

sanctify: to make holy
sanction: authoritative permission or approval
execrable: abominable
sacrament: something regarded as possessing sacred character
sacrilege: the violation of anything sacred

SAL/SIL/SAULT/SULT: to leap, to jump
insult: to treat with contemptuous rudeness
assault: a sudden or violent attack
somersault: to roll the body end over end, making a complete revolution
salient: prominent or conspicuous
resilient: able to spring back to an original form after compression
insolent: boldly rude or disrespectful
exult: to show or feel triumphant joy
desultory: at random, unmethodical

SCI: to know
conscious: aware of one's own existence
conscience: the inner sense of what is right or wrong, impelling one toward right action
unconscionable: unscrupulous
omniscient: knowing everything
prescient: having knowledge of things before they happen

SCRIBE/SCRIP: to write
scribble: to write hastily or carelessly
describe: to tell or depict in words
script: handwriting
postscript: any addition or supplement
proscribe: to condemn as harmful or odious
ascribe: to credit or assign, as to a cause or course
conscription: draft
transcript: a written or typed copy
circumscribe: to draw a line around

SE: apart
select: to choose in preference to another
separate: to keep apart, divide
seduce: to lead astray
segregate: to separate or set apart from others
secede: to withdraw formally from an association
sequester: to remove or withdraw into solitude or retirement
sedition: incitement of discontent or rebellion against a government

SEC/SEQU: to follow
second: next after the first
prosecute: to seek to enforce by legal process
sequence: the following of one thing after another
obsequious: fawning
non sequitur: an inference or a conclusion that does not follow from the premises

SED/SESS/SID: to sit; to be still; to plan; to plot
preside: to exercise management or control
resident: a person who lives in a place
sediment: the matter that settles to the bottom of a liquid
dissident: disagreeing, as in opinion or attitude
residual: remaining, leftover
subsidiary: serving to assist or supplement
insidious: intended to entrap or beguile
assiduous: diligent, persistent, hardworking

SENS/SENT: to feel; to be aware
sense: any of the faculties by which humans and animals perceive stimuli originating outside the body
sensory: of or pertaining to the senses or sensation
sentiment: an attitude or feeling toward something
presentiment: a feeling that something is about to happen
dissent: to differ in opinion, esp. from the majority
resent: to feel or show displeasure
sentinel: a person or thing that stands watch
insensate: without feeling or sensitivity

SOL: to loosen; to free
dissolve: to make a solution of, as by mixing in a liquid
soluble: capable of being dissolved or liquefied
resolution: a formal expression of opinion or intention made
dissolution: the act or process of dissolving into parts or elements
dissolute: indifferent to moral restraints
absolution: forgiveness for wrongdoing

SPEC/SPIC/SPIT: to look; to see
perspective: one's mental view of facts, ideas, and their interrelationships
speculation: the contemplation or consideration of some subject
suspicious: inclined to suspect
spectrum: a broad range of related things that form a continuous series
retrospective: contemplative of past situations

circumspect: watchful and discreet, cautious
perspicacious: having keen mental perception and understanding
conspicuous: easily seen or noticed; readily observable
specious: deceptively attractive

STA/STI: to stand; to be in place
static: of bodies or forces at rest or in equilibrium
destitute: without means of subsistence
obstinate: stubbornly adhering to a purpose, opinion, or course of action
constitute: to make up
stasis: the state of equilibrium or inactivity caused by opposing equal forces
apostasy: renunciation of an object of one's previous loyalty

SUA: smooth
suave: smoothly agreeable or polite
persuade: to encourage; to convince
dissuade: to deter
assuage: to make less severe, ease, relieve

SUB/SUP: below
submissive: inclined or ready to submit
subsidiary: serving to assist or supplement
subliminal: existing or operating below the threshold of confidence
subtle: thin, tenuous, or rarefied
subterfuge: an artifice or expedient used to evade a rule
supposition: the act of assuming

SUPER/SUR: above
surpass: to go beyond in amount, extent, or degree
superlative: the highest kind or order
supersede: to replace in power, as by another person or thing
supercilious: arrogant, haughty, condescending
superfluous: extra, more than necessary
surmount: to get over or across, to prevail
surveillance: a watch kept over someone or something

TAC/TIC: to be silent
reticent: disposed to be silent or not to speak freely
tacit: unspoken understanding
taciturn: uncommunicative

TAIN/TEN/TENT/TIN: to hold
detain: to keep from proceeding
pertain: to have reference or relation
tenacious: holding fast
abstention: the act of refraining voluntarily
tenure: the holding or possessing of anything
tenable: capable of being held, maintained, or defended
sustenance: nourishment, means of livelihood
pertinacious: persistent, stubborn

TEND/TENS/TENT/TENU: to stretch; to thin
tension: the act of stretching or straining
tentative: of the nature of, or done as a trial, attempt
tendentious: having a predisposition towards a point of view
distend: to expand by stretching
attenuate: to weaken or reduce in force
extenuating: making less serious by offering excuses
contentious: quarrelsome, disagreeable, belligerent

THEO: god
atheist: one who does not believe in a deity or divine system
theocracy: a form of government in which a deity is recognized as the supreme ruler
theology: the study of divine things and the divine faith
apotheosis: glorification, glorified ideal

TRACT: to drag; to pull; to draw
tractor: a powerful vehicle used to pull farm machinery
attract: to draw either by physical force or by an appeal to emotions or senses
contract: a legally binding document
detract: to take away from, esp. a positive thing
abstract: to draw or pull away, remove
tractable: easily managed or controlled
protract: to prolong, draw out, extend

TRANS: across
transaction: the act of carrying on or conduct to a conclusion or settlement
transparent: easily seen through, recognized, or detected
transition: a change from one way of being to another
transgress: to violate a law, command, or moral code

transcendent: going beyond ordinary limits
intransigent: refusing to agree or compromise

US/UT: to use
abuse: to use wrongly or improperly
usage: a customary way of doing something
usurp: to seize and hold
utilitarian: efficient, functional, useful

VEN/VENT: to come or to move toward
convene: to assemble for some public purpose
venturesome: showing a disposition to undertake risks
intervene: to come between disputing factions, mediate
contravene: to come into conflict with
adventitious: accidental

VER: truth
verdict: any judgment or decision
veracious: habitually truthful
verity: truthfulness
verisimilitude: the appearance or semblance of truth
aver: to affirm, to declare to be true

VERD: green
verdant: green with vegetation; inexperienced
verdure: fresh, rich vegetation

VERS/VERT: to turn
controversy: a public dispute involving a matter of opinion
revert: to return to a former habit
diverse: of a different kind, form, character
aversion: dislike
introvert: a person concerned primarily with inner thoughts and feelings
extrovert: an outgoing person
inadvertent: unintentional
covert: hidden, clandestine
avert: to turn away from

VI: life
vivid: strikingly bright or intense
vicarious: performed, exercised, received, or suffered in place of another
viable: capable of living
vivacity: the quality of being lively, animated, spirited
joie de vivre: joy of life (French expression)
convivial: sociable

VID/VIS: to see
evident: plain or clear to the sight or understanding
video: the elements of television pertaining to the transmission or reception of the image
adviser: one who gives counsel
survey: to view in a general or comprehensive way
vista: a view or prospect

VIL: base, mean
vilify: to slander, to defame
revile: to criticize with harsh language
vile: loathsome, unpleasant

VOC/VOK: to call
vocabulary: the stock of words used by or known to a particular person or group
advocate: to support or urge by argument
equivocate: to use ambiguous or unclear expressions
vocation: a particular occupation
avocation: something one does in addition to a principle occupation
vociferous: crying out noisily
convoke: to call together
invoke: to call on a deity

VOL: to wish
voluntary: undertaken of one's own accord or by free choice
malevolent: characterized by or expressing bad will
benevolent: characterized by or expressing goodwill
volition: free choice, free will; act of choosing

VOR: to eat
voracious: having a great appetite
carnivorous: meat-eating
omnivorous: eating or absorbing everything

APPENDIX C

Top GRE Words in Context

The GRE tests the same kinds of words over and over again. Here you will find the most popular GRE words with their definitions in context to help you to remember them. If you see a word that's unfamiliar to you, take a moment to study the definition and, most importantly, reread the sentence with the word's definition in mind.

Remember: Learning vocabulary words in context is one of the best ways for your brain to retain the words' meanings. A broader vocabulary will serve you well on all four GRE Verbal question types and will also be extremely helpful in the Analytical Writing section.

ABATE: to reduce in amount, degree, or severity
As the hurricane's force ABATED, the winds dropped and the sea became calm.

ABSCOND: to leave secretly
The patron ABSCONDED from the restaurant without paying his bill by sneaking out the back door.

ABSTAIN: to choose not to do something
She ABSTAINED from choosing a mouthwatering dessert from the tray.

ABYSS: an extremely deep hole
The submarine dove into the ABYSS to chart the previously unseen depths.

ADULTERATE: to make impure
The chef made his ketchup last longer by ADULTERATING it with water.

ADVOCATE: to speak in favor of
The vegetarian ADVOCATED a diet containing no meat.

AESTHETIC: concerning the appreciation of beauty
Followers of the AESTHETIC Movement regarded the pursuit of beauty as the only true purpose of art.

AGGRANDIZE: to increase in power, influence, and reputation
The supervisor sought to AGGRANDIZE herself by claiming that the achievements of her staff were actually her own.

ALLEVIATE: to make more bearable
Taking aspirin helps to ALLEVIATE a headache.

AMALGAMATE: to combine; to mix together
Giant Industries AMALGAMATED with Mega Products to form Giant-Mega Products Incorporated.

AMBIGUOUS: doubtful or uncertain; able to be interpreted several ways
The directions she gave were so AMBIGUOUS that we disagreed on which way to turn.

AMELIORATE: to make better; to improve
The doctor was able to AMELIORATE the patient's suffering using painkillers.

ANACHRONISM: something out of place in time
The aged hippie used ANACHRONISTIC phrases like *groovy* and *far out* that had not been popular for years.

ANALOGOUS: similar or alike in some way; equivalent to
In the Newtonian construct for explaining the existence of God, the universe is ANALOGOUS to a mechanical timepiece, the creation of a divinely intelligent "clockmaker."

ANOMALY: deviation from what is normal
Albino animals may display too great an ANOMALY in their coloring to attract normally colored mates.

ANTAGONIZE: to annoy or provoke to anger
The child discovered that he could ANTAGONIZE the cat by pulling its tail.

ANTIPATHY: extreme dislike
The ANTIPATHY between the French and the English regularly erupted into open warfare.

APATHY: lack of interest or emotion
The APATHY of voters is so great that less than half the people who are eligible to vote actually bother to do so.

ARBITRATE: to judge a dispute between two opposing parties
Since the couple could not come to agreement, a judge was forced to ARBITRATE their divorce proceedings.

ARCHAIC: ancient, old-fashioned
Her ARCHAIC Commodore computer could not run the latest software.

ARDOR: intense and passionate feeling
Bishop's ARDOR for the landscape was evident when he passionately described the beauty of the scenic Hudson Valley.

ARTICULATE: able to speak clearly and expressively
She is such an ARTICULATE defender of labor that unions are among her strongest supporters.

ASSUAGE: to make something unpleasant less severe
Serena used aspirin to ASSUAGE her pounding headache.

ATTENUATE: to reduce in force or degree; to weaken
The Bill of Rights ATTENUATED the traditional power of governments to change laws at will.

AUDACIOUS: fearless and daring
Her AUDACIOUS nature allowed her to fulfill her dream of skydiving.

AUSTERE: severe or stern in appearance; undecorated
The lack of decoration makes military barracks seem AUSTERE to the civilian eye.

BANAL: predictable, clichéd, boring
He used BANAL phrases like *Have a nice day,* or *Another day, another dollar.*

BOLSTER: to support; to prop up
The presence of giant footprints BOLSTERED the argument that Sasquatch was in the area.

BOMBASTIC: pompous in speech and manner
The ranting of the radio talk-show host was mostly BOMBASTIC; his boasting and outrageous claims had no basis in fact.

CACOPHONY: harsh, jarring noise
The junior high orchestra created an almost unbearable CACOPHONY as they tried to tune their instruments.

CANDID: impartial and honest in speech
The observations of a child can be charming since they are CANDID and unpretentious.

CAPRICIOUS: changing one's mind quickly and often
Queen Elizabeth I was quite CAPRICIOUS; her courtiers could never be sure which of their number would catch her fancy.

CASTIGATE: to punish or criticize harshly
Many Americans are amazed at how harshly the authorities in Singapore CASTIGATE perpetrators of what would be considered minor crimes in the United States.

CATALYST: something that brings about a change in something else
The imposition of harsh taxes was the CATALYST that finally brought on the revolution.

CAUSTIC: biting in wit
Dorothy Parker gained her reputation for CAUSTIC wit from her cutting, yet clever, insults.

CHAOS: great disorder or confusion
In many religious traditions, God created an ordered universe from CHAOS.

CHAUVINIST: someone prejudiced in favor of a group to which he or she belongs
The attitude that men are inherently superior to women and therefore must be obeyed is common among male CHAUVINISTS.

CHICANERY: deception by means of craft or guile
Dishonest used car sales people often use CHICANERY to sell their beat-up old cars.

COGENT: convincing and well reasoned
Swayed by the COGENT argument of the defense, the jury had no choice but to acquit the defendant.

CONDONE: to overlook, pardon, or disregard
Some theorists believe that failing to prosecute minor crimes is the same as CONDONING an air of lawlessness.

CONVOLUTED: intricate and complicated
Although many people bought *A Brief History of Time,* few could follow its CONVOLUTED ideas and theories.

CORROBORATE: to provide supporting evidence
Fingerprints CORROBORATED the witness's testimony that he saw the defendant in the victim's apartment.

CREDULOUS: too trusting; gullible
Although some four-year-olds believe in the Easter Bunny, only the most CREDULOUS nine-year-olds also believe in him.

CRESCENDO: steadily increasing volume or force
The CRESCENDO of tension became unbearable as Evel Knievel prepared to jump his motorcycle over the school buses.

DECORUM: appropriateness of behavior or conduct; propriety
The countess complained that the vulgar peasants lacked the DECORUM appropriate for a visit to the palace.

DEFERENCE: respect, courtesy
The respectful young law clerk treated the Supreme Court justice with the utmost DEFERENCE.

DERIDE: to speak of or treat with contempt; to mock
The awkward child was often DERIDED by his "cooler" peers.

DESICCATE: to dry out thoroughly
After a few weeks of lying on the desert's baking sands, the cow's carcass became completely DESICCATED.

DESULTORY: jumping from one thing to another; disconnected
Diane had a DESULTORY academic record; she had changed majors 12 times in three years.

DIATRIBE: an abusive, condemnatory speech
The trucker bellowed a DIATRIBE at the driver who had cut him off.

DIFFIDENT: lacking self-confidence
Steve's DIFFIDENT manner during the job interview stemmed from his nervous nature and lack of experience in the field.

DILATE: to make larger; to expand
When you enter a darkened room, the pupils of your eyes DILATE to let in more light.

DILATORY: intended to delay
The congressman used DILATORY measures to delay the passage of the bill.

DILETTANTE: someone with an amateurish and superficial interest in a topic
Jerry's friends were such DILETTANTES that they seemed to have new jobs and hobbies every week.

DIRGE: a funeral hymn or mournful speech
Melville wrote the poem "A DIRGE for James McPherson" for the funeral of a Union general who was killed in 1864.

DISABUSE: to set right; to free from error
Galileo's observations DISABUSED scholars of the notion that the sun revolved around the earth.

DISCERN: to perceive; to recognize
It is easy to DISCERN the difference between butter and butter-flavored topping.

DISPARATE: fundamentally different; entirely unlike
Although the twins appear to be identical physically, their personalities are DISPARATE.

DISSEMBLE: to present a false appearance; to disguise one's real intentions or character
The villain could DISSEMBLE to the police no longer—he admitted the deed and tore up the floor to reveal the body of the old man.

DISSONANCE: a harsh and disagreeable combination, often of sounds
Cognitive DISSONANCE is the inner conflict produced when long-standing beliefs are contradicted by new evidence.

DOGMA: a firmly held opinion, often a religious belief
Linus's central DOGMA was that children who believed in the Great Pumpkin would be rewarded.

DOGMATIC: dictatorial in one's opinions
The dictator was DOGMATIC—he, and only he, was right.

DUPE: to deceive; a person who is easily deceived
Bugs Bunny was able to DUPE Elmer Fudd by dressing up as a lady rabbit.

ECLECTIC: selecting from or made up from a variety of sources
Budapest's architecture is an ECLECTIC mix of Eastern and Western styles.

EFFICACY: effectiveness
The EFFICACY of penicillin was unsurpassed when it was first introduced; the drug completely eliminated almost all bacterial infections for which it was administered.

ELEGY: a sorrowful poem or speech
Although Thomas Gray's "ELEGY Written in a Country Churchyard" is about death and loss, it urges its readers to endure this life and to trust in spirituality.

ELOQUENT: persuasive and moving, especially in speech
The Gettysburg Address is moving not only because of its lofty sentiments but also because of its ELOQUENT words.

EMULATE: to copy; to try to equal or excel
The graduate student sought to EMULATE his professor in every way, copying not only how she taught but also how she conducted herself outside of class.

ENERVATE: to reduce in strength
The guerrillas hoped that a series of surprise attacks would ENERVATE the regular army.

ENGENDER: to produce, cause, or bring about
His fear and hatred of clowns was ENGENDERED when he witnessed the death of his father at the hands of a clown.

ENIGMA: a puzzle; a mystery
Speaking in riddles and dressed in old robes, the artist gained a reputation as something of an ENIGMA

ENUMERATE: to count, list, or itemize
Moses returned from the mountain with tablets on which the commandments were ENUMERATED.

EPHEMERAL: lasting a short time
The lives of mayflies seem EPHEMERAL to us, since the flies' average life span is a matter of hours.

EQUIVOCATE: to use expressions of double meaning in order to mislead
When faced with criticism of her policies, the politician EQUIVOCATED and left all parties thinking she agreed with them.

ERRATIC: wandering and unpredictable
The plot seemed predictable until it suddenly took a series of ERRATIC turns that surprised the audience.

ERUDITE: learned, scholarly, bookish
The annual meeting of philosophy professors was a gathering of the most ERUDITE, well-published individuals in the field.

ESOTERIC: known or understood by only a few
Only a handful of experts are knowledgeable about the ESOTERIC world of particle physics.

ESTIMABLE: admirable
Most people consider it ESTIMABLE that Mother Teresa spent her life helping the poor of India.

EULOGY: speech in praise of someone
His best friend gave the EULOGY, outlining his many achievements and talents.

EUPHEMISM: use of an inoffensive word or phrase in place of a more distasteful one
The funeral director preferred to use the EUPHEMISM *sleeping* instead of the word *dead*.

EXACERBATE: to make worse
It is unwise to take aspirin to try to relieve heartburn; instead of providing relief, the drug will only EXACERBATE the problem.

EXCULPATE: to clear from blame; prove innocent
The adversarial legal system is intended to convict those who are guilty and to EXCULPATE those who are innocent.

EXIGENT: urgent; requiring immediate action
The patient was losing blood so rapidly that it was EXIGENT to stop the source of the bleeding.

EXONERATE: to clear of blame
The fugitive was EXONERATED when another criminal confessed to committing the crime.

EXPLICIT: clearly stated or shown; forthright in expression
The owners of the house left a list of EXPLICIT instructions detailing their house-sitter's duties, including a schedule for watering the house plants.

FANATICAL: acting excessively enthusiastic; filled with extreme, unquestioned devotion
The stormtroopers were FANATICAL in their devotion to the emperor, readily sacrificing their lives for him.

FAWN: to grovel
The understudy FAWNED over the director in hopes of being cast in the part on a permanent basis.

FERVID: intensely emotional; feverish
The fans of Maria Callas were unusually FERVID, doing anything to catch a glimpse of the great opera singer.

FLORID: excessively decorated or embellished
The palace had been decorated in a FLORID style; every surface had been carved and gilded.

FOMENT: to arouse or incite
The protesters tried to FOMENT feeling against the war through their speeches and demonstrations.

FRUGALITY: a tendency to be thrifty or cheap
Scrooge McDuck's FRUGALITY was so great that he accumulated enough wealth to fill a giant storehouse with money.

GARRULOUS: tending to talk a lot
The GARRULOUS parakeet distracted its owner with its continuous talking.

GREGARIOUS: outgoing, sociable
She was so GREGARIOUS that when she found herself alone, she felt quite sad.

GUILE: deceit or trickery
Since he was not fast enough to catch the roadrunner on foot, the coyote resorted to GUILE in an effort to trap his enemy.

GULLIBLE: easily deceived
The con man pretended to be a bank officer so as to fool GULLIBLE bank customers into giving him their account information.

HOMOGENOUS: of a similar kind
The class was fairly HOMOGENOUS, since almost all of the students were senior journalism majors.

ICONOCLAST: one who opposes established beliefs, customs, and institutions
His lack of regard for traditional beliefs soon established him as an ICONOCLAST.

IMPERTURBABLE: not capable of being disturbed
The counselor had so much experience dealing with distraught children that she seemed IMPERTURBABLE, even when faced with the wildest tantrums.

IMPERVIOUS: impossible to penetrate; incapable of being affected
A good raincoat will be IMPERVIOUS to moisture.

IMPETUOUS: quick to act without thinking
It is not good for an investment broker to be IMPETUOUS, since much thought should be given to all the possible options.

IMPLACABLE: unable to be calmed down or made peaceful
His rage at the betrayal was so great that he remained IMPLACABLE for weeks.

INCHOATE: not fully formed; disorganized
The ideas expressed in Nietzsche's mature work also appear in an INCHOATE form in his earliest writing.

INGENUOUS: showing innocence or childlike simplicity
She was so INGENUOUS that her friends feared that her innocence and trustfulness would be exploited when she visited the big city.

INIMICAL: hostile, unfriendly
Even though the children had grown up together, they were INIMICAL to each other at school.

INNOCUOUS: harmless
Some snakes are poisonous, but most species are INNOCUOUS and pose no danger to humans.

INSIPID: lacking interest or flavor
The critic claimed that the painting was INSIPID, containing no interesting qualities at all.

INTRANSIGENT: uncompromising; refusing to be reconciled
The professor was INTRANSIGENT on the deadline, insisting that everyone turn the assignment in at the same time.

INUNDATE: to overwhelm; to cover with water
The tidal wave INUNDATED Atlantis, which was lost beneath the water.

IRASCIBLE: easily made angry
Attila the Hun's IRASCIBLE and violent nature made all who dealt with him fear for their lives.

LACONIC: using few words
She was a LACONIC poet who built her reputation on using words as sparingly as possible.

LAMENT: to express sorrow; to grieve
The children continued to LAMENT the death of the goldfish weeks after its demise.

LAUD: to give praise; to glorify
Parades and fireworks were staged to LAUD the success of the rebels.

LAVISH: to give unsparingly (v.); extremely generous or extravagant (adj.)
She LAVISHED the puppy with so many treats that it soon became overweight and spoiled.

LETHARGIC: acting in an indifferent or slow, sluggish manner
The clerk was so LETHARGIC that, even when the store was slow, he always had a long line in front of him.

LOQUACIOUS: talkative
She was naturally LOQUACIOUS, which was a problem in situations in which listening was more important than talking.

LUCID: clear and easily understood
The explanations were written in a simple and LUCID manner so that students were immediately able to apply what they learned.

LUMINOUS: bright, brilliant, glowing
The park was bathed in LUMINOUS sunshine, which warmed the bodies and the souls of the visitors.

MALINGER: to evade responsibility by pretending to be ill
A common way to avoid the draft was by MALINGERING—pretending to be mentally or physically ill so as to avoid being taken by the Army.

MALLEABLE: capable of being shaped
Gold is the most MALLEABLE of precious metals; it can easily be formed into almost any shape.

METAPHOR: a figure of speech comparing two different things; a symbol
The METAPHOR "a sea of troubles" suggests a lot of troubles by comparing their number to the vastness of the sea.

METICULOUS: extremely careful about details
To find all the clues at the crime scene, the investigators METICULOUSLY examined every inch of the area.

MISANTHROPE: a person who dislikes others
The character Scrooge in *A Christmas Carol* is such a MISANTHROPE that even the sight of children singing makes him angry.

MITIGATE: to soften; to lessen
A judge may MITIGATE a sentence if she decides that a person committed a crime out of need.

MOLLIFY: to calm or make less severe
Their argument was so intense that is was difficult to believe any compromise would MOLLIFY them.

MONOTONY: lack of variation
The MONOTONY of the sound of the dripping faucet almost drove the research assistant crazy.

NAIVE: lacking sophistication or experience
Having never traveled before, the elementary school students were more NAIVE than their high school counterparts on the field trip.

OBDURATE: hardened in feeling; resistant to persuasion
The president was completely OBDURATE on the issue, and no amount of persuasion would change his mind.

OBSEQUIOUS: overly submissive and eager to please
The OBSEQUIOUS new associate made sure to compliment her supervisor's tie and agree with him on every issue.

OBSTINATE: stubborn, unyielding
The OBSTINATE child could not be made to eat any food that he disliked.

OBVIATE: to prevent; to make unnecessary
The river was shallow enough to wade across at many points, which OBVIATED the need for a bridge.

OCCLUDE: to stop up; to prevent the passage of
A shadow is thrown across the earth's surface during a solar eclipse, when the light from the sun is OCCLUDED by the moon.

ONEROUS: troublesome and oppressive; burdensome
The assignment was so extensive and difficult to manage that it proved ONEROUS to the team in charge of it.

OPAQUE: impossible to see through; preventing the passage of light
The heavy buildup of dirt and grime on the windows almost made them OPAQUE.

OPPROBRIUM: public disgrace
After the scheme to embezzle the elderly was made public, the treasurer resigned in utter OPPROBRIUM.

OSTENTATION: excessive showiness
The OSTENTATION of the Sun King's court is evident in the lavish decoration and luxuriousness of his palace at Versailles.

PARADOX: a contradiction or dilemma
It is a PARADOX that those most in need of medical attention are often those least able to obtain it.

PARAGON: model of excellence or perfection
She is the PARAGON of what a judge should be honest, intelligent, hardworking, and just.

PEDANT: someone who shows off learning
The graduate instructor's tedious and excessive commentary on the subject soon gained her a reputation as a PEDANT.

PERFIDIOUS: willing to betray one's trust
The actress's PERFIDIOUS companion revealed all of her intimate secrets to the gossip columnist.

PERFUNCTORY: done in a routine way; indifferent
The machinelike bank teller processed the transaction and gave the waiting customer a PERFUNCTORY smile.

PERMEATE: to penetrate
This miraculous new cleaning fluid is able to PERMEATE stains and dissolve them in minutes!

PHILANTHROPY: charity; a desire or effort to promote goodness
New York's Metropolitan Museum of Art owes much of its collection to the PHILANTHROPY of private collectors who willed their estates to the museum.

PLACATE: to soothe or pacify
The burglar tried to PLACATE the snarling dog by saying "Nice doggy," and offering it a treat.

PLASTIC: able to be molded, altered, or bent
The new material was very PLASTIC and could be formed into products of vastly different shapes.

PLETHORA: excess
Assuming that more was better, the defendant offered the judge a PLETHORA of excuses.

PRAGMATIC: practical as opposed to idealistic
While daydreaming gamblers think they can get rich by frequenting casinos, PRAGMATIC gamblers realize that the odds are heavily stacked against them.

PRECIPITATE: to throw violently or bring about abruptly; lacking deliberation
Upon learning that the couple married after knowing each other only two months, friends and family members expected such a PRECIPITATE marriage to end in divorce.

PREVARICATE: to lie or deviate from the truth
Rather than admit that he had overslept again, the employee PREVARICATED and claimed that heavy traffic had prevented him from arriving at work on time.

PRISTINE: fresh and clean; uncorrupted
Since concerted measures had been taken to prevent looting, the archeological site was still PRISTINE when researchers arrived.

PRODIGAL: lavish, wasteful
The PRODIGAL son quickly wasted all of his inheritance on a lavish lifestyle devoted to pleasure.

PROLIFERATE: to increase in number quickly
Although she only kept two guinea pigs initially, they PROLIFERATED to such an extent that she soon had dozens.

PROPITIATE: to conciliate; to appease
The management PROPITIATED the irate union by agreeing to raise wages for its members.

PROPRIETY: correct behavior; obedience to rules and customs
The aristocracy maintained a high level of PROPRIETY, adhering to even the most minor social rules.

PRUDENCE: wisdom, caution, or restraint
The college student exhibited PRUDENCE by obtaining practical experience along with her studies, which greatly strengthened her résumé.

PUNGENT: sharp and irritating to the senses
The smoke from the burning tires was extremely PUNGENT.

QUIESCENT: motionless
Many animals are QUIESCENT over the winter months, minimizing activity in order to conserve energy.

RAREFY: to make thinner or sparser
Since the atmosphere RAREFIES as altitudes increase, the air at the top of very tall mountains is too thin to breathe.

REPUDIATE: to reject the validity of
The old woman's claim that she was Russian royalty was REPUDIATED when DNA tests showed she was of no relation to them.

RETICENT: silent, reserved
Physically small and RETICENT in her speech, Joan Didion often went unnoticed by those upon whom she was reporting.

RHETORIC: effective writing or speaking
Lincoln's talent for RHETORIC was evident in his beautifully expressed Gettysburg Address.

SATIATE: to satisfy fully or overindulge
His desire for power was so great that nothing less than complete control of the country could SATIATE it.

SOPORIFIC: causing sleep or lethargy
The movie proved to be so SOPORIFIC that soon loud snores were heard throughout the theater.

SPECIOUS: deceptively attractive; seemingly plausible but fallacious
The student's SPECIOUS excuse for being late sounded legitimate but was proved otherwise when her teacher called her home.

STIGMA: a mark of shame or discredit
In *The Scarlet Letter*, Hester Prynne was required to wear the letter *A* on her clothes as a public STIGMA for her adultery.

STOLID: unemotional; lacking sensitivity
The prisoner appeared STOLID and unaffected by the judge's harsh sentence.

SUBLIME: lofty or grand
The music was so SUBLIME that it transformed the rude surroundings into a special place.

TACIT: done without using words
Although not a word had been said, everyone in the room knew that a TACIT agreement had been made about which course of action to take.

TACITURN: silent, not talkative
The clerk's TACITURN nature earned him the nickname "Silent Bob."

TIRADE: long, harsh speech or verbal attack
Observers were shocked at the manager's TIRADE over such a minor mistake.

TORPOR: extreme mental and physical sluggishness
After surgery, the patient experienced TORPOR until the anesthesia wore off.

TRANSITORY: temporary, lasting a brief time
The reporter lived a TRANSITORY life, staying in one place only long enough to cover the current story.

VACILLATE: to sway physically; to be indecisive
The customer held up the line as he VACILLATED between ordering chocolate chip or rocky road ice cream.

VENERATE: to respect deeply
In a traditional Confucian society, the young VENERATE their elders, deferring to the elders' wisdom and experience.

VERACITY: filled with truth and accuracy
She had a reputation for VERACITY, so everyone trusted her description of events.

VERBOSE: wordy
The professor's answer was so VERBOSE that his student forgot what the original question had been.

VEX: to annoy
The old man who loved his peace and quiet was VEXED by his neighbor's loud music

VOLATILE: easily aroused or changeable; lively or explosive
His VOLATILE personality made it difficult to predict his reaction to anything.

WAVER: to fluctuate between choices
If you WAVER too long before making a decision about which testing site to register for, you may not get your first choice.

WHIMSICAL: acting in a fanciful or capricious manner; unpredictable
The ballet was WHIMSICAL, delighting the children with its imaginative characters and unpredictable sets.

ZEAL: passion, excitement
She brought her typical ZEAL to the project, sparking enthusiasm in the other team members.

COMMONLY CONFUSED WORDS

Already—by this or that time, previously
He already completed his work.

All ready—completely prepared
The students were all ready to take their exam.

Altogether—entirely, completely
I am altogether certain that I turned in my homework.

All together—in the same place
She kept the figurines all together on her mantle.

Capital—a city containing the seat of government, the wealth or funds owned by a business or individual, resources
Atlanta is the capital of Georgia.
The company's capital gains have diminished in recent years.

Capitol—the building in which a legislative body meets
Our trip included a visit to the Capitol building in Washington, D.C.

Coarse—rough, not smooth; lacking refinement
The truck's large wheels enabled it to navigate the coarse, rough terrain.
His coarse language prevented him from getting hired for the job.

Course—path, series of classes or studies
James's favorite course is biology.
The doctor suggested that Amy rest and let the disease run its course.

Here—in this location
George Washington used to live here.

Hear—to listen to or to perceive by the ear
Did you hear the question?

Its—a personal pronoun that shows possession
Please put the book back in its place.

It's—the contraction of it is or it has
It's snowing outside.
It's been too long.

Lead—to act as a leader, to go first, or to take a superior position
The guide will lead us through the forest.

Led—past tense of lead
The guide led us through the forest.

Lead—a metal
It is dangerous to inhale fumes from paint containing lead.

Loose—free, to set free, not tight
She always wears loose clothing when she does yoga.

Lose—to become without
Use a bookmark so you don't lose your place in your book.

Passed—the past tense of pass, an euphemism for someone dying
We passed by her house on Sunday.

Past—that which has gone by or elapsed in time
In the past, Abby never used to study.
We drove past her house.

Principal—the head of a school, main or important
The quarterback's injury is the principal reason the team lost.
The principal of the school meets with parents regularly.

Principle—a fundamental law or truth
The laws of motion are among the most important principles in physics.

Stationary—fixed, not moving
Thomas rode a stationary bicycle at the gym.

Stationery—paper used for letter writing
The principal's stationery has the school's logo on the top.

Their—possessive of they
Paul and Ben studied for their test together.

There—a place, in that matter or respect
There are several question types on the GRE.
Please hang up your jacket over there.

They're—contraction of they are
Be careful of the bushes as they're filled with thorns.

APPENDIX D

Math Reference

The math on the GRE covers a lot of ground—from number properties and arithmetic to basic algebra and symbol problems to geometry and statistics. Don't let yourself be intimidated.

We've highlighted the 100 most important concepts that you need to know and divided them into three levels. The GRE Quantitative sections test your understanding of a relatively limited number of mathematical concepts, all of which you will be able to master.

Level 1 consists of foundational math topics. Though these topics may seem basic, review this list so that you are aware that these skills may play a part in the questions you will answer on the GRE. Look over the Level 1 list to make sure you're comfortable with the basics.

Level 2 is where most people start their review of math. Level 2 skills and formulas come into play quite frequently on the GRE. If the skills needed to handle Level 1 or 2 topics are keeping you from feeling up to the tasks expected on the GRE Quantitative section, you might consider taking the Kaplan GRE Math Refresher course.

Level 3 represents the most challenging math concepts you'll find on the GRE. Don't spend a lot of time on Level 3 if you still have gaps in Level 2, but once you've mastered Level 2, tackling Level 3 can put you over the top.

LEVEL 1

1. How to add, subtract, multiply, and divide WHOLE NUMBERS

You can check addition with subtraction.

$17 + 5 = 22$ $\qquad$ $22 - 5 = 17$

You can check multiplication with division.

$5 \times 28 = 140$ $\qquad$ $140 \div 5 = 28$

2. How to add, subtract, multiply, and divide FRACTIONS

Find a common denominator before adding or subtracting fractions.

$$\frac{4}{5} + \frac{3}{10} = \frac{8}{10} + \frac{3}{10} = \frac{11}{10} \text{ or } 1\frac{1}{10}$$

$$2 - \frac{3}{8} = \frac{16}{8} - \frac{3}{8} = \frac{13}{8} \text{ or } 1\frac{5}{8}$$

To multiply fractions, multiply the numerators first and then multiply the denominators. Simplify if necessary.

$$\frac{3}{4} \times \frac{1}{6} = \frac{3}{24} = \frac{1}{8}$$

You can also reduce before multiplying numerators and denominators. This keeps the products small.

$$\frac{5}{8} \times \frac{2}{15} = \frac{\cancel{5}^{1}}{\cancel{8}_{4}} \times \frac{\cancel{2}}{\cancel{15}} = \frac{1}{12}$$

To divide by a fraction, multiply by its reciprocal. To write the reciprocal of a fraction, flip the numerator and the denominator.

$$5 \div \frac{1}{3} = \frac{5}{1} \times \frac{3}{1} = 15 \qquad \frac{1}{3} \div \frac{4}{5} = \frac{1}{3} \times \frac{5}{4} = \frac{5}{12}$$

3. How to add, subtract, multiply, and divide DECIMALS

To add or subtract, align the decimal points and then add or subtract normally. Place the decimal point in the answer directly below existing decimal points.

$$\begin{array}{r} 3.25 \\ +\ 4.4 \\ \hline 7.65 \end{array} \qquad \begin{array}{r} 7.65 \\ -\ 4.4 \\ \hline 3.25 \end{array}$$

To multiply with decimals, multiply the digits normally and count off decimal places (equal to the total number of places in the factors) from the right.

$$2.5 \times 2.5 = 6.25$$
$$0.06 \times 2{,}000 = 120.00 = 120$$

To divide by a decimal, move the decimal point in the divisor to the right to form a whole number; move the decimal point in the dividend the same number of places. Divide as though there were no decimals, then place the decimal point in the quotient.

$$6.25 \div 2.5$$
$$= 62.5 \div 25 = 2.5$$

4. How to convert FRACTIONS TO DECIMALS and DECIMALS TO FRACTIONS

To convert a fraction to a decimal, divide the numerator by the denominator.

$\frac{4}{5} = 0.8$ $\qquad$ $\frac{4}{50} = 0.08$ $\qquad$ $\frac{4}{500} = 0.008$

To convert a decimal to a fraction, write the digits in the numerator and use the decimal name in the denominator.

$0.003 = \frac{3}{1{,}000}$ $\quad$ $0.03 = \frac{3}{100}$ $\quad$ $0.3 = \frac{3}{10}$

5. How to add, subtract, multiply, and divide POSITIVE AND NEGATIVE NUMBERS

When addends (the numbers being added) have the same sign, add their absolute values; the sum has the same sign as the addends. But when addends have different signs, subtract the absolute values; the sum has the sign of the greater absolute value.

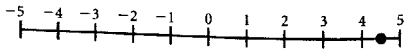
$3 + 9 = 12$, but $-3 + (-9) = -12$
$3 + (-9) = -6$, but $-3 + 9 = 6$

In multiplication and division, when the signs are the same, the product/quotient is positive. When the signs are different, the product/quotient is negative.

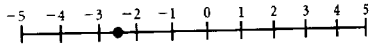
$6 \times 7 = 42$ and $-6 \times (-7) = 42$
$-6 \times 7 = -42$ and $6 \times (-7) = -42$
$96 \div 8 = 12$ and $-96 \div (-8) = 12$
$-96 \div 8 = -12$ and $96 \div (-8) = -12$

6. How to plot points on the NUMBER LINE

To plot the point 4.5 on the number line, start at 0, go right to 4.5, halfway between 4 and 5.



To plot the point −2.5 on the number line, start at 0, go left to −2.5, halfway between −2 and −3.



7. How to plug a number into an ALGEBRAIC EXPRESSION

To evaluate an algebraic expression, choose numbers for the variables or use the numbers assigned to the variables.

Evaluate $4np + 1$ when $n = -4$ and $p = 3$.

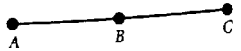
$4np + 1 = 4(-4)(3) + 1 = -48 + 1 = -47$

8. How to SOLVE a simple LINEAR EQUATION

Use algebra to isolate the variable. Do the same steps to both sides of the equation.

$28 = -3x - 5$
$28 + 5 = -3x - 5 + 5$ $\quad$ Add 5.
$33 = -3x$
$\frac{33}{-3} = \frac{-3x}{-3}$ $\quad$ Divide by −3.
$-11 = x$

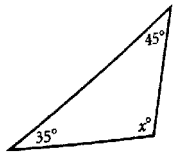
9. How to add and subtract LINE SEGMENTS



If $AB = 6$ and $BC = 8$, then $AC = 6 + 8 = 14$.
If $AC = 14$ and $BC = 8$, then $AB = 14 - 8 = 6$.

10. How to find the THIRD ANGLE of a TRIANGLE, given the other two angles

Use the fact that the sum of the measures of the interior angles of a triangle always sum to 180°



$35 + 45 + x = 180$
$80 + x = 180$
$x = 100$

LEVEL 2

11. How to use PEMDAS

When you're given a complex arithmetic expression, it's important to know the order of operations. Just remember PEMDAS (as in "Please excuse my dear Aunt Sally"). What PEMDAS means is this: Clean up **Parentheses** first (nested sets of parentheses are worked from the innermost set to the outermost set.); then deal with **Exponents** (or **Radicals**); then do the **Multiplication** and **Division** together, going from left to right; and finally do the **Addition** and **Subtraction** together, again going from left to right.

Example:

$$9 - 2 \times (5 - 3)^2 + 6 \div 3 =$$

Begin with the parentheses:

$$9 - 2 \times (2)^2 + 6 \div 3 =$$

Then do the exponent:

$$9 - 2 \times 4 + 6 \div 3 =$$

Now do multiplication and division from left to right:

$$9 - 8 + 2 =$$

Finally, do addition and subtraction from left to right:

$$1 + 2 = 3$$

12. How to use the PERCENT FORMULA

Identify the part, the percent, and the whole.

$$Part = Percent \times Whole$$

Find the part.

Example:

What is 12 percent of 25?

Setup:

$$\text{Part} = \frac{12}{100} \times 25 = \frac{300}{100} = 3$$

Find the percent.

Example:

45 is what percent of 9?

Setup:

$$45 = \frac{\text{percent}}{100} \times 9$$

$$\frac{45}{9} \times 100\% = 500\%$$

Find the whole.

Example:

15 is $\frac{3}{5}$ percent of what number?

Setup:

$$15 = \frac{3}{5}\left(\frac{1}{100}\right) \times \text{Whole}$$

$$15 = \frac{3}{500} \times \text{Whole}$$

$$\text{Whole} = 15\left(\frac{500}{3}\right) = \frac{7{,}500}{3} = 2{,}500$$

13. How to use the PERCENT INCREASE/ DECREASE FORMULAS

Identify the original whole and the amount of increase/decrease.

$$\textit{Percent increase} = \frac{\textit{Amount of increase}}{\textit{Original whole}} \times 100\%$$

$$\textit{Percent decrease} = \frac{\textit{Amount of decrease}}{\textit{Original whole}} \times 100\%$$

Example:

The price goes up from \$80 to \$100. What is the percent increase?

Setup:

$$\text{Percent increase} = \frac{20}{80} \times 100\%$$
$$= 0.25 \times 100\% = 25\%$$

14. How to predict whether a sum, difference, or product will be ODD or EVEN

Don't bother memorizing the rules. Just take simple numbers like 2 for even numbers and 3 for odd numbers and see what happens.

Example:

If m is even and n is odd, is the product mn odd or even?

Setup:

Say $m = 2$ and $n = 3$.
2×3 is even, so mn is even.

15. How to recognize MULTIPLES OF 2, 3, 4, 5, 6, 9, 10, and 12

2: Last digit is even
3: Sum of digits is a multiple of 3
4: Last two digits are a multiple of 4
5: Last digit is 5 or 0
6: Sum of digits is a multiple of 3, and last digit is even
9: Sum of digits is a multiple of 9
10: Last digit is 0
12: Sum of digits is a multiple of 3, and last two digits are a multiple of 4

16. How to find a COMMON FACTOR of two numbers

Break both numbers down to their prime factors to see which they have in common. Then multiply the shared prime factors to find all common factors.

Example:

What factors greater than 1 do 135 and 225 have in common?

Setup:

First find the prime factors of 135 and 225; $135 = 3 \times 3 \times 3 \times 5$, and $225 = 3 \times 3 \times 5 \times 5$. The numbers share $3 \times 3 \times 5$ in common. Thus, aside from 3 and 5, the remaining common factors can be found by multiplying 3, 3, and 5 in every possible combination: $3 \times 3 = 9$, $3 \times 5 = 15$, and $3 \times 3 \times 5 = 45$. To summarize, the common factors of 135 and 225 are 3, 5, 9, 15, and 45.

17. How to find a COMMON MULTIPLE of two numbers

The product of two numbers is the easiest common multiple to find, but it is not always the least common multiple.

Example:

What is the least common multiple of 28 and 42?

Setup:

$$28 = 2 \times 2 \times 7$$
$$42 = 2 \times 3 \times 7$$

The LCM can be found by finding the prime factorization of each number, then seeing the greatest number of times each factor is used. Multiply each prime factor the greatest number of times it appears.

In 28, 2 is used twice. In 42, 2 is used once. In 28, 7 is used once. In 42, 7 is used once, and 3 is used once.

So you multiply each factor the greatest number of times it appears in a prime factorization:

$$\text{LCM} = 2 \times 2 \times 3 \times 7 = 84$$

18. How to find the AVERAGE or ARITHMETIC MEAN

$$\textit{Average} = \frac{\textit{Sum of terms}}{\textit{Number of terms}}$$

Example:

What is the average of 3, 4, and 8?

Setup:

$$\text{Average} = \frac{3 + 4 + 8}{3} = \frac{15}{3} = 5$$

19. How to use the AVERAGE to find the SUM

$$\textit{Sum} = (\textit{Average}) \times (\textit{Number of terms})$$

Example:

17.5 is the average (arithmetic mean) of 24 numbers.

What is the sum of the 24 numbers?

Setup:

$$\text{Sum} = 17.5 \times 24 = 420$$

20. How to find the AVERAGE of CONSECUTIVE NUMBERS

The average of evenly spaced numbers is simply the average of the smallest number and the largest number. The average of all the integers from 13 to 77, for example, is the same as the average of 13 and 77:

$$\frac{13 + 77}{2} = \frac{90}{2} = 45$$

21. How to COUNT CONSECUTIVE NUMBERS

The number of integers from A to B inclusive is $B - A + 1$.

Example:

How many integers are there from 73 through 419, inclusive?

Setup:

$$419 - 73 + 1 = 347$$

22. How to find the SUM OF CONSECUTIVE NUMBERS

$$\textit{Sum} = (\textit{Average}) \times (\textit{Number of terms})$$

Example:

What is the sum of the integers from 10 through 50, inclusive?

Setup:

Average = (10 + 50) ÷ 2 = 30
Number of terms = 50 − 10 + 1 = 41
Sum = 30 × 41 = 1,230

23. How to find the MEDIAN

Put the numbers in numerical order and take the middle number.

Example:

What is the median of 88, 86, 57, 94, and 73?

Setup:

First, put the numbers in numerical order, then take the middle number:

57, 73, 86, 88, 94

The median is 86.

In a set with an even number of numbers, take the average of the two in the middle.

Example:

What is the median of 88, 86, 57, 73, 94, and 100?

Setup:

First, put the numbers in numerical order.

57, 73, 86, 88, 94, 100

Because 86 and 88 are the two numbers in the middle:

(86 + 88) ÷ 2 = 174 ÷ 2 = 87 is the median.

24. How to find the MODE

Take the number that appears most often. For example, if your test scores were 88, 57, 68, 85, 98, 93, 93, 84, and 81, the mode of the scores would be 93 because it appears more often than any other score. (If there's a tie for most often, then there's more than one mode. If there is only one of each number in a set, there is no mode.)

25. How to find the RANGE

Take the positive difference between the greatest and least values. Using the example under "How to find the MODE" above, if your test scores were 88, 57, 68, 85, 98, 93, 93, 84, and 81, the range of the scores would be 41, the greatest value minus the least value (98 − 57 = 41).

26. How to use actual numbers to determine a RATIO

To find a ratio, put the number associated with *of* on the top and the word associated with *to* on the bottom.

$$Ratio = \frac{of}{to}$$

The ratio of 20 oranges to 12 apples is $\frac{20}{12}$, or $\frac{5}{3}$. Ratios should always be reduced to lowest terms.

27. How to use a ratio to determine an ACTUAL NUMBER

Set up a proportion using the given ratio.

Example:

The ratio of boys to girls is 3 to 4. If there are 135 boys, how many girls are there?

Setup:

$$\frac{3}{4} = \frac{135}{g}$$
$$3 \times g = 4 \times 135$$
$$3g = 540$$
$$g = 180$$

28. How to use actual numbers to determine a RATE

Identify the quantities and the units to be compared. Keep the units straight.

Example:

Anders typed 9,450 words in $3\frac{1}{2}$ hours. What was his rate in words per minute?

Setup:

First convert $3\frac{1}{2}$ hours to 210 minutes. Then set up the rate with words on top and minutes on bottom (because "per" means "divided by"):

$$\frac{9{,}450 \text{ words}}{210 \text{ minutes}} = 45 \text{ words per minute}$$

29. How to deal with TABLES, GRAPHS, AND CHARTS

Read the question and all labels carefully. Ignore extraneous information and zero in on what the question asks for. Take advantage of the spread in the answer choices by approximating the answer whenever possible and choosing the answer choice closest to your approximation.

30. How to count the NUMBER OF POSSIBILITIES

You can use multiplication to find the number of possibilities when items can be arranged in various ways.

Example:

How many three-digit numbers can be formed with the digits 1, 3, and 5 each used only once?

Setup:

Look at each digit individually. The first digit (or, the hundreds digit) has three possible numbers to plug in: 1, 3, or 5. The second digit (or, the tens digit) has two possible numbers, since one has already been plugged in. The last digit (or, the ones digit) has only one remaining possible number. Multiply the possibilities together: $3 \times 2 \times 1 = 6$.

31. How to calculate a simple PROBABILITY

$$Probability = \frac{Number\ of\ favorable\ outcomes}{Total\ number\ of\ possible\ outcomes}$$

Example:

What is the probability of throwing a 5 on a fair six-sided die?

Setup:

There is one favorable outcome—throwing a 5. There are 6 possible outcomes—one for each side of the die.

$$\text{Probability} = \frac{1}{6}$$

32. How to work with new SYMBOLS

If you see a symbol you've never seen before, don't be alarmed. It's just a made-up symbol whose operation is defined by the problem. Everything you need to know is in the question stem. Just follow the instructions.

33. How to SIMPLIFY BINOMIALS

A binomial is a sum or difference of two terms. To simplify two binomials that are multiplied together use the FOIL method. Multiply the First terms, then the Outer terms, followed by the Inner terms and the Last terms. Lastly, combine like terms.

Example:

$$(3x + 5)(x - 1) =$$
$$3x^2 - 3x + 5x - 5 =$$
$$3x^2 + 2x - 5$$

34. How to FACTOR certain POLYNOMIALS

A polynomial is an expression consisting of the sum of two or more terms, where at least one of the terms is a variable.

Learn to spot these classic equations.

$$ab + ac = a(b + c)$$
$$a^2 + 2ab + b^2 = (a + b)^2$$
$$a^2 - 2ab + b^2 = (a - b)^2$$
$$a^2 - b^2 = (a - b)(a + b)$$

35. How to solve for one variable IN TERMS OF ANOTHER

To find x "in terms of" y, isolate x on one side, leaving y as the only variable on the other.

36. How to solve an INEQUALITY

Treat it much like an equation—adding, subtracting, multiplying, and dividing both sides by the same thing. Just remember to reverse the inequality sign if you multiply or divide by a negative quantity.

Example:

Rewrite $7 - 3x > 2$ in its simplest form.

Setup:

$$7 - 3x > 2$$

First, subtract 7 from both sides:

$$7 - 3x - 7 > 2 - 7$$

So $-3x > -5$.

Now divide both sides by -3, and remember to reverse the inequality sign:

$$x < \frac{5}{3}$$

37. How to handle ABSOLUTE VALUES

The *absolute value* of a number n, denoted by $|n|$, is defined as n if $n \geq 0$ and $-n$ if $n < 0$. The absolute value of a number is the distance from zero to the number on the number line. The absolute value of a number or expression is always positive.

$$|-5| = 5$$

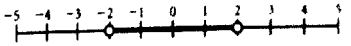
If $|x| = 3$, then x could be 3 or -3.

Example:

If $|x - 3| < 2$, what is the range of possible values for x?

Setup:

Represent the possible range for $x - 3$ on a number line.



$|x - 3| < 2$, so $(x - 3) < 2$ and $(x - 3) > -2$
$x - 3 < 2$ and $x - 3 > -2$
$x < 2 + 3$ and $x > -2 + 3$
$x < 5$ and $x > 1$
So $1 < x < 5$.

38. How to TRANSLATE ENGLISH INTO ALGEBRA

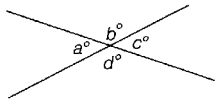
Look for the key words and systematically turn phrases into algebraic expressions and sentences into equations.

Here's a table of key words that you may have to translate into mathematical terms:

Operation	Key Words
Addition	sum, plus, and, added to, more than, increased by, combined with, exceeds, total, greater than
Subtraction	difference between, minus, subtracted from, decreased by, diminished by, less than, reduced by
Multiplication	of, product, times, multiplied by, twice, double, triple, half
Division	quotient, divided by, per, out of, ratio of ___ to ___
Equals	equals, is, was, will be, the result is, adds up to, costs, is the same as

39. How to find an ANGLE formed by INTERSECTING LINES

Vertical angles are equal. Angles along a line add up to 180°.

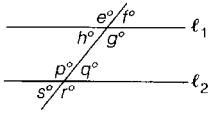


$a = c$
$b = d$
$a + b = 180°$
$a + b + c + d = 360°$

40. How to find an angle formed by a TRANSVERSAL across PARALLEL LINES

All the acute angles are equal. All the obtuse angles are equal. An acute plus an obtuse equals 180°.

Example:



ℓ_1 is parallel to ℓ_2

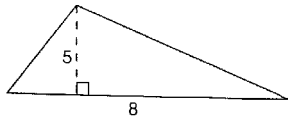
$e = g = p = r$
$f = h = q = s$
$e + q = g + s = 180°$

41. How to find the AREA of a TRIANGLE

$$Area = \frac{1}{2}(base)(height)$$

Base and height must be perpendicular to each other. Height is measured by drawing a perpendicular line segment from the base—which can be any side of the triangle—to the angle opposite the base.

Example:

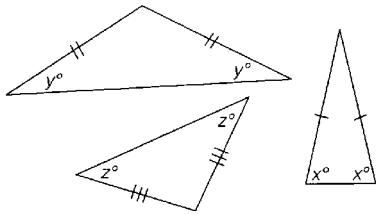


Setup:

$$Area = \frac{1}{2}(8)(5) = 20$$

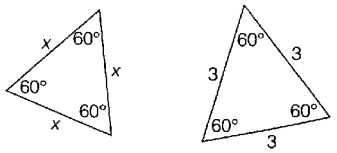
42. How to work with ISOSCELES TRIANGLES

Isosceles triangles have two equal sides and two equal angles. If a GRE question tells you that a triangle is isosceles, you can bet that you'll need to use that information to find the length of a side or a measure of an angle.



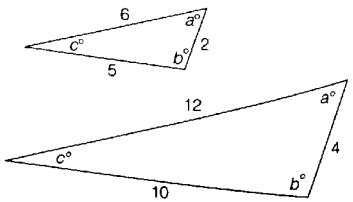
43. How to work with EQUILATERAL TRIANGLES

Equilateral triangles have three equal sides and three 60° angles. If a GRE question tells you that a triangle is equilateral, you can bet that you'll need to use that information to find the length of a side or a measure of an angle.



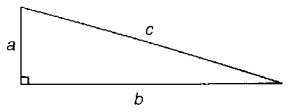
44. How to work with SIMILAR TRIANGLES

In similar triangles, corresponding angles are equal, and corresponding sides are proportional. If a GRE question tells you that triangles are similar, use the properties of similar triangles to find the length of a side or the measure of an angle.



45. How to find the HYPOTENUSE or a LEG of a RIGHT TRIANGLE

For all right triangles, Pythagorean theorem: $a^2 + b^2 = c^2$, here a and b are the legs and c is the hypotenuse.



46. How to spot SPECIAL RIGHT TRIANGLES

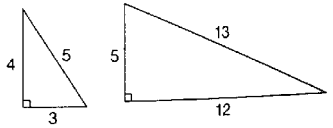
3:4:5

5:12:13

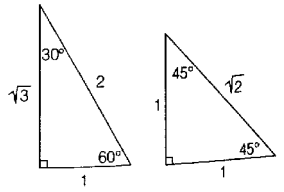
30°-60°-90°

45°-45°-90°

These numbers (3, 4, 5 and 5, 12, 13) represent the ratio of the side lengths of these triangles.



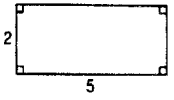
Likewise, the numbers 1, $\sqrt{3}$, 2 and 1, 1, $\sqrt{2}$ represent the ratios of the side lengths of these special triangles.



47. How to find the PERIMETER of a RECTANGLE

$Perimeter = 2(length + width)$

Example:



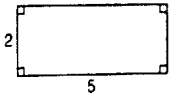
Setup:

Perimeter = 2(2 + 5) = 14

48. How to find the AREA of a RECTANGLE

$Area = (length)(width)$

Example:



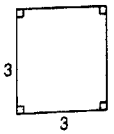
Setup:

Area = 2 × 5 = 10

49. How to find the AREA of a SQUARE

$Area = (side)^2$

Example:



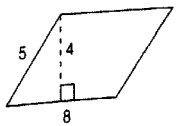
Setup:

Area = 3^2 = 9

50. How to find the AREA of a PARALLELOGRAM

$Area = (base)(height)$

Example:



Setup:

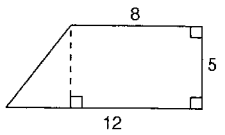
Area = 8 × 4 = 32

51. How to find the AREA of a TRAPEZOID

A trapezoid is a quadrilateral having only two parallel sides. You can always drop a perpendicular line or two to break the figure into a rectangle and a triangle or two triangles. Use the area formulas for those familiar shapes. Alternatively, you could apply the general formula for the area of a trapezoid:

Area = (average of parallel sides) × (height)

Example:



Setup:

Area of rectangle = $8 \times 5 = 40$

Area of triangle = $\frac{1}{2}(4 \times 5) = 10$

Area of trapezoid = $40 + 10 = 50$

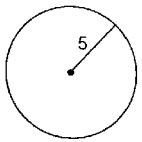
or Area of trapezoid = $\left(\frac{8 + 12}{2}\right) \times 5 = 50$

52. How to find the CIRCUMFERENCE of a CIRCLE

Circumference = $2\pi r$, where r is the radius

Circumference = πd, where d is the diameter

Example:



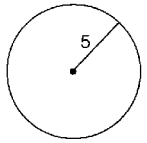
Setup:

Circumference = $2\pi(5) = 10\pi$

53. How to find the AREA of a CIRCLE

Area = πr^2 where r is the radius

Example:



Setup:

Area = $\pi \times 5^2 = 25\pi$

54. How to find the DISTANCE BETWEEN POINTS on the coordinate plane

If two points have the same *x* coordinates or the same *y* coordinates—that is, they make a line segment that is parallel to an axis—all you have to do is subtract the numbers that are different. Just remember that distance is always positive.

Example:

What is the distance from (2, 3) to (−7, 3)?

Setup:

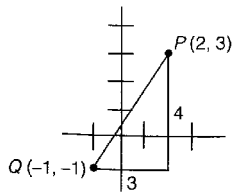
The *y*'s are the same, so just subtract the *x*'s: $2 - (-7) = 9$.

If the points have different *x* coordinates and different *y* coordinates, make a right triangle and use the Pythagorean theorem or apply the special right triangle attributes if applicable.

Example:

What is the distance from (2, 3) to (−1, −1)?

Setup:



It's a 3:4:5 triangle!

$PQ = 5$

55. How to find the SLOPE of a LINE

$$Slope = \frac{rise}{run} = \frac{change\ in\ y}{change\ in\ x}$$

Example:

What is the slope of the line that contains the points (1, 2) and (4, −5)?

Setup:

$$Slope = \frac{-5 - 2}{4 - 1} = \frac{-7}{3}$$

LEVEL 3

56. How to determine COMBINED PERCENT INCREASE/DECREASE

Start with 100 as a starting value.

Example:

A price rises by 10 percent one year and by 20 percent the next. What's the combined percent increase?

Setup:

Say the original price is $100.

Year one:
$100 + (10\% \text{ of } 100) = 100 + 10 = 110$

Year two:
$110 + (20\% \text{ of } 110) = 110 + 22 = 132$

From 100 to 132—that's a 32 percent increase.

57. How to find the ORIGINAL WHOLE before percent increase/decrease

Think of a 15 percent increase over *x* as 1.15*x* and set up an equation.

Example:

After decreasing by 5 percent, the population is now 57,000. What was the original population?

Setup:

0.95 × (Original population) = 57,000
Divide both sides by 0.95.
Original population = 57,000 ÷ 0.95 = 60,000

58. How to solve a SIMPLE INTEREST problem

With simple interest, the interest is computed on the principal only and is given by:

interest = (principal) × (interest rate) × (time**)*

* expressed as a decimal
** expressed in years or fraction of a year

Example:

If $12,000 is invested at 6 percent simple annual interest, how much interest is earned after 9 months?

Setup:

$$(12{,}000) \times (0.06) \times \left(\frac{9}{12}\right) = \$540$$

59. How to solve a COMPOUND INTEREST problem

If interest is compounded, the interest is computed on the principal as well as on any interest earned. To compute compound interest:

$$(Final\ balance) = (Principal) \times \left(1 + \frac{interest\ rate}{C}\right)^{CT}$$

where C = the number of times compounded annually

Example:

If $10,000 is invested at 8 percent annual interest, compounded semiannually, what is the balance after 1 year?

Setup:

Final balance

$$= (10{,}000) \times \left(1 + \frac{0.08}{2}\right)^{(2)(1)}$$

$$= (10{,}000) \times (1.04)^2$$

$$= \$10{,}816$$

60. How to solve a REMAINDERS problem

Pick a number that fits the given conditions and see what happens.

Example:

When *n* is divided by 7, the remainder is 5. What is the remainder when 2*n* is divided by 7?

Setup:

Find a number that leaves a remainder of 5 when divided by 7. You can find such a number by taking any multiple of 7 and adding 5 to it. A good choice would be 12. If $n = 12$, then $2n = 24$, which when divided by 7 leaves a remainder of 3.

61. How to solve a DIGITS problem

Use a little logic—and some trial and error.

Example:

If *A*, *B*, *C*, and *D* represent distinct digits in the addition problem below, what is the value of *D*?

$$\begin{array}{r} AB \\ +\ BA \\ \hline CDC \end{array}$$

Setup:

Two 2-digit numbers will add up to at most something in the 100s, so $C = 1$. *B* plus *A* in the units column gives a 1, and since *A* and *B* in the tens column don't add up to *C*, it can't simply be that $B + A = 1$. It must be that $B + A = 11$, and a 1 gets carried. In fact, *A* and *B* can be any pair of digits that add up to 11 (3 and 8, 4 and 7, etc.), but it doesn't matter what they are: they always give you the same value for *D*, which is 2:

$$\begin{array}{r} 47 \\ +\ 74 \\ \hline 121 \end{array} \qquad \begin{array}{r} 83 \\ +\ 38 \\ \hline 121 \end{array}$$

62. How to find a WEIGHTED AVERAGE

Give each term the appropriate "weight."

Example:

The girls' average score is 30. The boys' average score is 24. If there are twice as many boys as girls, what is the overall average?

Setup:

$$\text{Weighted avg.} = \frac{1 \times 30 + 2 \times 24}{3} = \frac{78}{3} = 26$$

HINT: Don't just average the averages.

63. How to find the NEW AVERAGE when a number is added or deleted

Use the sum of the terms of the old average to help you find the new average.

Example:

Michael's average score after four tests is 80. If he scores 100 on the fifth test, what's his new average?

Setup:

Find the original sum from the original average:

$$\text{Original sum} = 4 \times 80 = 320$$

Add the fifth score to make the new sum:

$$\text{New sum} = 320 + 100 = 420$$

Find the new average from the new sum:

$$\text{New average} = \frac{420}{5} = 84$$

64. How to use the ORIGINAL AVERAGE and NEW AVERAGE to figure out WHAT WAS ADDED OR DELETED

Use the sums.

Number added = (*new sum*) − (*original sum*)
Number deleted = (*original sum*) − (*new sum*)

Example:

The average of five numbers is 2. After one number is deleted, the new average is −3. What number was deleted?

Setup:

Find the original sum from the original average:

$$\text{Original sum} = 5 \times 2 = 10$$

Find the new sum from the new average:

$$\text{New sum} = 4 \times (-3) = -12$$

The difference between the original sum and the new sum is the answer.

$$\text{Number deleted} = 10 - (-12) = 22$$

65. How to find an AVERAGE RATE

Convert to totals.

$$\textit{Average A per B} = \frac{\textit{Total A}}{\textit{Total B}}$$

Example:

If the first 500 pages have an average of 150 words per page, and the remaining 100 pages have an average of 450 words per page, what is the average number of words per page for the entire 600 pages?

Setup:

$$\text{Total pages} = 500 + 100 = 600$$
$$\text{Total words} = (500 \times 150) + (100 \times 450)$$
$$= 120{,}000$$

$$\text{Average words per page} = \frac{120{,}000}{600} = 200$$

To find an average speed, you also convert to totals.

$$\textit{Average speed} = \frac{\textit{Total distance}}{\textit{Time}}$$

Example:

Rosa drove 120 miles one way at an average speed of 40 miles per hour and returned by the same 120-mile route at an average speed of 60 miles per hour. What was Rosa's average speed for the entire 240-mile round trip?

Setup:

To drive 120 miles at 40 mph takes 3 hours. To return at 60 mph takes 2 hours. The total time, then, is 5 hours.

$$\text{Average speed} = \frac{240 \text{ miles}}{5 \text{ hours}} = 48 \text{ mph}$$

66. How to solve a COMBINED WORK PROBLEM

In a combined work problem, you are given the rate at which people or machines perform work individually and asked to compute the rate at which they work together (or vice versa). The work formula states: *The inverse of the time it would take everyone working together equals the sum of the inverses of the times it would take each working individually.* In other words:

$$\frac{1}{r} + \frac{1}{s} = \frac{1}{t}$$

where *r* and *s* are, for example, the number of hours it would take Rebecca and Sam, respectively, to complete a job working by themselves, and *t* is the number of hours it would take the two of them working together. Remember that all these variables must stand for units of TIME and must all refer to the amount of time it takes to do the same task.

Example:

If it takes Joe 4 hours to paint a room and Pete twice as long to paint the same room, how long would it take the two of them, working together, to paint the same room, if each of them works at his respective individual rate?

Setup:

Joe takes 4 hours, so Pete takes 8 hours; thus:

$$\frac{1}{4} + \frac{1}{8} = \frac{1}{t}$$
$$\frac{2}{8} + \frac{1}{8} = \frac{1}{t}$$
$$\frac{3}{8} = \frac{1}{t}$$
$$t = \frac{1}{\left(\frac{3}{8}\right)} = \frac{8}{3}$$

So it would take them $\frac{8}{3}$ hours, or 2 hours 40 minutes, to paint the room together.

67. How to determine a COMBINED RATIO

Multiply one or both ratios by whatever you need to in order to get the terms they have in common to match.

Example:

The ratio of *a* to *b* is 7:3. The ratio of *b* to *c* is 2:5. What is the ratio of *a* to *c*?

Setup:

Multiply each member of *a*:*b* by 2 and multiply each member of *b*:*c* by 3, and you get *a*:*b* = 14:6 and *b*:*c* = 6:15. Now that the *b*s match, you can write *a*:*b*:*c* = 14:6:15 and then say *a*:*c* = 14:15.

68. How to solve a DILUTION or MIXTURE problem

In dilution or mixture problems, you have to determine the characteristics of a resulting mixture when different substances are combined. Or, alternatively, you have to determine how to combine different substances to produce a desired mixture. There are two approaches to such problems—the straightforward setup and the balancing method.

Example:

If 5 pounds of raisins that cost $1 per pound are mixed with 2 pounds of almonds that cost $2.40 per pound, what is the cost per pound of the resulting mixture?

Setup:

The straightforward setup:

($1)(5) + ($2.40)(2) = $9.80 = total cost for 7 pounds of the mixture

The cost per pound is $\$\frac{9.80}{7} = \$1.40$.

Example:

How many liters of a solution that is 10 percent alcohol by volume must be added to 2 liters of a solution that is 50 percent alcohol by volume to create a solution that is 15 percent alcohol by volume?

Setup:

The balancing method: Make the weaker and stronger (or cheaper and more expensive, etc.) substances

balance. That is, (percent difference between the weaker solution and the desired solution) × (amount of weaker solution) = (percent difference between the stronger solution and the desired solution) × (amount of stronger solution). Make n the amount, in liters, of the weaker solution.

$$n(15 - 10) = 2(50 - 15)$$
$$5n = 2(35)$$
$$n = \frac{70}{5} = 14$$

So 14 liters of the 10 percent solution must be added to the original, stronger solution.

69. How to solve a GROUP problem involving BOTH/NEITHER

Some GRE word problems involve two groups with overlapping members and possibly elements that belong to neither group. It's easy to identify this type of question because the words *both* and/or *neither* appear in the question. These problems are quite workable if you just memorize the following formula:

Group 1 + Group 2 + Neither − Both = Total

Example:

Of the 120 students at a certain language school, 65 are studying French, 51 are studying Spanish, and 53 are studying neither language. How many are studying both French and Spanish?

Setup:

$$65 + 51 + 53 - \text{Both} = 120$$
$$169 - \text{Both} = 120$$
$$\text{Both} = 49$$

70. How to solve a GROUP problem involving EITHER/OR CATEGORIES

Other GRE word problems involve groups with distinct "either/or" categories (male/female, blue-collar/white-collar, etc.). The key to solving this type of problem is to organize the information in a grid.

Example:

At a certain professional conference with 130 attendees, 94 of the attendees are doctors, and the rest are dentists. If 48 of the attendees are women and $\frac{1}{4}$ of the dentists in attendance are women, how many of the attendees are male doctors?

Setup:

To complete the grid, use the information in the problem, making each row and column add up to the corresponding total:

	Doctors	Dentists	Total
Male	55	27	82
Female		9	48
Total	94	36	130

After you've filled in the information from the question, use simple arithmetic to fill in the remaining boxes until you get the number you are looking for—in this case, that 55 of the attendees are male doctors.

71. How to work with FACTORIALS

You may see a problem involving factorial notation. If n is an integer greater than 1, then n factorial, denoted by $n!$, is defined as the product of all the integers from 1 to n. In other words:

$2! = 2 \times 1 = 2$
$3! = 3 \times 2 \times 1 = 6$
$4! = 4 \times 3 \times 2 \times 1 = 24$, etc.

By definition, $0! = 1$.

Also note: $6! = 6 \times 5! = 6 \times 5 \times 4!$, etc. Most GRE factorial problems test your ability to factor and/or cancel.

Example:

$$\frac{8!}{6! \times 2!} = \frac{8 \times 7 \times 6!}{6! \times 2 \times 1} = 28$$

72. How to solve a PERMUTATION problem

Factorials are useful for solving questions about permutations (i.e., the number of ways to arrange elements sequentially). For instance, to figure out how many ways there are to arrange 7 items along a shelf, you would multiply the number of possibilities for the first position times the number of possibilities remaining for the second position, and so on—in other words: $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$, or $7!$.

If you're asked to find the number of ways to arrange a smaller group that's being drawn from a larger group, you can either apply logic, or you can use the permutation formula:

$$_nP_k = \frac{n!}{(n-k)!}$$

where n = (# in the larger group) and
k = (# you're arranging).

Example:

Five runners run in a race. The runners who come in first, second, and third place will win gold, silver, and bronze medals respectively. How many possible outcomes for gold, silver, and bronze medal winners are there?

Setup:

Any of the 5 runners could come in first place, leaving 4 runners who could come in second place, leaving 3 runners who could come in third place, for a total of $5 \times 4 \times 3 = 60$ possible outcomes for gold, silver, and bronze medal winners. Or, using the formula:

$$_5P_3 = \frac{5!}{(5-3)!} = \frac{5!}{2!} = \frac{5 \times 4 \times 3 \times \cancel{2} \times \cancel{1}}{\cancel{2} \times \cancel{1}}$$
$$= 5 \times 4 \times 3 = 60$$

73. How to solve a COMBINATION problem

If the order or arrangement of the smaller group that's being drawn from the larger group does NOT matter, you are looking for the numbers of combinations, and a different formula is called for:

$$_nC_k = \frac{n!}{k!(n-k)!}$$

where n = (# in the larger group) and
k = (# you're choosing).

Example:

How many different ways are there to choose 3 delegates from 8 possible candidates?

Setup:

$$_8C_3 = \frac{8!}{3!\,(8-3)!} = \frac{8!}{3! \times 5!}$$
$$= \frac{8 \times 7 \times \cancel{6} \times \cancel{5} \times \cancel{4} \times \cancel{3} \times \cancel{2} \times \cancel{1}}{\cancel{3} \times \cancel{2} \times \cancel{1} \times \cancel{5} \times \cancel{4} \times \cancel{3} \times \cancel{2} \times \cancel{1}}$$
$$= 8 \times 7 = 56$$

So there are 56 different possible combinations.

74. How to solve PROBABILITY problems where probabilities must be multiplied

Suppose that a random process is performed. Then there is a set of possible outcomes that can occur. An event is a set of possible outcomes. We are concerned with the probability of events.

When all the outcomes are all equally likely, the basic probability formula is:

$$\textit{Probability} = \frac{\textit{Number of favorable outcomes}}{\textit{Number of possible outcomes}}$$

Many more difficult probability questions involve finding the probability that several events occur. Let's consider first the case of the probability that two events occur. Call these two events A and B. The probability that both events occur is the probability that event A occurs multiplied by the probability that event B occurs given that event A occurred. The probability that B occurs given that A occurs is called the conditional probability that B occurs given that A occurs. Except when events A and B do not depend on one another, the probability that B occurs given that A occurs is not the same as the probability that B occurs.

The probability that three events A, B, and C occur is the probability that A occurs multiplied by the conditional probability that B occurs given that A occurred multiplied by the conditional probability that C occurs given that both A and B have occurred.

This can be generalized to any number of events, where the number of events is an integer greater than 3.

Example:

If 2 students are chosen at random to run an errand from a class with 5 girls and 5 boys, what is the probability that both students chosen will be girls?

Setup:

The probability that the first student chosen will be a girl is $\frac{5}{10} = \frac{1}{2}$, and since there would be 4 girls and 5 boys left out of 9 students, the probability that the second student chosen will be a girl (given that the first student chosen is a girl) is $\frac{4}{9}$. Thus the probability that both students chosen will be girls is $\frac{1}{2} \times \frac{4}{9} = \frac{2}{9}$. There was conditional probability here because the probability of choosing the second girl was affected by another girl being chosen first.

Now let's consider another example where a random process is repeated.

Example:

If a fair coin is tossed 4 times, what's the probability that at least 3 of the 4 tosses will be heads?

Setup:

There are 2 possible outcomes for each toss, so after 4 tosses, there are $2 \times 2 \times 2 \times 2 = 16$ possible outcomes.

We can list the different possible sequences where at least 3 of the 4 tosses are heads. These sequences are

HHHT
HHTH
HTHH
THHH
HHHH

Thus, the probability that at least 3 of the 4 tosses will come up heads is:

$$\frac{\text{Number of favorable outcomes}}{\text{Number of possible outcomes}} = \frac{5}{16}$$

We could have also solved this question using the combinations formula. The probability of a head is $\frac{1}{2}$, and the probability of a tail is $\frac{1}{2}$. The probability of any particular sequence of heads and tails resulting from 4 tosses is $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$, which is $\frac{1}{16}$.

Suppose that the result each of the four tosses is recorded in each of the four spaces.

____ ____ ____ ____

Thus, we would record an H for head or a T for tails in each of the 4 spaces.

The number of ways of having exactly 3 heads among the 4 tosses is the number of ways of choosing 3 of the 4 spaces above to record an H for heads.

The number of ways of choosing 3 of the 4 spaces is

$${}_4C_3 = \frac{4!}{3!(4-3)!} = \frac{4!}{3!(1)!} = \frac{4 \times 3 \times 2 \times 1}{3 \times 2 \times 1 \times 1} = 4$$

The number of ways of having exactly 4 heads among the 4 tosses is 1.

If we use the combinations formula, using the definition that $0! = 1$, then

$${}_4C_4 = \frac{4!}{4!(4-4)!} = \frac{4!}{4!(0)!}$$
$$= \frac{4 \times 3 \times 2 \times 1}{4 \times 3 \times 2 \times 1 \times 1} = 1$$

Thus, ${}_4C_3 = 4$ and ${}_4C_4 = 1$. So the number of different sequences containing at least 3 heads is $4 + 1 = 5$.

The probability of having at least 3 heads is $\frac{5}{16}$.

75. How to deal with STANDARD DEVIATION

Like mean, mode, median, and range, standard deviation is a term used to describe sets of numbers. Standard deviation is a measure of how spread out a set of numbers is (how much the numbers deviate from the mean). The greater the spread, the higher the standard deviation. You'll never actually have to calculate the standard deviation on test day, but seeing how it's calculated can be helpful in understanding the concept:

- Find the average (arithmetic mean) of the set.
- Find the differences between the mean and each value in the set.
- Square each of the differences.
- Find the average of the squared differences.
- Take the positive square root of the average.

Although you won't have to calculate standard deviation on the GRE, you may be asked to compare standard deviations between sets of data or otherwise demonstrate that you understand what standard deviation means.

Example:

High temperatures, in degrees Fahrenheit, in two cities over five days:

September	1	2	3	4	5
City A	54	61	70	49	56
City B	62	56	60	67	65

For the five day period listed, which city had the greater standard deviation in high temperatures?

Setup:

Even without trying to calculate them out, one can see that City *A* has the greater spread in temperatures and, therefore, the greater standard deviation in high temperatures. If you were to go ahead and calculate the standard deviations following the steps described above, you would find that the standard deviation in high temperatures for City $A = \sqrt{\frac{254}{5}} \approx 7.1$, while the standard deviation for City $B = \sqrt{\frac{74}{5}} \approx 3.8$.

76. How to MULTIPLY/DIVIDE VALUES WITH EXPONENTS POWERS

Add/subtract the exponents.

Example:

$$x^a \times x^b = x^{a+b}$$
$$2^3 \times 2^4 = 2^7$$

Example:

$$\frac{x^c}{x^d} = x^{c-d}$$
$$\frac{5^6}{5^2} = 5^4$$

77. How to handle a value with an EXPONENT RAISED TO AN EXPONENT

Multiply the exponents.

Example:

$$(x^a)^b = x^{ab}$$
$$(3^4)^5 = 3^{20}$$

78. How to handle POWERS with a base of ZERO and POWERS with an EXPONENT of ZERO

Zero raised to any nonzero exponent equals zero.

Example:

$$0^4 = 0^{12} = 0^1 = 0$$

Any nonzero number raised to the exponent 0 equals 1.

Example:

$$3^0 = 15^0 = (0.34)^0 = (-345)^0 = \pi^0 = 1$$

The lone exception is 0 raised to the 0 power, which is *undefined*.

79. How to handle NEGATIVE POWERS

A number raised to the exponent $-x$ is the reciprocal of that number raised to the exponent x.

Example:

$$n^{-1} = \frac{1}{n}, n^{-2} = \frac{1}{n^2}, \text{ and so on.}$$
$$5^{-3} = \frac{1}{5^3} = \frac{1}{5 \times 5 \times 5} = \frac{1}{125}$$

80. How to handle FRACTIONAL POWERS

Fractional exponents relate to roots. For instance, $x^{\frac{1}{2}} = \sqrt{x}$.

Likewise, $x^{\frac{1}{3}} = \sqrt[3]{x}, x^{\frac{1}{4}} = \sqrt[4]{x}$, and so on.

Example:

$$(x-2)^{\frac{1}{3}} = x^{(-2)(\frac{1}{3})} = x^{-\frac{2}{3}} = \frac{1}{x}$$
$$4^{\frac{1}{2}} = \sqrt{4} = 2$$

81. How to handle CUBE ROOTS

The cube root of x is just the number that when used as a factor 3 times (i.e., cubed) gives you x. Both positive and negative numbers have one and only one cube root, denoted by the symbol $\sqrt[3]{\ }$, and the cube root of a number is always the same sign as the number itself.

Example:

$$(-5) \times (-5) \times (-5) = -125, \text{ so } \sqrt[3]{-125} = -5$$
$$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}, \text{ so } \sqrt[3]{\frac{1}{8}} = \frac{1}{2}$$

82. How to ADD, SUBTRACT, MULTIPLY, and DIVIDE ROOTS

You can add/subtract roots only when the parts inside the $\sqrt{\ }$ are identical.

Example:

$\sqrt{2} + 3\sqrt{2} = 4\sqrt{2}$
$\sqrt{2} - 3\sqrt{2} = -2\sqrt{2}$
$\sqrt{2} + \sqrt{3}$ cannot be combined.

To multiply/divide roots, deal with what's inside the $\sqrt{\ }$ and outside the $\sqrt{\ }$ separately.

Example:

$$(2\sqrt{3})(7\sqrt{5}) = (2 \times 7)(\sqrt{3 \times 5}) = 14\sqrt{15}$$
$$\frac{10\sqrt{21}}{5\sqrt{3}} = \frac{10}{5}\sqrt{\frac{21}{3}} = 2\sqrt{7}$$

83. How to SIMPLIFY A RADICAL

Look for factors of the number under the radical sign that are perfect squares; then find the square root of those perfect squares. Keep simplifying until the term with the square root sign is as simplified as possible: there are no other perfect square factors (4, 9, 16, 25, 36...) inside the $\sqrt{\ }$. Write the perfect squares as separate factors and "unsquare" them.

Example:

$$\sqrt{48} = \sqrt{16} \times \sqrt{3} = 4\sqrt{3}$$
$$\sqrt{180} = \sqrt{36} \times \sqrt{5} = 6\sqrt{5}$$

84. How to solve certain QUADRATIC EQUATIONS

Manipulate the equation (if necessary) into the "_____ = 0" form, factor the left side (reverse FOIL by finding two numbers whose product is the constant and whose sum is the coefficient of the term without the exponent), and break the quadratic into two simple expressions. Then find the value(s) for the variable that make either expression = 0.

Example:

$$x^2 + 6 = 5x$$
$$x^2 - 5x + 6 = 0$$
$$(x - 2)(x - 3) = 0$$
$$x - 2 = 0 \text{ or } x - 3 = 0$$
$$x = 2 \text{ or } 3$$

Example:

$$x^2 = 9$$
$$x = 3 \text{ or } -3$$

85. How to solve MULTIPLE EQUATIONS

When you see two equations with two variables on the GRE, they're probably easy to combine in such a way that you get something closer to what you're looking for.

Example:

If $5x - 2y = -9$ and $3y - 4x = 6$, what is the value of $x + y$?

Setup:

The question doesn't ask for x and y separately, so don't solve for them separately if you don't have to. Look what happens if you just rearrange a little and "add" the equations:

$$\begin{array}{r} 5x - 2y = -9 \\ +[-4x + 3y = \ \ 6] \\ \hline x + \ y = -3 \end{array}$$

86. How to solve a SEQUENCE problem

The notation used in sequence problems scares many test takers, but these problems aren't as bad as they look. In a sequence problem, the nth term in the sequence is generated by performing an operation, which will be defined for you, on either n or on the previous term in the sequence. For instance, if you are referring to the fourth term in a sequence, it is called n_4 in sequence notation. Familiarize yourself with sequence notation and you should have no problem.

Example:

What is the positive difference between the fifth and fourth terms in the sequence 0, 4, 18, ... whose nth term is $n^2(n - 1)$?

Setup:

Use the definition given to come up with the values for your terms:

$$n_5 = 5^2(5 - 1) = 25(4) = 100$$
$$n_4 = 4^2(4 - 1) = 16(3) = 48$$

So the positive difference between the fifth and fourth terms is $100 - 48 = 52$.

87. How to solve a FUNCTION problem

You may see function notation on the GRE. An algebraic expression of only one variable may be defined as a function, usually symbolized by f or g, of that variable.

Example:

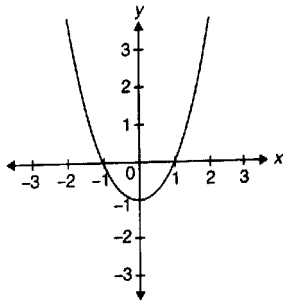
What is the minimum value of x in the function $f(x) = x^2 - 1$?

Setup:

In the function $f(x) = x^2 - 1$, if x is 1, then $f(1) = 1^2 - 1 = 0$. In other words, by inputting 1 into the function, the output $f(x) = 0$. Every number inputted has one and only one output (although the reverse is not necessarily true). You're asked to find the minimum value, so how would you minimize the expression $f(x) = x^2 - 1$? Since x^2 cannot be negative, in this case $f(x)$ is minimized by making $x = 0$: $f(0) = 0^2 - 1 = -1$, so the minimum value of the function is -1.

88. How to handle GRAPHS of FUNCTIONS

You may see a problem that involves a function graphed onto the xy-coordinate plane, often called a "rectangular coordinate system" on the GRE. When graphing a function, the output, $f(x)$, becomes the y-coordinate. For example, in the previous example, $f(x) = x^2 - 1$, you've already determined 2 points, (1, 0) and (0, −1). If you were to keep plugging in numbers to determine more points and then plotted those points on the xy-coordinate plane, you would come up with something like this:



This curved line is called a *parabola*. In the event that you should see a parabola on the GRE (it could be upside down or more narrow or wider than the one shown), you will most likely be asked to choose which equation the parabola is describing. These questions can be surprisingly easy to answer. Pick out obvious points on the graph, such as (1, 0) and (0, −1) above, plug these values into the answer choices, and eliminate answer choices that don't jibe with those values until only one answer choice is left.

89. How to handle LINEAR EQUATIONS

You may also encounter linear equations on the GRE. A linear equation is often expressed in the form

$y = mx + b$, where

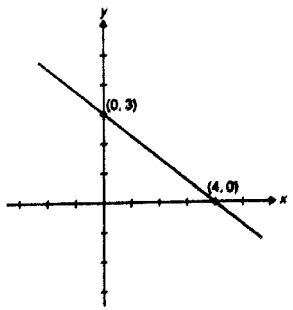
m = the slope of the line = $\frac{rise}{run}$

b = the y-intercept (the point where the line crosses the y-axis)

For instance, a slope of 3 means that the line rises 3 steps for every 1 step it makes to the right. A line with positive slope slopes up from left to right. A line with negative slope slopes down from left to right. A slope of zero (e.g., $y = 5$) is a flat (horizontal) line.

Example:

The graph of the linear equation $y = -\frac{3}{4}x + 3$ is this:



Note:

The equation could also be written in the form $3x + 4y = 12$, but this form does not readily describe the slope and y-intercept of the line.

To get a better handle on an equation written in this form, you can solve for y to write it in its more familiar form. Or, if you're asked to choose which equation the line is describing, you can pick obvious points, such as (0, 3) and (4, 0) in this example and use these values to eliminate answer choices until only one answer is left.

90. How to find the x- and y-INTERCEPTS of a line

The x-intercept of a line is the value of x where the line crosses the x-axis. In other words, it's the value of x when $y = 0$. Likewise, the y-intercept is the value of y where the line crosses the y-axis (i.e., the value of y when $x = 0$). The y-intercept is also the value b when the equation is in the form: $y = mx + b$. For instance, in the line shown in the previous example, the x-intercept is 4 and the y-intercept is 3.

91. How to find the MAXIMUM and MINIMUM lengths for a SIDE of a TRIANGLE

If you know n = the lengths of two sides of a triangle, you know that the third side is somewhere between the positive difference and the sum.

Example:

The length of one side of a triangle is 7. The length of another side is 3. What is the range of possible lengths for the third side?

Setup:

The third side is greater than the difference ($7 - 3 = 4$) and less than the sum ($7 + 3 = 10$).

92. How to find one angle or the sum of all the ANGLES of a REGULAR POLYGON

The term "regular" means all angles in the polygon are of equal measure.

Sum of the interior angles in a polygon with n sides =

$$(n - 2) \times 180$$

Degree measure of one angle in a regular polygon with n sides =

$$\frac{(n - 2) \times 180}{n}$$

Example:

What is the measure of one angle of a regular pentagon?

Setup:

Since a pentagon is a five-sided figure, plug $n = 5$ into the formula:

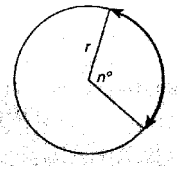
Degree measure of one angle

$$= \frac{(5 - 2) \times 180}{5} = \frac{540}{5} = 108$$

93. How to find the LENGTH of an ARC

Think of an arc as a fraction of the circle's circumference. Use the measure of an interior angle of a circle, which has 360 degrees around the central point, to determine the length of an arc.

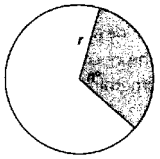
$$\text{Length of } arc = \frac{n}{360} \times 2\pi r$$



94. How to find the AREA of a SECTOR

Think of a sector as a fraction of the circle's area. Again, set up the interior angle measure as a fraction of 360, which is the degree measure of a circle around the central point.

$$\text{Area of sector} = \frac{n}{360} \times \pi r^2$$

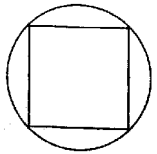


95. How to find the dimensions or area of an INSCRIBED or CIRCUMSCRIBED FIGURE

Look for the connection. Is the diameter the same as a side or a diagonal?

Example:

If the area of the square is 36, what is the circumference of the circle?



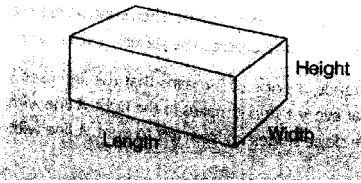
Setup:

To get the circumference, you need the diameter or radius. The circle's diameter is also the square's diagonal. The diagonal of the square is $6\sqrt{2}$. This is because the diagonal of the square transforms it into two separate 45°-45°-90° triangles (see #46). So, the diameter of the circle is $6\sqrt{2}$.

$$\text{Circumference} = \pi(\text{diameter}) = 6\pi\sqrt{2}.$$

96. How to find the VOLUME of a RECTANGULAR SOLID

$$\textit{Volume} = \textit{length} \times \textit{width} \times \textit{height}$$

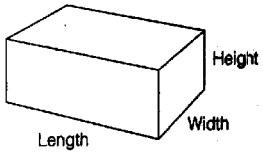


97. How to find the SURFACE AREA of a RECTANGULAR SOLID

To find the surface area of a rectangular solid, you have to find the area of each face and add them together. Here's the formula:

Let l = length, w = width, h = height:

$$\textit{Surface area} = 2(lw) + 2(wh) + 2(lh)$$

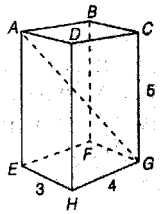


98. How to find the DIAGONAL of a RECTANGULAR SOLID

Use the Pythagorean theorem twice, unless you spot "special" triangles.

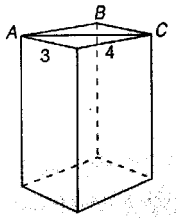
Example:

What is the length of AG?

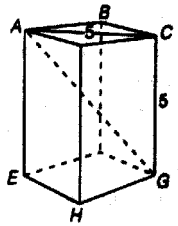


Setup:

Draw diagonal AC.



ABC is a 3-4-5 triangle, so $AC = 5$. Now look at triangle ACG:

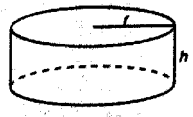


ACG is another special triangle, so you don't need to use the Pythagorean theorem. ACG is a 45-45-90 triangle, so $AG = 5\sqrt{2}$.

99. How to find the VOLUME of a CYLINDER

Volume = area of the base × height = $\pi r^2 h$

Example:



Let $r = 6$ and $h = 3$.

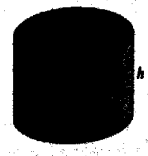
Setup:

Volume = $\pi r^2 h = \pi(6^2)(3) = 108\pi$

100. How to find the SURFACE AREA of a CYLINDER

Surface area = $2\pi r^2 + 2\pi rh$

Example:



Let $r = 3$ and $h = 4$.

Setup:

Surface area = $2\pi r^2 + 2\pi rh =$
$2\pi(3)^2 + 2\pi(3)(4) =$
$18\pi + 24\pi = 42\pi$