

SSC CGL Formulas and Tricks

NUMBER SYSTEM

$$1 + 2 + 3 + \dots + n = n(n + 1)/2$$

Explanation: Sum of first n natural numbers.

How to Identify: Sequence starts at 1 and increases by 1 each time.

NUMBER SYSTEM

$$(1^2 + 2^2 + 3^2 + \dots + n^2) = n(n + 1)(2n + 1)/6$$

Explanation: Sum of squares of first n natural numbers.

How to Identify: Terms are squared and in a sequence.

NUMBER SYSTEM

$$(1^3 + 2^3 + 3^3 + \dots + n^3) = (n(n + 1)/2)^2$$

Explanation: Sum of cubes of first n natural numbers.

How to Identify: Terms are cubed and in a sequence.

NUMBER SYSTEM

$$\text{Sum of first } n \text{ odd numbers} = n^2$$

Explanation: Quick sum for series like 1, 3, 5...

How to Identify: Sequence of odd numbers starting from 1.

NUMBER SYSTEM

$$\text{Sum of first } n \text{ even numbers} = n(n + 1)$$

Explanation: Quick sum for series like 2, 4, 6...

How to Identify: Sequence of even numbers starting from 2.

NUMBER SYSTEM

$$(a + b)(a - b) = (a^2 - b^2)$$

Explanation: Difference of squares identity.

How to Identify: Product of sum and difference of two same terms.

NUMBER SYSTEM

$$(a + b)^2 = (a^2 + b^2 + 2ab)$$

Explanation: Square of a sum identity.

How to Identify: A binomial term being squared.

NUMBER SYSTEM

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

Explanation: Square of a difference identity.

How to Identify: Difference of two terms being squared.

NUMBER SYSTEM

$$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$$

Explanation: Expansion of a trinomial squared.

How to Identify: Three terms being squared together.

NUMBER SYSTEM

$$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$$

Explanation: Factoring sum of cubes.

How to Identify: Sum of two cubed terms.

NUMBER SYSTEM

$$(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$$

Explanation: Factoring difference of cubes.

How to Identify: Difference of two cubed terms.

NUMBER SYSTEM

$$(a^3 + b^3 + c^3 - 3abc) = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ac)$$

Explanation: General cubic identity.

How to Identify: Large cubic terms involving three variables.

NUMBER SYSTEM

$$\text{If } a + b + c = 0, \text{ then } a^3 + b^3 + c^3 = 3abc$$

Explanation: Shortcut for cubic sums.

How to Identify: Sum of the three base numbers is zero (e.g., 25, -15, -10).

NUMBER SYSTEM

$$(a + b)^n = a^n + (nC1)an-1b + \dots + b^n$$

Explanation: Binomial expansion.

How to Identify: A binomial raised to a higher power n.

HCF AND LCM

$$\text{Product } (ab) = \text{HCF} * \text{LCM}$$

Explanation: Relates two numbers to their HCF and LCM.

How to Identify: Problem involves two numbers and their HCF/LCM.

HCF AND LCM

$$abc \neq \text{HCF} * \text{LCM}$$

Explanation: Note that product rule fails for 3+ numbers.

How to Identify: Problem involves three or more numbers.

HCF AND LCM

$$\text{HCF of fractions} = (\text{HCF of Num}) / (\text{LCM of Den})$$

Explanation: Formula for fraction HCF.

How to Identify: Finding common divisor for a set of fractions.

HCF AND LCM

LCM of fractions = (LCM of Num)/(HCF of Den)

Explanation: Formula for fraction LCM.

How to Identify: Finding least common multiple for a set of fractions.

HCF AND LCM

$d = am + bn$

Explanation: HCF d as linear combination.

How to Identify: Theoretical number system questions or remainder rules.

HCF AND LCM

Co-primes: HCF = 1

Explanation: Definition of co-prime numbers.

How to Identify: Checking if two numbers have any common factors besides 1.

HCF AND LCM

HCF always divides LCM

Explanation: Rule about the relationship of HCF/LCM.

How to Identify: Questions asking if certain HCF/LCM pairs are possible.

HCF AND LCM

Method 1: Prime Factors

Explanation: Find common prime factors.

How to Identify: Small to medium numbers that are easy to factorize.

HCF AND LCM

Method 2: Division Method

Explanation: Successive division until remainder is 0.

How to Identify: Medium to large numbers.

HCF AND LCM

Method 3: Large Numbers HCF

Explanation: Remove obvious common factors first.

How to Identify: Very large numbers; look for obvious factors like 2, 3, 5, 9.

SIMPLIFICATION

BODMAS Rule

Explanation: Order: Brackets, Of, Div, Mult, Add, Sub.

How to Identify: Long expressions with mixed operators.

SIMPLIFICATION

Modulus: $|a| = a$ if $a > 0$, $-a$ if $a < 0$

Explanation: Absolute value rule.

How to Identify: Vertical bars $| |$ around numbers or expressions.

SIMPLIFICATION

Vinculum (Bar)

Explanation: Solve expression under the bar first.

How to Identify: Horizontal bar over numbers within an equation.

ROOTS

Duplex $a = a^2$

Explanation: Duplex for single digit.

How to Identify: Square calculation starting from the left-most digit.

ROOTS

$$\text{Duplex } ab = 2(ab)$$

Explanation: Duplex for two digits.

How to Identify: Cross-multiplying during squaring process.

ROOTS

$$\text{Duplex } abc = 2(ac) + b^2$$

Explanation: Duplex for three digits.

How to Identify: Squaring three-digit numbers instantly.

ROOTS

$$\text{Duplex } abcd = 2(ad) + 2(bc)$$

Explanation: Duplex for four digits.

How to Identify: Squaring four-digit numbers efficiently.

ROOTS

$$\text{Cube Layout Method (e.g. } 16^3)$$

Explanation: Write $a \mid b \mid b^2 \mid b^3$ and double middle.

How to Identify: Numbers between 11-19; easy pattern for cubes.

AGES

$$nx$$

Explanation: n times the current age x .

How to Identify: Phrases like 'thrice his age' or 'five times'.

AGES

$$x + n$$

Explanation: Age n years later/hence.

How to Identify: Phrases like '5 years hence' or 'after 10 years'.

AGES

$$x - n$$

Explanation: Age n years ago.

How to Identify: Phrases like '7 years ago' or 'in the past'.

AGES

$$ax \text{ and } bx$$

Explanation: Ages in a ratio $a:b$.

How to Identify: Ratio is provided (e.g., ages of A and B are 4:5).

AGES

$$x/n$$

Explanation: $1/n$ times the age.

How to Identify: Phrases like 'one-fourth of his age'.

AGES

$$\text{Son's Age} = t1(x-1)/(x-y)$$

Explanation: Past times x , Present times y .

How to Identify: Problem gives past multiple and present multiple.

AGES

$$\text{Son's Age} = (z-1)t1/(y-z)$$

Explanation: Present times y , Future times z .

How to Identify: Problem gives present multiple and future multiple.

AGES

$$\text{Son's Age} = [(z-1)t2 + (x-1)t1]/(x-z)$$

Explanation: Past times x , Future times z .

How to Identify: Problem gives past multiple and future multiple.

AGES

$$\text{Son/Daughter Age} = [\text{Total} \pm \text{Years}(\text{Times}-1)] / (\text{Times}+1)$$

Explanation: Calculating age from total sum.

How to Identify: Problem mentions 'sum of ages' and a past/future multiple.

AGES

Cross Product Method

Explanation: Ratio $a:b$ vs $x:y$ after T years.

How to Identify: Two ratios given at different time points.

AVERAGE

$$\text{Average} = (\text{Total}) / (\text{No. of data})$$

Explanation: Basic average formula.

How to Identify: Standard average calculation requested.

AVERAGE

$$\text{New Entrant Age} = \text{New Avg} + \text{Old Members} * \text{Increase}$$

Explanation: Shortcut for new member joining.

How to Identify: A person joins and average increases.

AVERAGE

$$\text{Replacement Wt} = \text{Removed Wt} + \text{Count} * \text{Increase}$$

Explanation: Shortcut for replacing a person.

How to Identify: One person leaves and another joins.

AVERAGE

$$\text{Passed Cand} = \text{Total} * (\text{Total Avg} - \text{Fail Avg}) / (\text{Pass Avg} - \text{Fail Avg})$$

Explanation: Alligation-based shortcut.

How to Identify: Given total candidates and separate pass/fail averages.

AVERAGE

$$\text{Failed Cand} = \text{Total} * (\text{Pass Avg} - \text{Total Avg}) / (\text{Pass Avg} - \text{Fail Avg})$$

Explanation: Alligation-based shortcut.

How to Identify: Given total candidates and separate pass/fail averages.

AVERAGE

$$\text{Avg after } x \text{ innings} = \text{Total} - \text{Incr} * y \text{ innings}$$

Explanation: Cricket batting average shortcut.

How to Identify: Average change after a specific inning score.

AVERAGE

$$\text{Avg Speed} = \frac{2xy}{x+y}$$

Explanation: For two equal distances.

How to Identify: Same distance covered at two different speeds.

AVERAGE

$$\text{Avg Speed} = \frac{3xyz}{xy+yz+zx}$$

Explanation: For three equal distances.

How to Identify: Three equal segments covered at different speeds.

AVERAGE

$$\text{Original Exp} = N * [x(N+z) + y] / z$$

Explanation: Shortcut for group expenditure changes.

How to Identify: Number of students increases, total expense increases, but avg drops.

PERCENTAGE

$$\text{Value} / \text{Total Value} * 100$$

Explanation: Basic percentage formula.

How to Identify: Finding percent representation of a part.

PERCENTAGE

$$(100+x)/(100+y) * 100\%$$

Explanation: Comparing two values based on a third.

How to Identify: A and B are x% and y% more than C.

PERCENTAGE

$$\text{Initial} = (A * 100^3) / (100-x)(100-y)(100-z)$$

Explanation: Successive deductions.

How to Identify: Deductions like 'x% spent, then y% of remaining...'

PERCENTAGE

$$\text{Initial} = (A * 100^3) / (100+x)(100+y)(100+z)$$

Explanation: Successive increases.

How to Identify: Additions like 'x% added, then y% of increased...'

PERCENTAGE

$$\text{Pop in n years} = P(1+r/100)^n$$

Explanation: Population growth (Compound).

How to Identify: Annual fixed percentage increase of population.

PERCENTAGE

$$\text{Pop after 3 yrs} = P(100+x)(100+y)(100+z)/100^3$$

Explanation: Varying population rates.

How to Identify: Rates for year 1, 2, and 3 are different.

PERCENTAGE

$$\text{Cons. Reduction} = (r/100+r) * 100\%$$

Explanation: Price rises, keep expense same.

How to Identify: Phrases like 'so as not to increase expenditure'.

PERCENTAGE

$$\text{Cons. Increase} = (r/100-r) * 100\%$$

Explanation: Price drops, keep expense same.

How to Identify: Phrases like 'so as not to decrease expenditure'.

PERCENTAGE

$$\text{Net Change} = x^2/100 \text{ decrease}$$

Explanation: Successive x% increase and x% decrease.

How to Identify: The same percentage is increased and then decreased.

PERCENTAGE

$$\text{Net Change} = [x-y-(xy/100)]\%$$

Explanation: One x% increase, one y% decrease.

How to Identify: Two different changes (inc/dec) on the same value.

PERCENTAGE

$$\text{Net Change} = [x+y+(xy/100)]\%$$

Explanation: Two successive increases.

How to Identify: Two positive percentage changes (inc/inc).

PERCENTAGE

$$\text{Revenue Effect} = [\text{Inc} - \text{Dec} - (\text{Inc} \cdot \text{Dec} / 100)]$$

Explanation: Price vs Consumption effect.

How to Identify: Price goes up/down while quantity goes up/down.

PERCENTAGE

$$\text{Max Marks } M = 100 \cdot (y+z) / x$$

Explanation: Score y , fail by z , pass $x\%$.

How to Identify: Student scores some marks and fails by some, pass % given.

PERCENTAGE

$$\text{Max Marks } M = 100 \cdot (a+b) / (y-x)$$

Explanation: Two students pass/fail marks diff.

How to Identify: One student fails by 'a', another exceeds by 'b'.

PERCENTAGE

$$\text{Area Error} = [x - y - (xy/100)]$$

Explanation: Rectangle side measurement errors.

How to Identify: One side measured $x\%$ more, other $y\%$ less.

PERCENTAGE

$$\text{Area Increase} = [2x + (x^2/100)]\%$$

Explanation: Sides of square/circle inc by $x\%$.

How to Identify: Radius or side increased, find effect on area.

PERCENTAGE

$$\text{Pass \% in both} = 100 - (x + y - z)$$

Explanation: Venn diagram shortcut.

How to Identify: $x\%$ fail in Sub A, $y\%$ fail in Sub B, $z\%$ fail in both.

PROFIT AND LOSS

$$\text{Profit} = \text{SP} - \text{CP}$$

Explanation: Basic profit definition.

How to Identify: Standard profit calculation.

PROFIT AND LOSS

$$\text{Loss} = \text{CP} - \text{SP}$$

Explanation: Basic loss definition.

How to Identify: Standard loss calculation.

PROFIT AND LOSS

$$\text{Gain/Loss \%} = (\text{G or L} / \text{CP}) * 100\%$$

Explanation: Percentage of profit or loss.

How to Identify: Finding the rate of return on cost.

PROFIT AND LOSS

$$\text{Gain \%} = [\text{Error} / (\text{True} - \text{Error})] * 100\%$$

Explanation: False weight profit shortcut.

How to Identify: Dishonest shopkeeper using less weights.

PROFIT AND LOSS

$$\text{Total Profit \%} = [(\%P + \%Less) / (100 - \%Less)] * 100\%$$

Explanation: Profit with false weight.

How to Identify: Dealer adds profit % on price AND uses less weights.

PROFIT AND LOSS

$$\text{CP} = (\text{More Gain} * 100) / \text{Diff in \% P}$$

Explanation: Shortcut for profit change.

How to Identify: Difference in profit amount given for two profit % scenarios.

PROFIT AND LOSS

$$SP = [\text{More Rupees} * (100 + \% \text{Gain})] / (\%G + \%L)$$

Explanation: Switch from loss to gain.

How to Identify: Sold at loss, if sold for 'X' more, would gain 'Y%'.

PROFIT AND LOSS

$$\text{Profit \%} = [(x - y) / y] * 100$$

Explanation: CP of x = SP of y articles.

How to Identify: Number of articles bought equals number sold for same price.

PROFIT AND LOSS

$$CP = (100 * \text{More Charge}) / (\% \text{ Diff})$$

Explanation: Shortcut for charge diff.

How to Identify: Product price changed and profit/loss % changed accordingly.

TIME AND WORK

$$M1 * D1 * T1 * E1 * W2 = M2 * D2 * T2 * E2 * W1$$

Explanation: Chain rule (Work W is crossed).

How to Identify: Multiple men, days, hours working on a project.

TIME AND WORK

$$\text{Together} = (x * y) / (x + y)$$

Explanation: A takes x, B takes y days.

How to Identify: Two people working together.

TIME AND WORK

$$\text{Together} = \frac{xyz}{xy+yz+zx}$$

Explanation: A, B, C work together.

How to Identify: Three people working together.

TIME AND WORK

$$\text{B Alone} = \frac{x*y}{x-y}$$

Explanation: Total x, A takes y days.

How to Identify: Combined time and one person's time given.

TIME AND WORK

$$\text{Original Workers} = \frac{(\text{More} * \text{New Days})}{\text{Less Days}}$$

Explanation: Shortcut for worker count.

How to Identify: If 'X' more men were there, work finished 'Y' days earlier.

PIPE & CISTERNS

$$1 \text{ hour part} = 1/x$$

Explanation: Work rate for filling.

How to Identify: Basic filling rate calculation.

PIPE & CISTERNS

$$1 \text{ hour empty} = 1/y$$

Explanation: Work rate for emptying.

How to Identify: Basic leakage or drain rate calculation.

PIPE & CISTERNS

$$\text{Time} = \frac{xy}{y-x}$$

Explanation: One fills (x), one empties (y).

How to Identify: Fill pipe and drain pipe open together.

PIPE & CISTERNS

$$\text{Time} = \frac{xy}{(x+y)}$$

Explanation: Both fill (x and y).

How to Identify: Two inlet pipes open together.

PIPE & CISTERNS

$$\text{Time} = \frac{xyz}{(yz+xz-xy)}$$

Explanation: 2 fill (x,y), 1 empty (z).

How to Identify: Three pipes: two inlet, one outlet.

PIPE & CISTERNS

$$\text{Leak empty time} = \frac{xy}{(y-x)}$$

Explanation: Filled in x, leaked in y.

How to Identify: Tank fills slower due to a leak.

TIME AND DISTANCE

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

Explanation: Basic speed definition.

How to Identify: Standard motion calculation.

TIME AND DISTANCE

$$\text{Speed } a:b \rightarrow \text{Time } b:a$$

Explanation: Inverse ratio rule.

How to Identify: Speeds of two objects compared over same distance.

TIME AND DISTANCE

$$\text{Avg Speed} = \frac{2xy}{(x+y)}$$

Explanation: Harmonic mean speed.

How to Identify: Round trip or two equal distance segments.

TIME AND DISTANCE

$$\text{Dist} = [\text{Prod S} / \text{Diff S}] * \text{Diff Time}$$

Explanation: Shortcut for arrival diff.

How to Identify: Late/Early problems (Late by 10m, Early by 5m).

TIME AND DISTANCE

$$\text{Dist} = \text{Total Time} * [\text{Prod S} / \text{Add S}]$$

Explanation: Total journey time given.

How to Identify: Going and coming back in total 'T' hours.

TIME AND DISTANCE

$$\text{Meeting dist} = (S1 * S2 * \text{Diff Time}) / (\text{Diff Speed})$$

Explanation: Catch up distance.

How to Identify: One person starts later and catches up.

TIME AND DISTANCE

$$\text{Dist} = 2 * \text{Total Dist} * (a/a+b)$$

Explanation: Meeting point shortcut.

How to Identify: Two people meet after traveling from A to B and back.

TIME AND DISTANCE

$$\text{Rest Time/hr} = (\text{Diff Speed}) / (\text{No Stop Speed})$$

Explanation: Stoppage time shortcut.

How to Identify: Given speed with and without stoppages.

PROBLEM ON TRAIN

$$\text{Rel Speed} = S1 + S2 \text{ (Opposite)}$$

Explanation: Trains moving towards each other.

How to Identify: Opposite direction trains.

PROBLEM ON TRAIN

$$\text{Rel Speed} = S_1 - S_2 \text{ (Same)}$$

Explanation: Trains moving in same direction.

How to Identify: One train overtaking another.

PROBLEM ON TRAIN

$$\text{Dist} = \text{Train} + \text{Platform}$$

Explanation: Crossing a platform/bridge.

How to Identify: Train passing a platform of some length.

PROBLEM ON TRAIN

$$\text{Train Length} = [\text{Plat L} / \text{Diff T}] * \text{Pole T}$$

Explanation: Pole vs Platform crossing.

How to Identify: Train crosses a pole in T1 and platform in T2.

PROBLEM ON TRAIN

$$\text{Faster S} = \text{Avg L} * [1/\text{Opp T} + 1/\text{Same T}]$$

Explanation: Two train interaction shortcut.

How to Identify: Crossing times in same vs opposite direction given.

PROBLEM ON TRAIN

$$\text{Slower S} = \text{Avg L} * [1/\text{Opp T} - 1/\text{Same T}]$$

Explanation: Two train interaction shortcut.

How to Identify: Crossing times in same vs opposite direction given.

PROBLEM ON TRAIN

$$S_2 = S_1 * \sqrt{T_1/T_2}$$

Explanation: Speeds after meeting.

How to Identify: Trains cross and reach destinations in T_1 and T_2 .

BOATS AND STREAMS

$$\text{Upstream} = x - y$$

Explanation: Against the flow.

How to Identify: Boat moving against current.

BOATS AND STREAMS

$$\text{Downstream} = x + y$$

Explanation: With the flow.

How to Identify: Boat moving with current.

BOATS AND STREAMS

$$\text{Dist} = z(x^2 - y^2)/2x$$

Explanation: Total trip time given.

How to Identify: Boat goes to a place and back in total ' z ' hours.

BOATS AND STREAMS

$$\text{Boat } S = z(x+y)/(y-x)$$

Explanation: Down vs Up time given.

How to Identify: Takes x hrs down and y hrs up; current speed z given.

BOATS AND STREAMS

$$\text{Boat } S = [(\text{Stream } S) * (\text{Sum } T)] / (\text{Diff } T)$$

Explanation: Time comparison shortcut.

How to Identify: Takes T_1 for downstream and T_2 for upstream.

ALLIGATION

$$\text{Cheaper/Dearer} = (D-M)/(M-C)$$

Explanation: Rule of Alligation.

How to Identify: Mixing two items of different costs for a target mean.

ALLIGATION

$$\text{Sugar Added} = [\text{Sol} * (\text{Req} - \text{Pres})] / (100 - \text{Req})$$

Explanation: Concentration change.

How to Identify: Adding pure solute to a solution to increase %.

ALLIGATION

$$\text{Water Added} = [\text{Sol} * (\text{Req} - \text{Pres})] / (1 - \text{Req})$$

Explanation: Dilution shortcut.

How to Identify: Adding water to change the fractional value of a mix.

SIMPLE INTEREST

$$SI = \text{ptr} / 100$$

Explanation: Basic Simple Interest.

How to Identify: Standard interest calculation.

SIMPLE INTEREST

$$\text{Installment} = 100A / [100t + rt(t-1)/2]$$

Explanation: Debt installment shortcut.

How to Identify: Annual payment to discharge a debt over time.

SIMPLE INTEREST

$$P = (\text{Interest} * 100) / (t_1r_1 + t_2r_2 + \dots)$$

Explanation: Varying rates over time.

How to Identify: Principal invested at different rates for different periods.

SIMPLE INTEREST

$$\text{Rate} = [100 * (\text{Multiple} - 1)] / \text{Time}$$

Explanation: Principal doubles/triples.

How to Identify: Amount becomes 'n' times in 'T' years.

SIMPLE INTEREST

$$\text{Sum} = (\text{More Int} * 100) / (\text{Time} * \text{More Rate})$$

Explanation: Interest change shortcut.

How to Identify: If rate was X% more, interest would be Y more.

COMPOUND INTEREST

$$\text{Amount} = P[1 + r/100]^t$$

Explanation: Basic Compound Interest.

How to Identify: Annual compounding calculation.

COMPOUND INTEREST

$$\text{Half-yearly: } P[1 + r/200]^{2t}$$

Explanation: Compounded twice a year.

How to Identify: Phrases like 'compounded semi-annually'.

COMPOUND INTEREST

$$\text{Quarterly: } P[1 + r/400]^{4t}$$

Explanation: Compounded four times a year.

How to Identify: Phrases like 'compounded quarterly'.

COMPOUND INTEREST

$$\text{Amount} = P[1+r_1/100]*[1+r_2/100]...$$

Explanation: Successive varying rates.

How to Identify: Rates for year 1, 2, 3 are different.

COMPOUND INTEREST

$$\text{CI-SI Diff (2y)} = P(r/100)^2$$

Explanation: Shortcut for 2-year difference.

How to Identify: Finding difference between SI and CI for 2 years.

COMPOUND INTEREST

$$\text{CI-SI Diff (3y)} = [3r + 3r^2/100 + r^3/100^2]\% \text{ of } P$$

Explanation: Shortcut for 3-year difference.

How to Identify: Finding difference between SI and CI for 3 years.

MENSURATION

$$\text{Area Rect} = L * B$$

Explanation: Rectangle area.

How to Identify: Basic 2D space calculation.

MENSURATION

$$\text{Diagonal Rect} = \sqrt{L^2 + B^2}$$

Explanation: Rectangle diagonal.

How to Identify: Finding distance between opposite corners.

MENSURATION

$$\text{Area Square} = \text{Side}^2 = 1/2 * \text{Diag}^2$$

Explanation: Square area.

How to Identify: Basic 2D space calculation.

MENSURATION

$$\text{Area 4 walls} = 2 * (L+B) * H$$

Explanation: Room interior area.

How to Identify: Painting or tiling the walls of a room.

MENSURATION

$$\text{Area Rhombus} = 1/2 * (d1*d2)$$

Explanation: Rhombus area.

How to Identify: Given lengths of the two diagonals.

MENSURATION

$$\text{Area Equil. Tri} = \frac{\sqrt{3}}{4} * \text{Side}^2$$

Explanation: Equilateral triangle area.

How to Identify: Triangle with all sides equal.

MENSURATION

$$\text{Area Isos. Tri} = \frac{b}{4} * \sqrt{4a^2 - b^2}$$

Explanation: Isosceles triangle area.

How to Identify: Triangle with two sides equal.

MENSURATION

$$\text{Heron's Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

Explanation: Area of any triangle.

How to Identify: Three side lengths (a, b, c) are known.

MENSURATION

$$\text{Area Trapezium} = 1/2 * (\text{sum parallel}) * H$$

Explanation: Trapezium area.

How to Identify: Quad with only two parallel sides.

MENSURATION

$$\text{Circumference Circle} = 2 * (22/7) * r$$

Explanation: Circle perimeter.

How to Identify: Finding the length of the boundary.

MENSURATION

$$\text{Area Circle} = (22/7) * r^2$$

Explanation: Circle area.

How to Identify: Basic 2D space calculation.

MENSURATION

$$\text{Volume Cuboid} = lbh$$

Explanation: Cuboid capacity.

How to Identify: Finding how much a box can hold.

MENSURATION

$$\text{Surface Area Cuboid} = 2(lb+bh+lh)$$

Explanation: Cuboid outer area.

How to Identify: Painting or wrapping a rectangular box.

MENSURATION

$$\text{Diagonal Cuboid} = \sqrt{l^2+b^2+h^2}$$

Explanation: Longest rod inside box.

How to Identify: Longest possible distance inside a cuboid.

MENSURATION

$$\text{Volume Cube} = a^3$$

Explanation: Cube capacity.

How to Identify: Finding capacity of a cubic container.

MENSURATION

$$\text{Volume Cylinder} = \left(\frac{22}{7}\right) * r^2 * h$$

Explanation: Cylinder capacity.

How to Identify: Finding volume of a pipe or tank.

MENSURATION

$$\text{Curved SA Cylinder} = 2 * \left(\frac{22}{7}\right) r h$$

Explanation: Cylinder side area.

How to Identify: Painting only the side of a pipe.

MENSURATION

$$\text{Volume Sphere} = \left(\frac{4}{3}\right) * \left(\frac{22}{7}\right) * r^3$$

Explanation: Sphere capacity.

How to Identify: Finding volume of a ball.

MENSURATION

$$\text{Surface Area Sphere} = 4 * \left(\frac{22}{7}\right) * r^2$$

Explanation: Sphere outer area.

How to Identify: Total area of a ball's surface.

MENSURATION

$$\text{Volume Hemisphere} = \left(\frac{2}{3}\right) * \left(\frac{22}{7}\right) * r^3$$

Explanation: Hemisphere capacity.

How to Identify: Half of a sphere's volume.

MENSURATION

$$\text{Total SA Hemisphere} = 3 * \left(\frac{22}{7}\right) * r^2$$

Explanation: Hemisphere total area.

How to Identify: Includes curved side and flat top circle.