MEMORIZE

- TIMES TABES THROUGH 12 x 12

1	2	3	4	5	6	7	8	9	10	11	12	13	14
2	4	6	8	10	12	14	16	18	20	22	24	26	
3	6	9	12	15	18	21	24	27	30	33	36	39	
4	8	12	16	20	24	28	32	36	40	44	48	52	
5	10	15	20	25	30	35	40	45	50	55	60	65	
6	12	18	24	30	36	42	48	54	60	66	72	78	
7	14	21	28	35	42	49	56	63	70	77	84	91	
8	16	24	32	40	48	56	64	72	80	88	96	104	
9	18	27	36	45	54	63	72	81	90	99	108	117	
10	20	30	40	50	60	70	80	90	100	110	120	130	
11	22	33	44	55	66	77	88	99	110	121	132	143	
12	24	36	48	60	72	84	96	108	120	132	144	156	

13^2 = 169

14^2 = 196

15^2 = 225

20^2 = 400

25^2 = 625

16^2 = 256

17^2 = 289

18^2 = 324

19^2 = 361

- FRACTION TO DECIMAL

1/2	0.5
1/3	0.33
1/4	0.25
1/5	0.2
1/6	0.17
1/8	0.125
1/12	0.083

- $\sqrt{2} \approx 1.4$ (VALENTINES DAY)
  $\sqrt{3} \approx 1.7$ (PATRICK'S DAY)

- EXPONENT RULES

$a^x = a^y$	$\Leftrightarrow x = y$
a^x / a^y	$= a^{x-y}$
$(a^x)^y$	$= a^{xy}$
$a^x a^y$	$= a^{x+y}$
a^{-x}	$= 1/a^x$
$a^x b^x$	$= (ab)^x$
$a^{x/y}$	$= \sqrt[y]{a^x} = (\sqrt[y]{a})^x$ such as $x,y > 1$
a^0	$= 1$
a^1	$= a$
1^x	$= 1$

- POWERS OF 2

2^0	1
2^1	2
2^2	4
2^3	8
2^4	16
2^5	32
2^6	64
2^7	128
2^8	256
2^9	512
2^{10}	1024

- PRIME NUMBERS < 100

	2	3	5	7	
11		13		17	19
		23			29
31				37	
41		43		47	
		53			59
61				67	
71		73			79
		83			89
				97	
101		103		107	109

- PERFECT SQUARES (PYTHAGOREAN)

3	4	5	13	84	85
5	12	13	15	112	113
7	24	25	17	144	145
9	40	41	19	180	181
11	60	61	21	220	221

- DIVISIBILITY RULES

2	last digit 0, 2, 4, 6, 8
3	sum of digits / 3
4	last 2 digits / 4
5	last digit 0 or 5
6	Divisible by 2 & 3
7	last digit is doubled & subtracted from the rest, ans = 0 or div by 7
8	last 3 digits are / by 8
9	sum of digits / 9
10	Last digit is 0
11	+- sum of digits = 0 or / by 11 ex 275 = 2-7+5 = 0✓ 5775 = 5-7+7-5 = 0✓
12	Divisible by 3 & 4

- PROBABILITY

NOT A PRIME NO.

TRIANGLES ARE NOT NECESSARILY △

NORMAL DISTRIBUTION

		REMAINING	
• -3SD to 3SD	: 99%	1%	or 0.5% per side
• -2SD to 2SD	: 95%	5%	2.5
• -1SD to 1SD	: 68%	32%	16%

- POLYGON ANGLE : $(n-2)180°$
- AREA OF QUADRILATERAL : $\frac{1}{2}(b_1+b_2)h$
- ARITHMETIC SEQUENCE

$a_n = a_1 + (n-1)d$

$a_1 = a_n - (n-1)d$

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

$S_n =$

CENTRAL ANGLE = 2(INSCRIBED ANGLE)

AREA OF RHOMBUS : $\frac{D_1 \cdot D_2}{2}$

AREA OF PARALLELOGRAM : bh

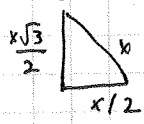
VOL cyl : $\pi r^2 h$

VOL cone : $\frac{1}{3}\pi r^2 h$

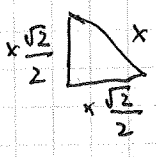
VOL PYRAMID : $\frac{1}{3} L \cdot W \cdot H$

VOL SPHERE : $(4/3)(\pi r^3)$

30-60-90



45-45-90



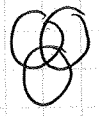
$S_1 < S_2 + S_3$ less than sum

$S_3 > S_2 - S_3$ greater than diff

TRIPLE VENN DIAGRAM

TOTAL = SUM OF 3c − SUM OF 2c − 2(SUM OF 3c)

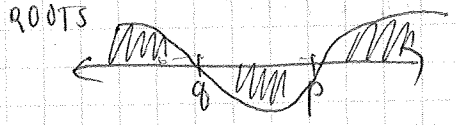
SUM(1c) + 2(2c) + 3(3c) = No. of occurences



A + B − Both + Neither = TOTAL

QUADRATIC EQUATION

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$



<0 >0

$q < x < p$ $x < q$ $x > p$

PERPENDICULAR LINES

SLOPE IS ⊖ RECIPROCAL

DISCOUNT:

20% discount → $\frac{1}{5}$

Remain after 3 years : $(4/5)^3$

★ REREAD QUESTIONS esp. PROPORTIONS

★ FACTOR

$6 = 3^1 2^1$ $2 \cdot 2 = 4$

$(1+1)(1+1) = 4$

☆ PERFECT SQUARES ARE THE ONLY ONES WHICH HAVE ODD # FACTORS

- PERCENT

% change $= \frac{N-O}{O}$

$N = (1+G)O$

DATA SUFFICIENCY DOs & DONTs

DO
1. DO use a grid to track progress. AD / BCE
2. DO start with the easy statement. BD / ACE
3. DO try to rephrase the question and the statements.

DONT
1. DON'T suffer from statement carryover.
2. DON'T confuse "no" with "insufficient"
3. DON'T confuse Y/N with value

PROBABILITY

~~PROB~~ =

PERMUTATION
$^nP_r = \frac{n!}{(n-r)!}$

COMBINATION (order no matter)
$^nC_r = \frac{n!}{r!\,(n-r)!}$

CIRCULAR
$(n-1)!$

PROB of A & B $= P_A \cdot P_B$
PROB of A or B $= P_A + P_B - P(A \cap B)$

EXPONENTS
$x^{-n} = 1/x^n$
$x^m \cdot x^n = x^{m+n}$
$x^m / x^n = x^{m-n}$
$(x^m)^n = x^{m \cdot n}$
$(x/y)^n = x^n/y^n$

WORK
$T = \frac{AB}{A+B}$
COMBINED RATE $= \frac{xyz}{xy+xz+yz}$

QUADRATIC INEQUALITY
- SQUARING OF INEQUALITY

$a < b$
$a^2 \gtrless b^2$
↳ If $a+b$ $\begin{cases} + & a^2 < b^2 \\ - & a^2 > b^2 \end{cases}$

$a \gtrless b$
$a^2 \gtrless b^2$ ↳ If $a+b$ $\begin{cases} + & a^2 > b^2 \\ - & a^2 < b^2 \end{cases}$

ABSOLUTE VALUE REVERSE LOGIC
$|x-a| = b$
midpoint

NEGATIVE ABSOLUTE VALUE
$|-x-a| = b \iff |x+a| = b$

EVEN - ODD

E + E = E
O + O = E
E + O = O

E × E = E
O × O = O
E × O = E

PRIME # or NOT?

- where to put solid red line?
  - > Mid-way in the list of factors
  - > SQUARE-ROOT OF THE GIVEN #

  e.g. 24 ⇒ $4\sqrt{24} < 5$

> TO KNOW WHETHER A # IS PRIME OR NOT, YOU ONLY NEED TO CHECK FOR DIVISIBILITY WITH PRIME #S UNTIL THE SQUARE ROOT OF THE #.

CYCLICITY OF UNITS DIGIT

Cu
u

CYCLICITY OF
C1 – 1
C2 – 4
C3 – 4
C4 – 2
C5 – 1
C6 – 1
C7 – 4
C8 – 4
C9 – 2

(1) – 1, 5, 6
(4) – 2, 3, 7, 8
2 – 4, 9

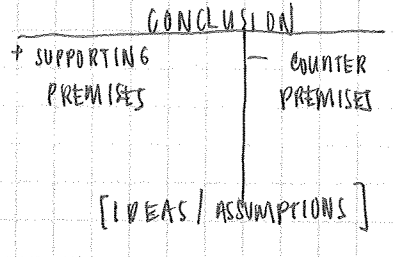
GCD / LCD

~~GCD × LCD~~

GCD(a,b) × LCM(a,b) = (a)(b)

CRITICAL REASONING

1. DIAGRAM



2. SHORT HAND
CAUSE → EFFECT

BOLD FACE

COMMONLY USED TERMS — SYNONYMS

- CONCLUSION (SUPPORT / NOT SUPPORT) — CLAIM, SYNOPSIS, CONTEM. OF CONC.
- EVIDENCE (UNDISPUTED FACT) — FACT, DATA POINT, PREMISE — CONC CAN BE DRAWN IN
- BELIEF (CAN BE DISPUTED) (AUTHOR BELIEVES TRUE) — IMPRESSION, OPINION, THESIS, HYPOTHESIS, NOTION, UNDERSTANDING, POSITION,
- CONTRADICTION (INCOMPATIBILITY BET. 2 STATEMENTS) — CONFLICT, DISCREPANCY, DISAGREEMENT
- PREDICTION (AUTHOR BELIEVES WILL HAPPEN) (CONDITIONS TO BE SATISFIED)
- AN EXPLANATION (ANOTHER REASONING FOR EVENT) (MAIN & ACT REASONING)

① PROVE
a MUST BE TRUE
b MAIN POINT
c METHOD OF RES.
d FLAW IN RES
e PAR. RES.

② HELP
f ASSUMPTION
g STRENGTHEN
h RESOLVE PAR

③ HURT
i WEAKEN

☆ CAUSALITY
Events in SHORT
1. Event before another
2. 2 or more events occuring
ATTACK:
1. ALTERNATE CAUSE
2. CAUSE; NO EFFECT
3. EFFECT; NO CAUSE
4. EFFECT → CAUSE
5. DATA UNRELIABLE

☆ EVALUATE

(a) MBT
CORRECT
- Paraphrase
- Combination of stimulus
☆ FACT TEST

INCORRECT
- Could be true
- Exagg
- New Info
- Shell game
- Opp. Answer
- Reverse

(b) MP
CAR
- Conclusion

INCORRECT
- true but not complete
- Repeat Premise
- Info not in stimulus
- new element
- half right, half wrong
- Exagg.

(c) METHOD OF RES / FLAW
☆ FACT TEST
- Use only stimulus

(d) PAR RES
Not imp.
- TOPIC
- ORDER OF ARG

PAR:
- Opposite, Reverse
- Method of Res
- Validity of arg
- Conc
- Premises

"SIMILARLY BY ACTION ARG"

(i) WEAKEN
Focus on conc.
New info ok
Attack arg by:
- Incomplete info
- Improper Comparison
- Qualified Conc

INC:
- opposite
- Shell game
- Out of scope

(e) Assumption / Fill in the blank
- Negate answers for contenders
(A) supporter — link elements
(B) Defender — possible event if attack does not exist.
CORRECT:
- No other cause
- C → E
- NC → NE
- E ✗→ C
- good data

(f) STRENGTHEN
- Focus on conc.
- personalize Arg.
- Hole in Arg.

INC.
- opposite
- shell game
- Out of scope

(h) PARADOX
- NO conc.
- Contradiction
- FIND POSSIBLE CAUSE

INC
- Explains only one side
- Similarity → Sim
- Diff - Diff

☆ NUMBERS
① ↑% ≠ ↑#
② ↓% ≠ ↓#
③ ↑# ≠ ↑%
④ ↓# ≠ ↓%
⑤ High # ≠ High %
Small # ≠ Small %
⑥ Large % ≠ High #
Small % ≠ Small #
- % info, no # in answers
- # info, no % answers
- both % and #, check

If ... will Future

If ... present Habitual

If ... please verb Command

UNREAL
were
past tense (could, would, might, P-P.)

whether : 2 choices
conditional if : choices + not at all

Rather ... than
Prefer ... to
Would rather .. that ... verb simple past

HOPE / WISH → contrary to fact (unreal

OPTIONAL THAT : say, tell, think, believe
OBLIGATORY THAT : mention, declare, report, state

AS MUCH AS : non-countable
AS MANY AS : countable
* WRONG : more than number
four times more than
should be as much / as many
this rock weighs twice as much as
four times as much money as
half as many kitties as

CAUSATIVE VERBS
have + simple verb
. have him feed
. get + infinite
got him to feed
. make + simple verb
. make a in force
~~make~~ force + inf
forced me to give

AFFIRMATIVE (SO / TOO)
and she will too
and so will she

INFERENCE
= from POV of author
or FACT from passage

DO SO : entire action including verb, objects, mod
Quinn did not eat dinner quickly but her brother did so
DO IT : noun antecedent
Quinn failed to do her HW, but her brother did it.

* WHILE ~~simple~~ must be a ~~complete~~ clause
While others NOT X
While others do not
* ABSOLUTE PHRASE modifies clause, or
↳ no verb allowed → noun + that OK

SOME ⊕ sentence
ANY ⊖ sentence
want some coffee
don't want any coffee
COMPARED WITH - differences
COMPARED TO - similarities

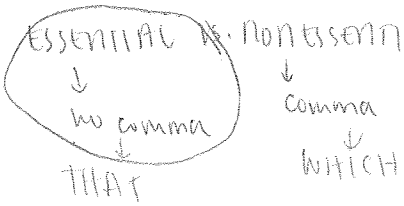
PARALLELISM
• start with subordinates
where ... where
who ... whose
• LINKING VERBS should be PAIR
the bouquet was a gift of love.
EQUAL!

NUMBERS greater not more
INCREASE : change of one thing over time
GREATER : comparison of 2 things
price of gold is greater than that of copper

Either neither : follows closest noun
When used alone (either, neither) SINGULAR
Collective nouns : S
• Indefinite Pronouns : S
Anybody, anyone, anything, each, every
everyone, everything, either, neither
• SANAM depends on context (closest noun)
Some All None Any More / Most
• FRACTIONS closest noun
• FLIP IT ! Subj may come after.

PRONOUNS:
This / these will not replace nouns.
Her products are weird, many consider ~~these~~ THEM unique
That / those must agree in # with noun
Her company is better than ~~those~~ of competitors
the companies
ONE PRONOUN, ONE ANTECEDENT
it / its → one sing. noun
they / them / their → same plural noun
ONE - can take SING / PLURAL ANTECEDENT

TENSE:
- DO NOT USE Progressive tense for FUTURE tense



WHICH – only to a noun immediately preceding it
NEVER an entire clause
☆ Appositive between relative clause & modified noun is ALLOWED

- CLAUSES LED BY THE PRONOUN THAT CANNOT MODIFY PEOPLE
>X The scientists that made the discovery were rewarded
✓ The scientists who made the discovery were rewarded

WHOSE: people or things
WHO vs WHOM
relative clause — object of verb or preposition
WHERE – should only be places.
To use IN WHICH for conditions, etc.

CONDITIONAL

✓ Present + Future
Past + Conditional

X Present + Cond
Past + Future

✓ they believe that – WILL BE believed / WOULD BE

X believe / believed — WOULD BE / WILL BE

If X would => not allowed

high, low
higher, lower] ADJ only

✓ My bills are lower than they were last yr.
✗ I spend lower than I did.
✓ I spend Less ✓ than ...

PAR COMP
- You are more interesting than he
- You are less interesting than she
- Adrian runs quickly.
  He runs more quickly than you.
- ONLY USE MORE/LESS THAN when there is comparison

PAST PARTICIPLE

- do not use when order is obvious
Autumn drove to the store & bought some ice cream.
- do not use when referent/affix is clearly stated.
- only use when necessary / it has an effect on the sentence meaning
>continued effect

WHETHER

- I like ice cream, whether it ~~BE~~ IS chocolate or any flavor

PARALLELISM. ~~Omitted words~~

– can omit units, verbs, clauses

I walk faster than Brian whereas I drink 2 cups, she drinks 3.
I walk as fast now as when I was younger.

AGE: times as, as
> five times as old as ✓
five times older X

- TIMES w/o as or than
six times the cost last yr.
twice the number
✓ ten years OLDER.
✗ ten years as old

* EXPRESS a condition by using IF not, inverting S & V + should
> ~~should~~ he pass
If he passes ✓
> JUST AS ✓
JUST AS, SO TOO

SC MODIFIERS

VERB-ING → NOUN — no comma after
→ ACTION < describe how action is done
RESULT
↳ comma after

|▷ HOW, DESCRIBE, RESULT

Joe played the puppy wearing a black collar.
↳ NO COMMA.

ACTION - doer of both actions is the same
- separated with comma if it modifies the preceding action.
↳ RESULT OF THE ACTION: cause → effect
Mary made a bouquet, winning accolades from everyone.
→ same doer.

CONSTRUCTIONS
Verb-ing Modifier, Modified entity
NOUN / ACTION (depends on context)

* VERB-ING MOD ┌ can mod to-verb
- not always modify subject
PROCESS: find modified action

MOD. ACTION
MODIFIER ACTION
] SAME DOER

Joe became the CFO of the company, increasing his pay significantly.
↳ not JOE
↳ a move that increased his pay significantly

ERROR NOTES:
- not because it's in subjunctive tense mean that verb should be in infinitive form?
Ex.. ensure that patients would be ... before it was conducted
- not only ... but (valid idiom)
- where is only for places. In other situations, use "in which"
- attributed to
- correlate with
- CIS — CWD compare to similarities, compare with differences
- put ONLY before modified noun
- PRICE - can only be higher / lower
- GOODS & SERVICES - can be more / less expensive
- AMOUNT OF time, NUMBER of resources
- costs (money) => Non-countable
costs (fixed costs, variable, tax deductable) => COUNTABLE
much / many
- POPULATION : non-countable
- FINES - countable
- SINGULAR QUANTITY (portion of interest) => GREATER THAN
- INCENTIVES : countable
- FEWEST is a word

QUANT: GMAT CLUB

- PRIME #s
  - ▷ all prime numbers above 3 are of the form $6n-1$ or $6n+1$
  - ▷ check if prime: divide the number (n) with integers smaller than $\sqrt{n}$
- FACTORS
  - ▷ If a is a factor of b, and a is a factor of c, then a is a factor of $(mb+nc)$ even $(mb+nc)$
  - ▷ a is factor of b, b is factor of c, then a is factor of c
  - ▷ a is factor of b, b is factor of a, then $a=b$ or $a=-b$

ABSOLUTE VALUES:

$\|a+b\| = \|a\| + \|b\|$	a, b same sign
$\|a+b\| < \|a\| + \|b\|$	diff
$\|a-b\| = \|a\| - \|b\|$	same
$\|a-b\| > \|a\| - \|b\|$	diff

SUM OF THE FACTORS OF AN INTEGER

$N = a^p \cdot b^q \cdot c^r$

$$\text{SUM} = \frac{(a^{p+1}-1)(b^{q+1}-1)(c^{r+1}-1)}{(a-1)(b-1)(c-1)}$$

- $ab = GCD(a,b) \cdot LCM(a,b)$
- NUMBER OF TRAILING ZEROS IN FACTORIALS

$\frac{n}{5} + \frac{n}{5^2} + \frac{n}{5^3} \cdots$ Ex: 32!

$\frac{32}{5} + \frac{32}{5^2} = 6+1 = \boxed{7}$

$\rightarrow \frac{n}{p} + \frac{n}{p^2} + \frac{n}{p^3} \cdots$

CONSECUTIVE INTEGERS

mean $= \frac{a_1 + a_n}{2}$

if n is odd, $\sum a_n$ is div by n

if n is even, $\sum a_n$ is NOT div by n

the product of n cons. int. is div by n!

EVENLY SPACED SET

$a_n = a_1 + d(n-1)$

- mean = median
- SUM $= \frac{n(a_1+a_n)}{2} = \frac{2a_1+d(n-1)}{2} \cdot n$
- sum of n first positive int. $= \frac{n^2+n}{2}$

- sum of n first odd $= n^2$
- sum of " " even $= n^2+n$

DECIMAL

- only terminating if denominator is $2^n \cdot 5^m$

EXPONENT

$a^n - b^n$: div by $a-b$

$a^n - b^n$: div by $a+b$ if n is even

$a^n + b^n$: div by $a+b$ if n is odd, not div by $a+b$ if n is even

CYCLICITY

0: 0,1,5,6

2: 4,9

4: 2,3,7,8

ROOTS:

$\sqrt{x^2} = |x|$

$\sqrt{25} = 5$

$x^2 = 25, x = \pm 5$

$\sqrt{2} \approx 1.41$

$\sqrt{3} \approx 1.73$

$\sqrt{5} \approx 2.24$

$\sqrt{6} \approx 2.45$

$\sqrt{7} \approx 2.65$

$\sqrt{8} \approx 2.83$

$\sqrt{10} \approx 3.16$

QUADRATIC EQ:

$ax^2+bx+c=0$ $\quad \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

No solution if $b^2 < 4ac$

one solution if $b^2 = 4ac$

- max value: $\frac{-b}{2a}$
- SUM OF ROOTS: $-\frac{b}{a}$
- PRODUCT OF ROOTS: $\frac{c}{a}$

- $x^3+y^3 = (x+y)(x^2+y^2-xy)$
- $x^3-y^3 = (x-y)(x^2+y^2+xy)$

QUAD EQ determinants: if Δ is Θ, 1 root is $\oplus$, 1 not is Θ

REMAINDERS

- find remainder when divided by x

$n = mx + r$

x = LCM

r = first common integer

WORK

$T_{TOTAL} = \frac{xy}{x+y}$ OR $\frac{xyz}{xy+yz+xz}$

SETS

① TOTAL = A+B+C − (overlap of 2 groups) + (all 3) + (Neither)

= A+B − Both + Neither

② TOTAL = A+B+C − (sum of exact 2) − 2(all 3) + Neither

Δ

- midsegment $= \frac{1}{2}$ (3rd side · parallel)
- angle bisector: $\frac{BD}{DC} = \frac{AB}{AC}$
- similar Δs: side $\frac{x}{y} \rightarrow$ area $\frac{x^2}{y^2}$

$A = \sqrt{s(s-a)(s-b)(s-c)}$ $\rightarrow s = \frac{a+b+c}{2}$

CONGRUENCE: SAS, SSS, ASA

Δ

- EQUILATERAL: $A = \frac{a^2\sqrt{3}}{4}$, $h = \frac{a\sqrt{3}}{2}$
- ISOSCELES: $B = 2\sqrt{L^2-h^2}$, base, leg, height; $h = \sqrt{L^2-(\frac{B}{2})^2}$
- RIGHT 30,60,90: ratio $1:\sqrt{3}:2$
- RIGHT 45,45,90: $1:1:\sqrt{2}$, $A = \frac{s^2}{2}$

PYTHAGOREAN TRIPLE

(3,4,5) (5,12,13) (7,24,25) (8,15,17) (9,40,41) (11,60,61)

(12,35,37) (13,84,85) (16,63,65) (20,21,29) (28,45,53)

(33,56,65) (36,77,85) (39,80,89) (48,55,73) (65,72,97)

COORDINATE GEOMETRY

$m = \frac{y_2-y_1}{x_2-x_1}$ $\quad (x_1,y_1)$ $\quad x_2-x_1$

★ ONE POINT & SLOPE: $y-y_1 = m(x-x_1)$

★ PARALLEL TO LINE, POINT: $a(x-x_1)+b(y-y_1)=0$

- DISTANCE BET LINES: $D = \frac{|b-c|}{\sqrt{m^2+1}}$ $\quad y=mx+b$, $y=mx+c$

PERPENDICULAR LINES

slope $= -\frac{1}{m}$

PRODUCT $m_1 \cdot m_2 = -1$

⊥ if $a_1a_2 + b_1b_2 = 0$

to $a_1x+b_1y+c_1=0$

$a_2x+b_2y+c_2=0$

DISTANCE OF POINT TO LINE

$D = \frac{|ax_0+by_0+c|}{\sqrt{a^2+b^2}}$ $\quad (x_0,y_0)$ $\quad ax+by+c=0$

ORIGIN: $D = \frac{|c|}{\sqrt{a^2+b^2}}$

- POINT, PERP. TO LINE: $b(x-x_1) - a(y-y_1) = 0$

STANDARD DEV

variance $= \frac{\sum (x-mean)^2}{N}$

$SD = \sqrt{variance}$

	COVER	REMAIN	PER SIDE
1SD	68%	32%	16%
2SD	95%	5%	2.5%
3SD	99%	1%	0.5%

- change by % → change SD by same %
- increase/decrease #, no change in SD

PROBABILITY

P of independent events

$P = C^n_k \cdot p^k \cdot (1-p)^{n-k}$

ex. 3 heads in 8 toss

$P = C^8_3 \cdot (0.5)^3 \cdot (0.5)^5$

# of arrangement $= n!$

COMBINATION: $C^n_k = \frac{n!}{k!(n-k)!}$

PERMUTATION: ORDER DOESN'T MATTER $P^n_k = \frac{n!}{(n-k)!}$

CIRCULAR: $(n-1)!$

SEQUENCE

$a_n = a_{n-1} + d = a_1 + (n-1)d$

mean$_{AP} = \frac{a+b}{2}$

$S = \frac{n}{2}(a_1+a_n) = \frac{n}{2}[2a+(n-1)d]$

geom. mean $= \sqrt{ab}$

harm. mean $= 2ab/(a+b)$

GEOM. PROG.: ratio of terms is constant

$b_n = b_{n-1} \cdot r = \boxed{a_1 \cdot r^{n-1}}$ $\quad S = b_1 \cdot \frac{r^n-1}{r-1} = \boxed{\frac{b_1}{1-r}}$ INFINITE

PARALLELOGRAM

$A = bh$

diagonal = $\sqrt{w^2+h^2}$

RHOMBUS

$A = \frac{d_1 \cdot d_2}{2}$

SQUARE

$A = \frac{d^2}{2}$

$d = s\sqrt{2}$

TRAPEZOID

$A = h \cdot \frac{a+b}{2}$

$A = h \cdot \text{median}$

O CIRCLE

$C = 2\pi r = \pi D = \sqrt{4\pi A}$

$A = \pi r^2 = \frac{\pi D^2}{4} = \frac{C^2}{4\pi}$

CHORD

length = $2\sqrt{r^2-d^2}$ ↳ altitude

POWER POINT

$(PA)(PB) = (PC)(PD)$

can also be for tangent, point inside O

tangent 90°

3D GEOM.

CUBE	CUBOID	CYLINDER	CONE	SPHERE
$V = a^3$	$V = abc$	$V = \pi r^2 h$	$V = \frac{1}{3}\pi r^2 h$	$V = \frac{4}{3}\pi r^3$
$SA = 6a^2$	$SA = 2(ab+bc+ac)$	$SA_{side} = 2\pi r h$	$l = \sqrt{r^2+h^2}$	$SA = 4\pi r^2$
$d = \sqrt{3}a$	$d = \sqrt{a^2+b^2+c^2}$	$SA_{whole} = 2\pi r(r+h)$		

CUBE INSIDE SPHERE

side of cube = $\frac{2r}{\sqrt{3}}$

CYL INSIDE SPHERE

$h_{CYL} = 2\sqrt{R^2-r^2}$

EQUILATERAL △s

$A = \frac{s^2\sqrt{3}}{4}$

PRODUCT OF n consecutive integers is always divisible by n!

49 -> 51 GMAT CLUB

· FOCUS on INTEGER PROP, STATISTICS, PROB, INEQ, ABSOLUTE VAL

notes:

1. For DS, try #s, be wary of obvious Cs
2. Logic can solve some Qs
3. Check equations if they are not same
4. For integers questions, check divisibility if only 1 possible pattern/answer is present
5. For averages/mode/median, check LOGIC (min/max)

(11) BE CAREFUL OF "MORE THAN", "LESS THAN" READ QUESTION PROMPT CAREFULLY!

(12) INEQUALITY: REMEMBER THAT ⊖ MULTIPLIER WILL REVERSE < > SIGNS!
CHECK EVEN, IF VARIABLES
• DO NOT MULTIPLY VARIABLE WHOSE SIGN YOU DO NOT KNOW!

(13) LEAST COMMON DENOMINATOR: LCM OF DENOMINATORS YOU NEED TO MAKE THE FRACTIONS ADDIBLE/SUBTRACTIBLE

(14) READ QUESTION PROMP ESP. FOR SHORT QUESTIONS. CHECK NEEDED INFO. CLEARLY!

(15) DON'T FORGET # OF COMBINATIONS SHOULD BE MULTIPLIED TO PROBABILITY. FOR REPEATS

ERROR

(1) PERCENT

simple interest

$I = Pt\left(\frac{r}{100}\right)$ t => time

compound int

$P' = P\left(1+\frac{r}{100}\right)^t$

or

$P' = P\left(1+\frac{r}{100n}\right)^{tn}$ => n = times per year

(2) △ sides

$S_3 - S_1 < S_2 < S_3 + S_1$

(3) $h(n)$ = product of even #s from 2 to n

p is smallest prime factor of $h(100)+1$

p = ?

$h(100)$ and $h(100)+1$

↓

$(2)(4)(6)(8)\cdots(100)$

$2^{50}(1\cdot2\cdot3\cdot4\cdot50)$

$(2^{50})(50!)$ $(2^{50})(50!)+1$

CO-PRIMES

ONLY SHARE 1 as PRIME FACTOR

Thus, $p > 50$

(4) INEQUALITIES

	$-\infty$	-1	0	1	$+\infty$
x	-5	$-\frac{1}{3}$		$3/4$	10
x^2	25	$1/9$		$9/16$	100
x^3	-125	$-\frac{1}{27}$		$27/64$	1000
x^4	625	$\frac{1}{81}$		$/256$	10000

* FOR DIV OR MULT, USE BOTH LOWER & HIGHER VALUES OF DECIMALS

(5) BETWEEN ≠ SAME DISTANCE

(6) PERCENT: 200% more than x = 300% x = 3x

(7) SQUARES, DIFFERENCE BET SQUARES IS UNIQUE AND INCREASES WITH THE INCREASE IN VALUE

(8) # OF 0s IN DECIMAL $\frac{x}{10^{12}}$ → 12 − # of digits of x

If x is <10 ∴ # of 0s is 11

(9) PRIME #s, check example til ~8

(10) COMBINATIONS

DIGIT $\frac{5!}{2!}$ (repeat I)

GOOGLE = $\frac{6!}{2!\,2!}$ (repeat g, o)

(11) PERCENT:

IF THERE'S CHANGE IN TOTAL, DON'T FORGET TO ADD THAT CHANGE "MRS. LEE'S EARNINGS"

ERROR NOTES VP 5

SC

- Parallelism must win! remove garbage
  was reported & emigrated
- NOT EVERY... WANTS... SHE
  NOT ALL ... WANT ... THEY
- order that the garage (be) built
  PARALLELISM MUST WIN! → no need to input if present ...
- when you're in doubt, recheck STEM ! (rare bird ... it)
- when in doubt, choose the PAR one

CR

- when in doubt, choose the next best answer (although you think it's faulty)
- when lost, recheck STEM to look for missed info.
- ~~WHEN~~ ,

RC

- reread question, clarify your doubts ⇒ author's tone ...
- reread to check!

PS

- Arithmetic (Mean) ⇒ check possibilities : greatest possible value
- When stressed, stop to breathe
- STOP THINKING THAT IT'S A HARD* QUESTION
- ALWAYS STOP & LOOK FOR SHORTCUTS WHEN MULTIPLYING BIG #s
- REREAD STEM : <u>reduce</u> SD
- COMBINATION
  - 5 people, y doesn't wanna be beside x
    5! − 2(4!)
    ↳ bec. yx, xy arrangement

DS

- VENN DIAG ...
  given ...
- STOP TO ...

ERROR NOTES VP6 /EG3

SC
- when in doubt about meaning, pick the gramatically correct / best one
- _ and _ should be parallel even if no an appositive
- amount: only for uncountable nouns. fewer than one-quarter as many CORRECT

CR

RC
inference - recheck / reread
ambivalent - no opinion (TONE)

DS
Ratio in probability
5:6
e:w
] does not identify exact probability if you're gonna choose 2 Cs
- $\frac{x^2}{4} = \frac{4}{9}$ does not mean $x = \pm 2$ / $4 = \pm 3$] they are multiples of 2 & 3
- area of parallelogram = bh. knowing all sides does not imply area.

PS
- Sets: same # of both & neither : PATIO + SWIM = TOTAL SUFFICIENT