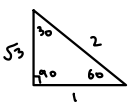
↳ Compound Interest → Amount $= P\left(1+\frac{R}{100}\right)^t$

↳ 5% annually compounded quarterly, now $R = R/4$

$t = t \times 4$

→ 30, 60, 90 Triangle

$1 : \sqrt{3} : 2$



↳ Multiples, difference between 2 multiples is also a multiple.

Eg → If K, K+200, K+350 are multiples of P, what is P

$P \rightarrow K \rightarrow K+200 \rightarrow K+350$

200 150

These both should be multiples of P

→ Trapezoid area $= \frac{b_1+b_2}{2} \cdot h$

→ Prime number trick, to test if any no. less than 100 is a prime, check if it is divisible by any prime numbers less than 10

→ Factors of large numbers trick

↳ ① Prime factorization

↳ ② List all exponents of prime factors

↳ ③ add 1 to each

↳ ④ Multiply them

Eg → 8400 → $2^4 \times 3^1 \times 5^2 \times 7^1$

→ {4, 1, 2, 1}

→ {5, 2, 3, 2}

→ $5 \times 2 \times 3 \times 2 \rightarrow \underline{60}$

Eg → 21600 → 216×100

→ $6^3 \times 10^2$

→ $(2\times3)^3 \times (5\times2)^2$

→ $2^3 \times 3^3 \times 5^2 \times 2^2$

→ $2^5 \times 3^3 \times 5^2$

→ (5, 3, 2) → (6, 4, 3)

→ $6 \times 4 \times 3 \rightarrow \underline{72}$

→ Sum of integers in a range → $\frac{n}{2}(a_1 + a_n)$

n → no. of terms → $a_n - (a_{i+1})$

Example → b/w 45 & 155

a_1 a_n

$n = 155 - (45+1)$

↳ Adding and subtracting Evens and odds

- $E+E=E$ • $E-E=E$ } Same always even
- $O+O=E$ • $O-O=E$
- $E+O=O$ } Different always odd
- $E-O=O$

↳ Multiplying Evens and odds

- $E \times E = E$
- $O \times O = O$
- $E \times O = E$

↳ Dividing Evens and odds

E/E = E or odd or not an integer • O/E → never an integer

O/O = O or not an integer

↳ $\frac{D}{S} = Q + \frac{r}{S}$

D → Divident
S → Divisor
Q → Quotient
r → Remainder

→ $|-k+4| > 2$

$-k+4 > 2$

$-k+4 < -2$

↳ Inequality as absolute value

→ Express $-3 \leq x \leq 11$ as absolute inequality

→ Add $-3 + 11 \rightarrow 8 \rightarrow$ Midpoint $\rightarrow \frac{8}{2} \rightarrow 4$

$|x-4| \leq 7$

→ Sum of angles in n sided polygon

$(n-2) \times 180$

→ Age Questions

- Pick a variable to represent the age "right now"

Q) Right now steve's age is half of Tom's age. In eight years, twice Tom's age will be five more than three times steve's age. How old is Tom right now.

↳ Tom today = T Tom in eight years → T+8

Steve today = S Steve in eight years → S+8

$T = 2S$ —①

$2(T+8) = 3(S+8) + 5$ —②

↳ Double matrix

	Type A	Type B	
Type 1	a	b	a+b
Type 2	c	d	c+d
	a+c	b+d	a+b+c+d

→ Sum of multiples in a range → No. of terms = N

a_1 → begining of range

a_N → last number in range

→ $(a_1 + a_N) \times \frac{N}{2}$

Examples → Sum of multiples of 5 bigger than 100 & less than 200.

→ So $a_1 = 105$

$a_n = 195$

$N = \frac{195-105}{5} + 1 \rightarrow 19$

$(195+105) \times \frac{19}{2}$

$= 2850$

→ Unit digit of 57^{123}

→ only see $7^1 \rightarrow 7$

$7^2 \rightarrow \ldots 9$

$7^3 \rightarrow \ldots 3$

$7^4 \rightarrow \ldots 1$

Pattern

$7^5 \rightarrow \ldots 7$

$7^6 \rightarrow \ldots 9$

$7^7 \rightarrow \ldots 3$

$7^8 \rightarrow \ldots 1$

→ Repeats every 4, $123 \% 4 \rightarrow 3$, check third no. in pattern = 3

→ Triangle side property

Sum of either 2 sides must be greater than the third side

$a + b > c$

$b + c > a$

$a + c > b$

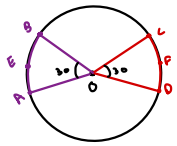
→ Diagonals of an n sided polygon

$\frac{n(n-3)}{2}$

→ Set of n items with b identical items

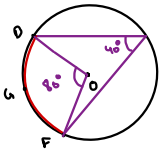
$N = \frac{n!}{b!}$

→ Equal arcs and chords



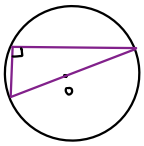
If $\angle AOB = \angle COD$, then arc AEB = arc CFD

→ Arc and incribed angle (angle which doesnt fall on centre  ABC)



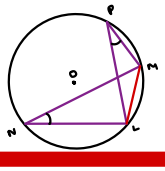
angle of arc will be 80°, double of incribed angle

→ Right angle



This has to be 90°

→ 2 incribed angles and same arc / chord



These angles are equal

→ Arc length proportion

$$\frac{\text{arc length}}{2\pi r} = \frac{\text{angle}}{360}$$

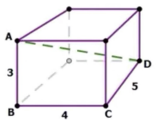
→ Area of a sector proportion

$$\frac{\text{area of sector}}{\pi r^2} = \frac{\text{angle}}{360}$$

→ Cylinder

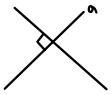
Volume $= \pi r^2 h$

Area $= 2\pi r^2 + 2\pi rh$



$AD^2 = AB^2 + BC^2 + CD^2$

→ Slope of ⊥lar lines



if slope of $a = m$

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

Inter Quartile Range

IQR → $Q_3 - Q_1$

→ Distance blw points (x, y) & (a, b)

$$\sqrt{(x-a)^2 + (y-b)^2}$$

→ Standard deviation →

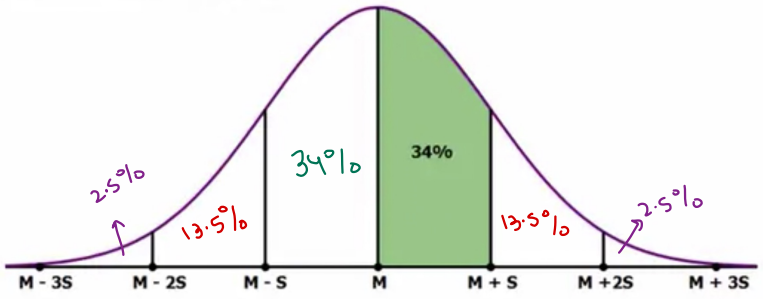
① Calc mean

② Subtract all values from mean

③ Square all values

④ Find mean of this new set → Variance

⑤ Square root variance → SD



↳ $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

↳ $P(A \text{ or } B) = P(A) + P(B)$ {for disjoint}

↳ $P(A \text{ and } B) = P(A) \cdot P(B)$ {for independent}

↳ $P(A \text{ and } B) = P(A) \cdot P(B|A)$ {not independent}

→ Binomial formula

p → probability of success on 1 trial

n → no of trials

r → no of success

$$(nCr) \cdot (p^r) \cdot (1-p)^{n-r}$$