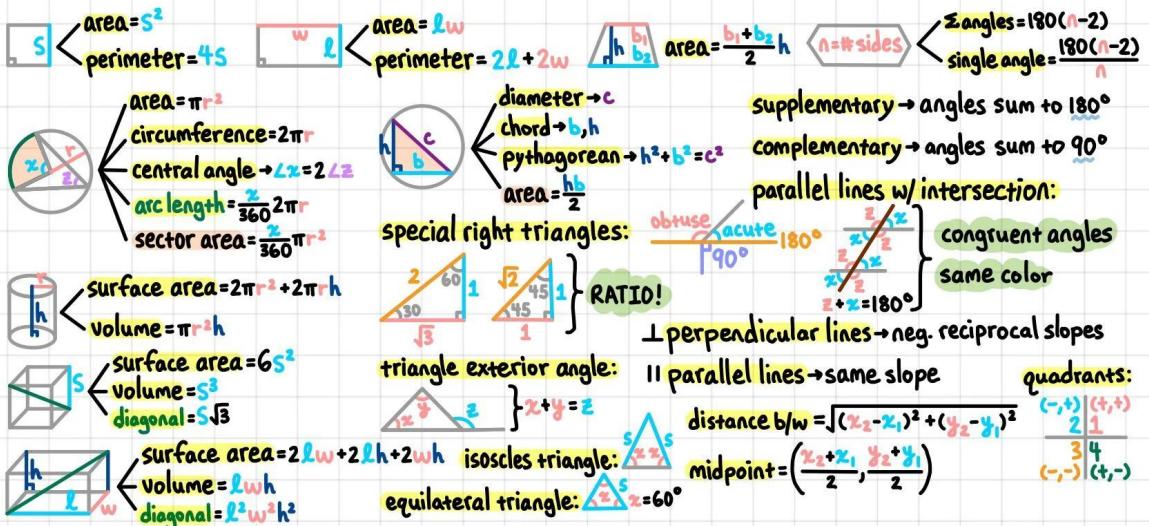


GRE NOTEBOOK

FORMULAS + KEY INFO

geometry



probability

combinations: $nCr = \frac{n!}{r!(n-r)!}$
order not matter

permutations: $nPr = \frac{n!}{(n-r)!}$
order matter

when items chosen indistinguishable
 $n \rightarrow$ total, $r \rightarrow$ chosen, $f \rightarrow$ frequency of each event

counting principle: total possible outcomes is product of all ways of each event occurring

examples:

a) how many ways arrange letters ABBCCC

$$n=6 \\ A \rightarrow f_1=1 \\ B \rightarrow f_2=2 \\ C \rightarrow f_3=3 \\ nPr = \frac{6!}{(1!)(2!)(3!)} \text{ indistinguishable}$$

c) ways chose 3 people from group of 5

$$nCr = \frac{5!}{3!2!} = \frac{5 \times 4 \times 3 \times 2 \times 1}{3 \times 2 \times 1 \times 2 \times 1} = 10 \\ 3 \times 2 \times 1 \text{ cancel out}$$

b) how many ways arrange 5 english + 3 science books on shelf so that subjects are together

2 placement options $nPr = \frac{2!}{0!} = 2!$ $\left\{ \begin{array}{l} S \rightarrow nPr = \frac{3!}{0!} = 3! \\ E \rightarrow nPr = \frac{5!}{0!} = 5! \end{array} \right\}$ (2!) (3!) (5!) counting principle

complementary events: $P(A) + P(\text{not } A) = 1$

independent: $P(A+B) = P(A)P(B)$

dependent: $P(A+B) = P(A)P(A|B)$

$\hookrightarrow P(A|B) \rightarrow$ probability of B given event A

Mutually exclusive: $P(A \text{ or } B) = P(A) + P(B)$

Mutually inclusive: $P(A \text{ or } B) = P(A) + P(B) - P(A+B)$



examples:

a) draw queen or heart

$$P(Q \text{ or } H) = P(Q) + P(H) - P(Q \text{ and } H)$$

b) draw queen or king

$$P(Q \text{ or } K) = P(Q) + P(K)$$

c) rain on Mon + Tues w/ daily $P(\text{rain}) = 0.3$

$$P(M \text{ and } T) = (0.3)(0.3)$$

d) 5 blue + red, draw blue then red no replace

$$P(B \text{ and } R) = P(B)P(R|B) = \frac{5}{10} \times \frac{4}{9}$$

percents

$$\% \Delta = \frac{\text{difference}}{\text{original}} \times 100$$

$$\% \text{ less than} \rightarrow \text{Final} = 1 - \frac{\% \text{ less than}}{100} \times \text{initial}$$

$$\% \text{ greater than} \rightarrow \text{Final} = 1 + \frac{\% \text{ less than}}{100} \times \text{initial}$$

$$\% \text{ discount} = \text{price} (1 - \text{percentage})$$

$$\% \text{ mark-up} = \text{price} (1 + \text{percentage})$$

examples:

a) 12 is 5% of what $\rightarrow 0.05x = 12$

b) 7% of 9 is what percent of 7 $\rightarrow 0.07(9) = \frac{x}{100}(7)$

c) 200% of 4% of 50 is what $\rightarrow \frac{200}{100} \times \frac{4}{100} \times 50$

d) what percent of y% of 50 is 40% of y $\rightarrow \frac{x}{100} \times \frac{y}{100} \times 50 = \frac{40}{100}y$

y cancel out

interest

simple interest = $(\text{principal})(\text{rate})(\text{time})$
compound interest: $a = p(1 + \frac{r}{n})^{nt}$

a \rightarrow future value, p \rightarrow principal, r \rightarrow rate, t \rightarrow time
n \rightarrow # times per year interest compounded

million $\rightarrow 10^6$
billion $\rightarrow 10^9$
trillion $\rightarrow 10^{12}$

Sequences

arithmetic sequence: $a_n = a_1 + (n-1)d$

- ↳ n^{th} term
- ↳ first term
- ↳ term #
- ↳ common difference
- ↳ # of terms added

$$\sum \rightarrow S_n = \frac{n}{2}(a_1 + a_n)$$

sum of first n terms

geometric sequence: $a_n = a_1 r^{(n-1)}$

- ↳ n^{th} term
- ↳ first term
- ↳ term #
- ↳ common ratio

work + rates

algebra

distance/work = (rate)(time)

work = (individual rate)(# individuals)(time)

average speed = total distance ÷ total time

for chase problems → subtract rates

proportion → equivalent relationships b/w ratio
keep track units

exponents: roots: difference of squares:

$$x^0=1 \quad \sqrt[n]{x^b} = \pm x^{b/n} \quad x^2 - y^2 = (x+y)(x-y)$$

$$x^a x^b = x^{a+b} \quad \sqrt{x} \sqrt{y} = \sqrt{xy} \quad (x+y)^2 = x^2 + 2xy + y^2$$

$$x^{-a} = \frac{1}{x^a} \quad \sqrt[x]{\frac{x}{y}} = \frac{\sqrt[x]{x}}{\sqrt[x]{y}}$$

$$\frac{x^a}{x^b} = x^{a-b} = \frac{1}{x^{b-a}}$$

$$x^a y^a = (xy)^a \quad \sqrt[n]{\frac{x}{z}} = \frac{\sqrt[n]{x}}{\sqrt[n]{z}}$$

$$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$$

$$(x^a)^b = x^{ab}$$

$$\text{PEMDAS}$$

$$a) (\sqrt[3]{x})^2 \rightarrow (x^{1/3})^2 = x^{2/3}$$

$$b) x^8 - y^8 \rightarrow (x^4)^2 - (y^4)^2 = (x^4 + y^4)(x^4 - y^4) = (x^2 + y^2)(x^2 - y^2)$$

$$\text{examples:}$$

$$\text{difference of squares:}$$

$$\text{solving abs. equations}$$

$$|x+y| \leq |x| + |y| \quad |x-y| \geq |x| - |y| \quad |x+y| = z \rightarrow x \pm y = z$$

$$\frac{x}{y} = \text{quotient} + \frac{\text{remainder}}{y}$$

divisibility:

a) # divide by 3 → sum of digits ÷ 3

b) # divide by 4 → last 2 digits ÷ 4

c) # divide by 6 → also ÷ by 2 + 3

d) # divide by 8 → last 3 digits ÷ 8

e) # divide by 9 → sum of digits ÷ 9

ratio

ratios → part to whole relationship

	parts	total
ratio		ratio total
multiplier		
actual		actual total

whole → ratio total = sum of all parts

multiplier = $\frac{\text{actual total}}{\text{ratio total}}$

partial actual = (part) × (multiplier)

each part has column

examples:

a) flour, egg, yeast, salt mixed in ratio of 11:9:3:2, how many lbs of yeast in 20 pound mix

	flour	egg	yeast	salt	total
ratio	11	9	3	2	25
multiplier	4/5	4/5	4/5	4/5	4/5
actual			12/5		20

multiplier → $25 \times \frac{4}{5} = 20$

yeast → $3 \times \frac{4}{5} = 12/5$

prime factorization

prime factorization: breaking down # into product of prime #s → integers w/ factors 1 + itself ↗

prime factorize each, use exponents

LCM ← for repeated prime factors take ones w/ largest exponent, w/ same power just take once
multiply previous w/ all non-repeated prime factors

GCF ← for repeated prime factors take ones w/ smallest exponent, w/ same power take once
multiply previous

examples:

a) LCM 24 & 60



LCM → $2^3 \times 3^1 \times 5^1 = 120$

prime factorization tree

2³ × 3¹ × 5¹

2² × 3¹ × 5¹

VOCABULARY

a-words

Abate: to lessen in intensity
Aberrant: abnormal
Abreast: informed
Abridge: to shorten
Abscond: to depart secretly
Accolade: award, honor
Acerbic: bitter
Acrimonious: angry
Acumen: accurate insight
Adept: skilled
Admonish: to advise
Adulation: excessive praise
Adulterate: to spoil
Advocate: to support
Aesthetic: pertaining to beauty
Agglomerate: to lump
Aggrandize: to increase influence
Aghast: shocked
Agog: eagerness
Alacrity: eagerness
Amalgamate: to combine
Ambivalence: hesitant
Ameliorate: to make better
Amenable: agreeable
Anachronism: something not belonging to time period
Anomaly: abnormality
Antedate: to predate
Anodyne: inoffensive
Antipathy: hatred
Apace: quickly
Apathy: lack of feeling
Approbation: expression of approval
Archaic: ancient
Arduous: strenuous
Artless: genuine
Ascertain: to investigate
Ascetic: self discipline
Asperity: harshness
Assuage: to pacify
Astringent: sharp, severe
Astringent: substance making skin tight
Audacious: daring
Auspicious: lucky
Austere: simple
Avarice: greed
Aver: to declare
Axiomatic: universally accepted

READING

adjectives
adverbs
verbs
nouns

b-words

Banal: boring
Belligerent: eager to fight
Bolster: to support
Bombastic: arrogant
Bucolic: rural
Burgeon: to flourish
Cacophony: harsh sound
Canon: established set of principles
Canonical: agrees with principles
Capricious: changing mind quickly and often
Castigation: severe punishment
Catalyst: thing that speeds up result
Caustic: corrosive
Censure: to criticize
Chary: cautious, wary
Chicanery: deceitfulness
Coalesce: to combine
Cogent: convincing
Complaisance: willing to comply
Connoisseur: judge, critic
Contentious: causing disagreement
Contiguous: side-by-side
Contrite: regretful
Convention: agreement
Convolted: complicated
Corroborate: to confirm
Credulous: gullible
Culpable: blamable
Cynicism: belief that people are motivated by selfishness

adjectives
adverbs
verbs
nouns

d-words

Dearth: scarcity
Decorum: proper behavior
Demur: to question
Deride: to ridicule
Derision: mockery
Desiccate: to dry
Diatribal: denunciation
Didactic: instructive
Diffident: timid
Dilettante: amateur
Disabuse: to undeceive
Discordant: harsh sound
Discretion: cautious reserve in speech
Disinterested: free of bias
Disparage: to belittle
Disparate: distinct
Dissemble: to mislead
Dissonance: lacking harmony
Divulge: to reveal
Dogmatic: stubbornly opinionated

e-words

Ebullience: cheerfulness
Eccentric: unconventional
Eclectic: choosing from wide range
Effrontery: boldness
Elegy: sad poem
Eloquent: well-spoken
Emollient: soothing
Empirical: based on observation or experiment
Endemic: native to location
Enervate: to weaken
Engender: to cause
Enigma: puzzle
Enigmatic: mysterious
Enmity: hostility
Ennui: dissatisfaction from boredom
Ephemeral: short-lived
Equivocal: ambiguous
Equivocate: to use ambiguous language for deception
Erudite: scholarly
Esoteric: restricted to small group
Eulogy: speech honoring dead
Euphony: pleasant sound
Evanescence: vanish like vapor
Exacerbate: to make worse
Excoriate: to criticize
Exculpate: to prove innocent
Exigent: urgent
Exonerate: to prove innocent
Extant: surviving
Extemporaneous: improvised

adjectives
adverbs
verbs
nouns

f-words

Facetious: inappropriate humor
Fallacy: mistaken belief
Fawn: to flatter
Fervent: emotional
Fervid: really passionate
Filibuster: long speech to delay legislature
Flout: to mock
Fortuitous: fortunate
Fulminate: to protest
Furtive: secretive

g-words

Garrulous: talkative
Germane: relevant
Gibe: insulting taunt
Glib: insincere speech, superficial
Gossamer: delicate
Grandiloquence: arrogant speech
Gregarious: sociable
Gyrate: to spiral

h-words

Hackneyed: cliche
Halcyon: calm
Harangue: long ranting speech
Harangue: to deliver a ranting speech
Hedonism: pursuit pleasure
Headlong: with reckless haste
Hector: to harass
Hegemony: domination over others
Heretical: violation
Homogenous: similar
Hubris: prideful

adjectives
adverbs
verbs
nouns

i-words

Iconoclast: rebel
Idolatrous: excessive devotion
Imminent: about to happen
Immutable: unchangeable
Impassive: unemotional
Impecunious: poor
Imperturbable: emotionally steady
Impetuous: impulsive
Implacable: unable to be calmed
Impunity: freedom from punishment
Inchoate: undeveloped
Incipient: begin to exist
Inculpate: to accuse
Indifferent: having no preference
Inert: inactive
Infelicitous: inappropriate
Ingenuous: unsuspecting
Inimical: hostile
Innocuous: harmless
Insipid: lacking interest
Intractable: stubborn
Intransigent: refusing to compromise
Intrepid: brave
Inured: accustomed to accepting something undesirable
Inveigle: to obtain by deception
Irascible: easily angered

l-words

Lachrymose: sad
Laconic: using few words
Largess: generous
Laud: to praise highly
Laudable: deserving praise
Libidinous: lustful
Loquacious: talkative
Lucid: clear
Ludic: playful in an aimless way
Lugubrious: sad
Luminous: bright

m-words

Macabre: disturbing
Magnanimity: forgiving
Malevolent: spiteful
Malleable: capable of being shaped
Martial: warlike
Martinet: strict disciplinarian
Maudlin: very emotional
Maverick: nonconformist, independent
Mendacity: dishonesty
Mercenary: greedy
Mercurial: sudden unpredictable change
Meticulous: detailed and thorough
Minatory: threatening
Misanthrope: hater of mankind
Mitigate: to lessen
Mollify: to soothe
Mordant: hard-hearted
Morose: sad
Mundane: ordinary, worldly
Munificent: very generous

adjectives
adverbs
verbs
nouns

n-words

Nadir: all time low
Nascent: beginning to exist, develop
Nebulous: cloudy, uncertain
Neologism: new word or expression
Neophyte: beginner
Noisome: unpleasant
Nonplussed: perplexed
Novitiate: beginner in religious order
Noxious: harmful

o-words

Obdurate: stubborn
Obfuscate: to make confusing
Objurgate: to scold
Obloquy: strong criticism, verbal abuse
Obsequious: eager to please
Obstinate: stubborn
Obtuse: mentally dull
Obviate: to anticipate and prevent
Oclude: to block
Odious: repulsive
Onerous: burdensome
Opaque: unable see through, hard to understand
Opprobrium: harsh criticism
Optimum: most favorable outcome
Orifice: opening
Oscillation: movement back-and-forth, hesitation
Ostensible: stated to be true, but not necessarily so
Ostentation: excessive showiness
Ostentatious: showy

p-words

Paean: song of praise
Paucity: scarcity
Pedagogy: art of teaching
Pendant: someone who overly shows off learning
Pellicid: clear
Penurious: stingy
Penury: poverty
Perennial: lasting long time
Perfidy: treachery
Perfunctory: done without care
Pernicious: gradual harmfulness
Perspicacious: wise
Peruse: to examine carefully
Pervade: to spread throughout
Pervasive: spread throughout
Philistine: person lack culture
Phlegmatic: unemotional, sluggish
Pine: to yearn for
Pious: religious
Pirate: to illegally use or reproduce
Pith: essential part
Pithy: precise
Placate: to soothe
Platitude: cliche
Plethora: surplus
Polemic: verbal attack
Polemical: controversial, argumentative
Pragmatic: practical rather than idealistic
Prattle: to babble meaninglessly
Precipitate: acting hastily with impulse
Precipitate: to cause to happen suddenly
Predilection: preference
Preen: to dress up
Prescience: clairvoyant
Presumptuous: disrespectfully bold
Prevaricate: to speak/act in an evasive way, beat-around-the-bush
Pristine: pure, uncorrupted
Probity: honesty
Proclivity: natural predisposition
Prodigal: wastefully lavish
Prodigious: enormous
Profligate: wastefully lavish
Profuse: abundant
Proliferate: to increase quickly
Prolific: productive
Propensity: natural predisposition
Propriety: being proper
Prosaic: dull
Puerile: childish
Putrefy: to rot

adjectives
adverbs
verbs
nouns

q-words

Quaff: to drink deeply
Qualms: causes for hesitancy
Queries: questions
Querulous: complaining
Quiescence: stillness
Quixotic: idealistic but impractical
Quotidian: recurring daily

adjectives
adverbs
verbs
nouns

r-words

Raconteur: skilled storyteller
Rancorous: resentment
Rarefy: to make thinner
Recalcitrant: disobedient
Recant: to retract from previous beliefs
Recondite: difficult to understand
Redoubtable: awe-inspiring
Refulgent: shiny
Relegate: to assign to lower position
Reneg: to go back on a promise
Repudiate: to reject
Rescind: to cancel
Restive: restless
Reticent: silent/reserved
Reverent: deeply respectful
Rhetoric: effective writing/speaking

s-words

Salubrious: promoting health
Sanction: official permission
Sanction: to authorize
Satire: literary work ridiculing human misconduct and stupidities
Sedulous: hard working
Shard: broken fragment
Solicitous: concerned, eager
Solvent: able to dissolve other substances, able to pay debts
Soporific: sleep-inducing
Sordid: filthy
Specious: seemingly plausible, but actually wrong
Spendthrift: who wastes money
Sporadic: occasionally
Spurious: not genuine
Squalid: filthy
Squander: to spend wastefully
Stoic: indifferent to pleasure/pain
Stupefy: to stun
Stymie: to hinder
Subpoena: court order appearance
Succinct: concise
Superfluous: extra, unnecessary
Supplant: to replace
Surfeit: extra
Synthesis: combination

t-words

Tacit: implied, not explicit
Temperate: showing moderation/self-restraint
Tenacity: persistence
Tenuous: flimsy
Terse: concise
Timorous: fear, lack of confidence
Tirade: angry speech
Torpid: sluggish
Torque: rotational force
Tortuous: complicated
Transient: temporary
Trenchant: insightful
Trepidation: apprehension
Trite: cliche
Trout: to praise
Truculent: eager to fight
Truism: true statement, but not interesting or new
Turgid: swollen, tediously pompous
Turbid: obscure, cloudy
Tyro: beginner

adjectives
adverbs
verbs
nouns

u-words

Ubiquitous: widespread
Unfeigned: genuine
Untenable: indefensible
Urbane: courteous, civilized

v-words

Vacillate: to sway indecisively
Variegated: multicolored
Venal: greedy
Venerate: to look up to
Veracity: honesty
Verity: truth
Vexation: annoyance
Vicarious: indirect empathy
Vigilant: watchful
Vilify: to defame
Vindictive: desire revenge
Virulent: bitterly hostile
Viscous: thick, sticky
Vitiate: to weaken
Vitriolic: malice
Vituperate: to condemn
Volatile: unstable
Voracious: huge appetite

w-words

Waver: to fluctuate between choices

z-words

Zeal: strong feeling of interest
Zealous: enthusiastically devoted

