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MAH-CET 2024

FINAL REVISION

MATHS

DAY - 9/10

BCA BBA BMS BBM

29 May

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💡 TIP 1

If two numbers are in a ratio of a:b and the sum of these numbers is ‘x’, then these numbers are $\frac{ax}{a+b}$ and $\frac{bx}{a+b}$

Example:

Ratio of two numbers is 4:5 and addition is 810. Find numbers.

💡 TIP 2

a:b = 3:4

b:c = 2:5

Find a:b:c ?

Equal the value of ’b’

a:b:c = 3 x 2 : 4 x 2 : 5 x 4

= 6 : 8 : 20

= 3 : 4 : 10

💡 TIP 3

a:b = 1:2

b:c = 3:2

c:d = 1:3

Find a:b:c:d ?

The ratio of urea and potash in a mixed fertilizer is 7:3. Express the quantity of urea present as percentage of the total amount of fertilizer?

A. 20%

B. 50%

C. 60%

D. 70%

Profit

Marked Price: Printed Price on product

Cost Price: Price at which product is PURCHASED by shopkeeper

Selling Price: Price at which product is SOLD.

PROFIT = SP - CP

PROFIT % $= \frac{Profit}{CP} \times 100$

Loss

Marked Price: Printed Price on product

Cost Price: Price at which product is PURCHASED by shopkeeper

Selling Price: Price at which product is SOLD.

LOSS = CP – SP

LOSS % = $\frac{Loss}{CP} \times 100$

Remember:

PROFIT & LOSS is always calculated on CP

How to find ?

SP – CP = +ve ➔ Profit

SP – CP = -ve ➔ Loss

Remember:

PROFIT & LOSS is always calculated on CP

How to find ?

SP – CP = +ve ➔ Profit

SP – CP = -ve ➔ Loss

Discount:

Discount is always calculated on Marked Price.

Discount = MP – SP

$$\text{Discount \%} = \frac{Discount}{MP} \times 100$$

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💡 **TIP:**

If a man purchased ‘m’ articles for Rs.p and sold ‘n’ article for Rs.q . Then how much is profit or loss percentage?

$$\text{Profit or Loss \%} = \frac{mq - np}{np} \times 100$$

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💡 TRICK FORMULA FOR SP

$$\text{SP} = \frac{100 + Profit\%}{100} \times CP$$

$$\text{SP} = \frac{100 - Loss\%}{100} \times CP$$

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💡 TRICK FORMULA FOR CP

$$\text{CP} = \frac{100 \times SP}{100 + Profit\ \%}$$

$$\text{CP} = \frac{100 \times SP}{100 - Loss\ \%}$$

Alfred buys an old scooter for Rs.4700 and spends Rs.800 on repairs. If he sells the scooter for Rs. 5800, his gain percent is

A. 4 4/7 %

B. 5 5/11%

C. 10%

D. 12%

If the selling price of an article is 4/3 of its cost the profit in the transaction is ?

A. 16 2/3%

B. 20.5 %

C. 25.5%

D. 33 1/3 %

Simple Interest

$$I = \frac{P \times N \times R}{100}$$

$$A = P + I$$

Compound Interest

$$A = P\left(1 + \frac{R}{100}\right)^{N}$$

$$CI = A - P$$

A sum of money at simple interest amounts to Rs.815 in 3 years and Rs.854 in 4 years. The sum is

A. Rs.650

B. Rs.690

C. Rs.698

D. Rs.700

A sum of money lent out at simple interest amounts to Rs.720 after 2 years and to Rs. 1020 after a further period of 5 years. The sum is

A. 500

B. 600

C. 700

D. 710

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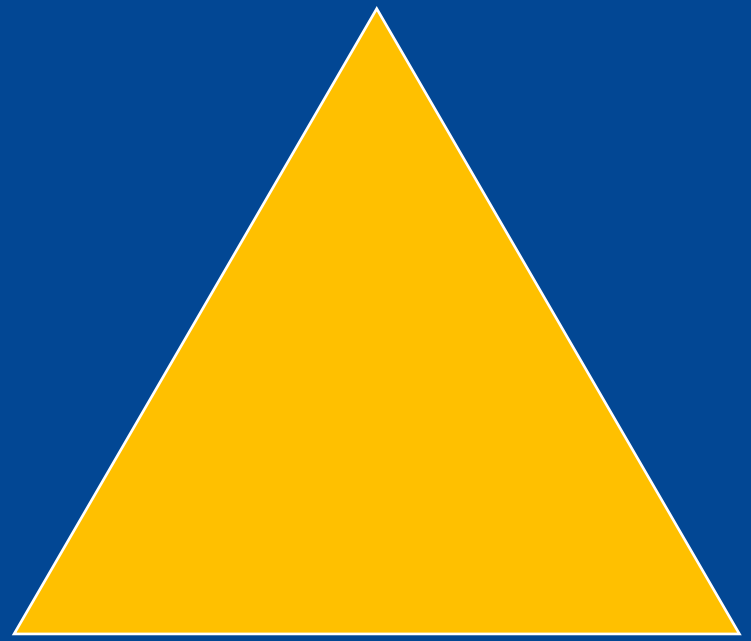
Compound Interest

On a principal amount P, Rate of interest for 1st year is R1%, for 2nd year is R2%, 3rd year is R3%

$$A = P\left(1+\frac{R1}{100}\right)\left(1+\frac{R2}{100}\right)\left(1+\frac{R3}{100}\right)$$

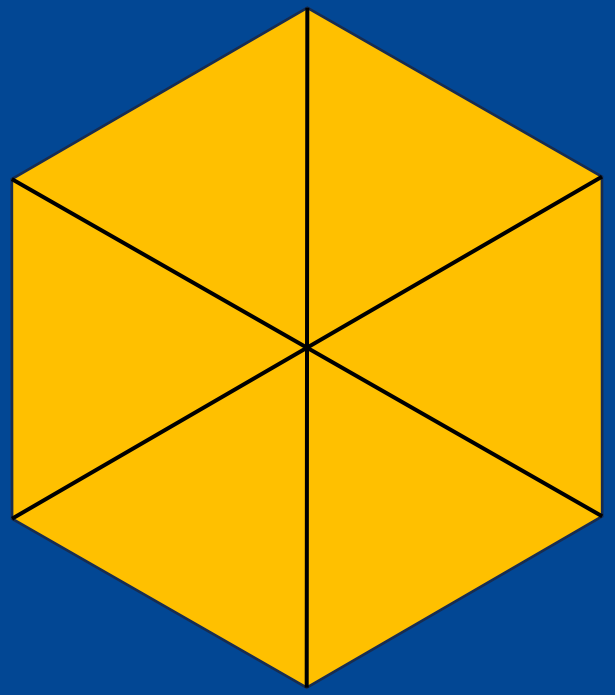
$$CI = A - P$$

Area of equilateral triangle



Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times side^2$

Area of regular hexagon



Area of regular hexagon = $\frac{3\sqrt{3}}{2} \times side^2$

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$$\sqrt{2} = 1.41$$

$$\sqrt{3} = 1.73$$

$$\sqrt{5} = 2.23$$

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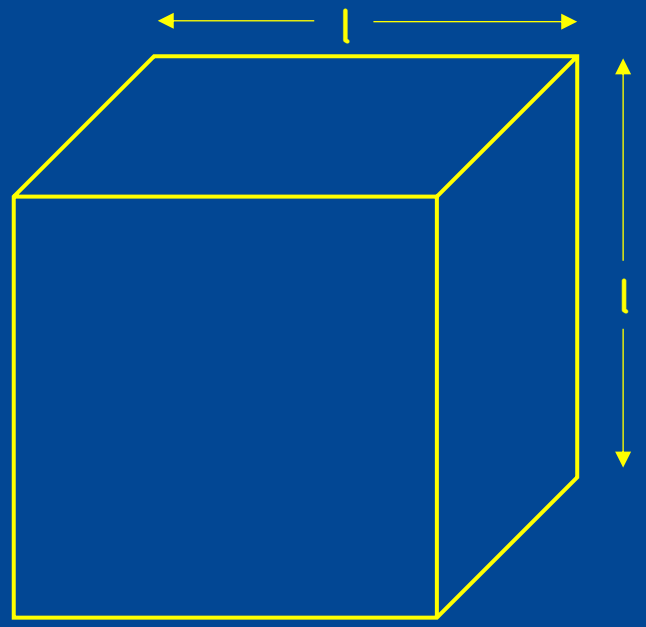

Cube:

Lateral surface area $= 4l^2$

Total surface area $= 6l^2$

Volume $= l^3$

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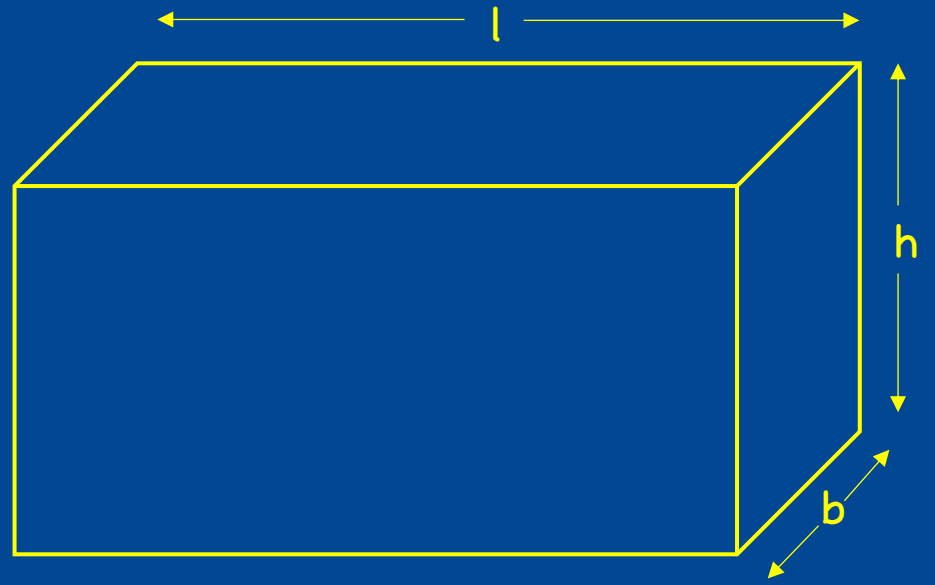


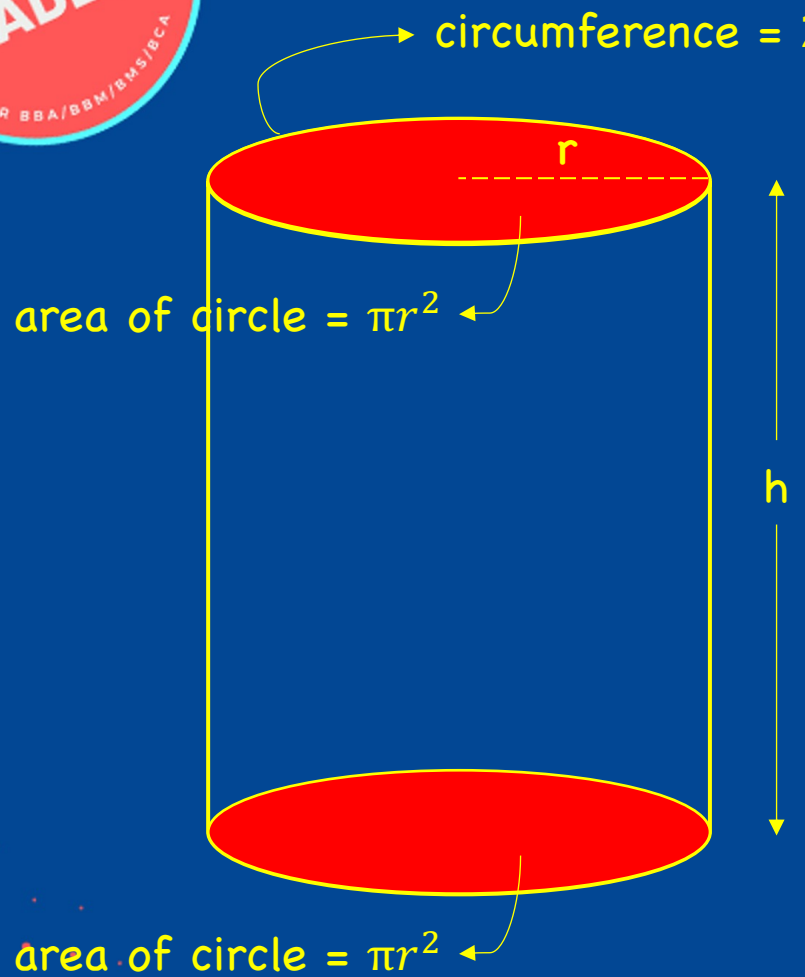
Cuboid:

Lateral surface area $= 2h(l + b)$

Total surface area $= 2h(lb + bh + hl)$

Volume $= lbh$

Cylinder:



Curved surface area $= 2\pi rh$

Total surface area $= 2\pi r(r + h)$

Volume $= \pi r^2 h$

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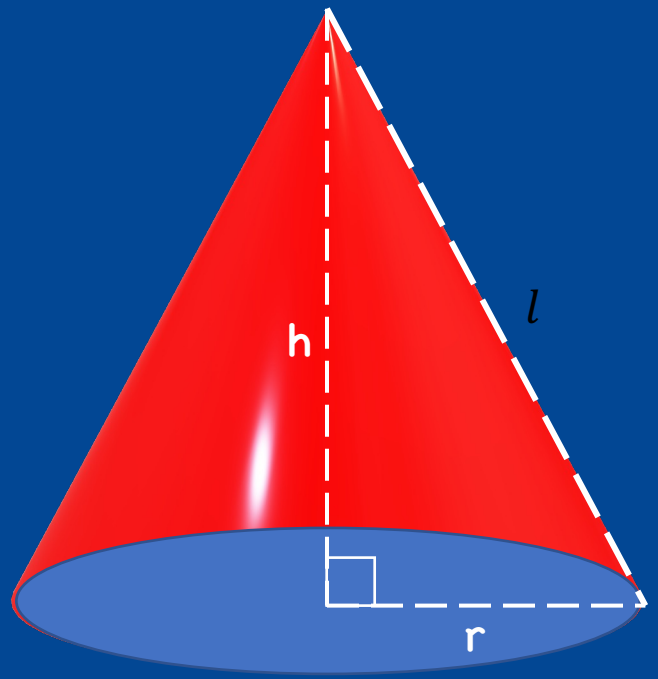

$$l^2 = h^2 + r^2$$

Cone:

Slant height $(l) = \sqrt{h^2 + r^2}$

Curved surface area $= \pi r l$

Total surface area $= \pi r(r + l)$

Volume $= \frac{1}{3}\pi r^2 h$

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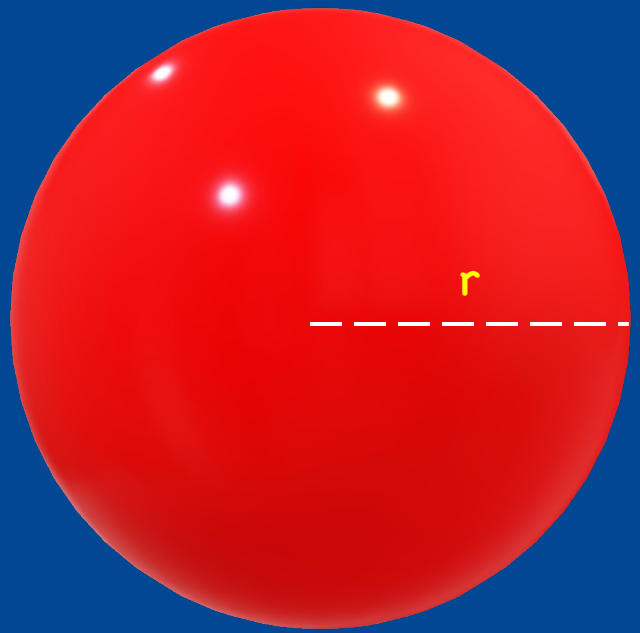

Sphere:

Surface area $= 4\pi r^2$

Volume $= \frac{4}{3}\pi r^3$

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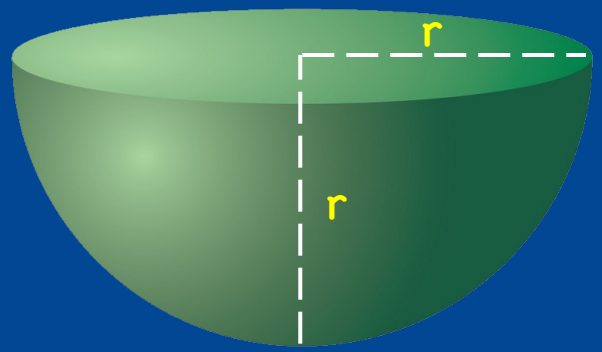


Hemisphere:

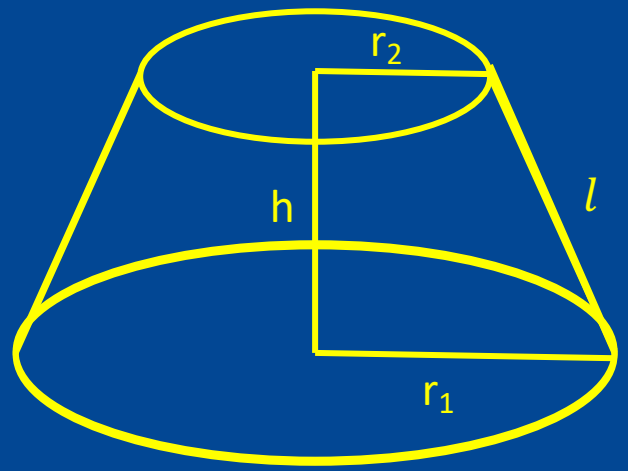
Curved Surface area $= 2\pi r^2$

Total Surface area
of solid hemisphere $= 3\pi r^2$

Volume $= \frac{2}{3}\pi r^3$

Frustum of a cone

'Frustum' is Latin word meaning 'piece cut off'



Slant height $(l) = \sqrt{h^2 + (r_1 - r_2)^2}$

The curved surface area $= \pi(r_1 + r_2)l$

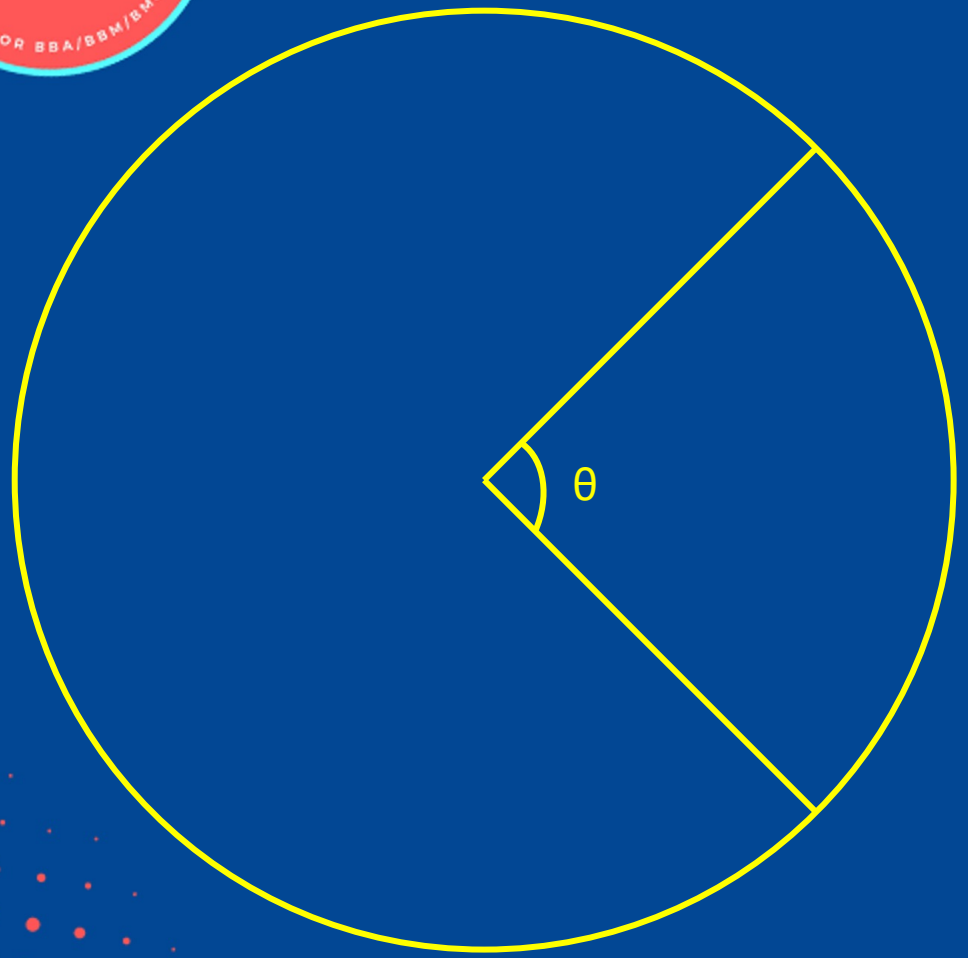
Total surface area

$= \pi(r_1 + r_2)l + \pi {r_1}^2 + \pi {r_2}^2$

$Volume\ of\ the\ frustum$

$= \frac{1}{3}\pi h({r_1}^2 + {r_2}^2 + r_1 \times r_2)$

Length of an arc & Area of a Sector

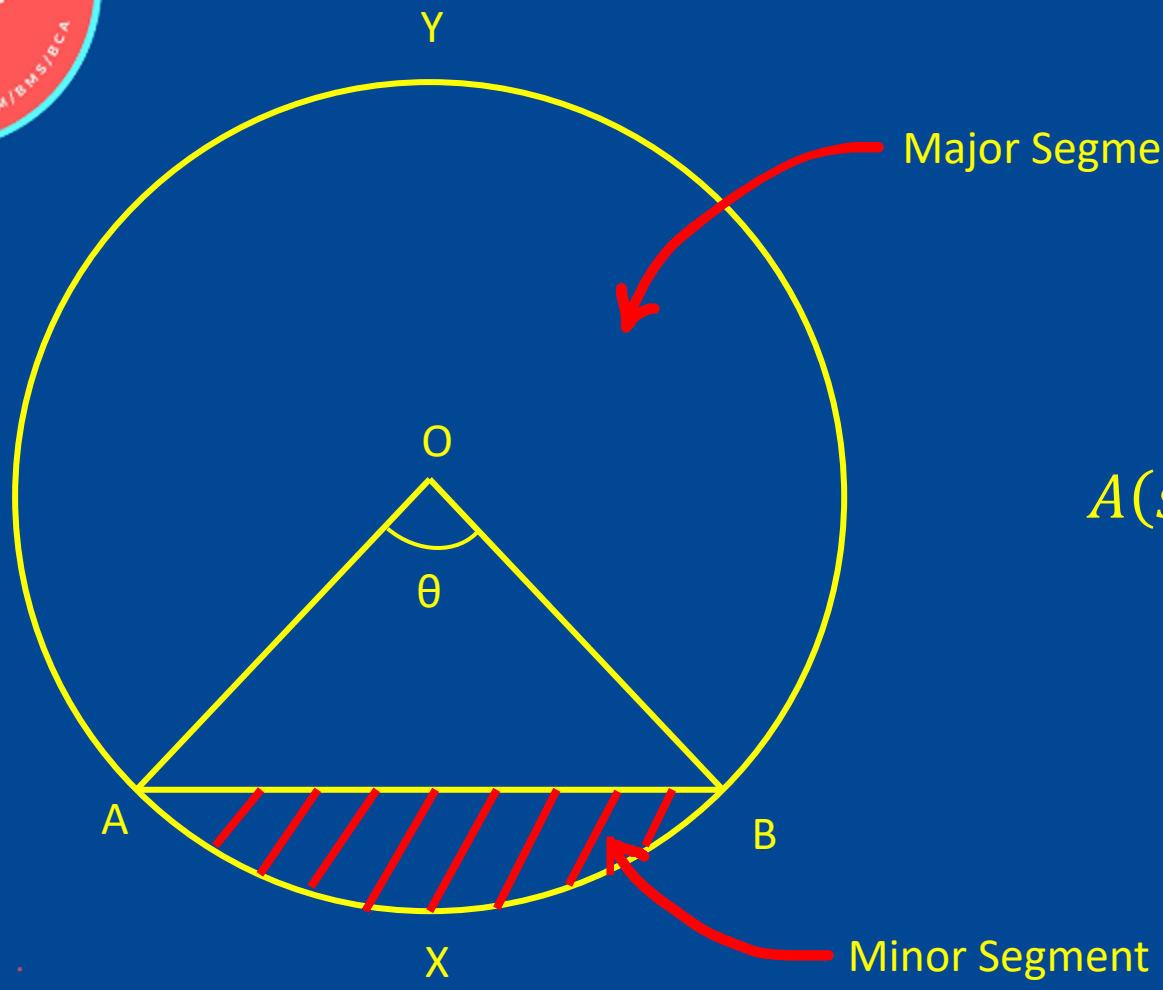


Area of the sector $= \frac{\theta}{360} \times \pi r^2$

Length of the arc $(l) = \frac{\theta}{360} \times 2\pi r$

Area of the sector $= \frac{1}{2} \times l \times r$

Area of Segment of a Circle



$$A(segment\ AXB) = r^2\left[\frac{\pi\theta}{360°} - \frac{sin\theta}{2}\right]$$

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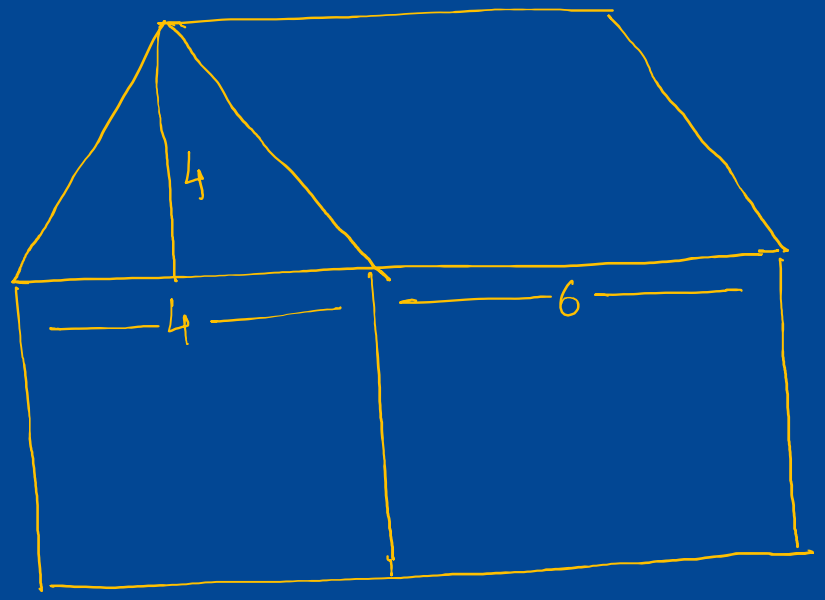

Find the area of the shape!

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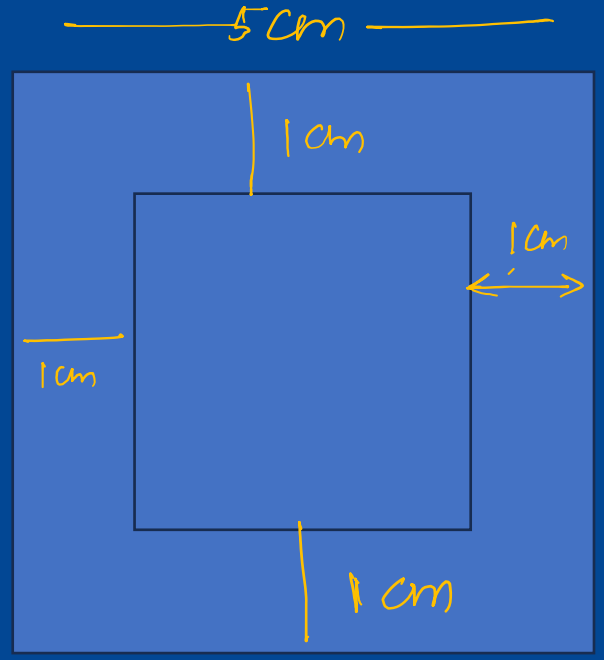

Speed, Distance, Time Relation

$$speed = \frac{distance}{time}$$

Important Concept 1a 🚀

If a person completes a work in ‘n’ days

then work done in 1 day = $\frac{1}{n}$ part of the work.

Important Concept 1b 🚀

Total work done by n person in m days = mn

Important Concept 2 🚀

Total work done is usually considered as ONE unit.

Important Concept 3 🚀

If M_1 persons can do W_1 work in D_1 days and M_2 persons can do W_2 work in D_2 days then,

$$\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$$

Important Concept 4 🚀

If M_1 persons can do W_1 work in D_1 days working T_1 hours per day and M_2 persons can do W_2 work in D_2 days working T_2 hours per day then,

$$\frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$$

Important Concept 5 🚀

If A can do a work in x days and B can do it work in y days the A and B working together can do same work in

$$\frac{xy}{x+y}\ days$$

Important Concept 6a 🚀

If A, B, C can do a piece of work in x, y and z days respectively, then all of them working together can do it in

$$\frac{xyz}{xy + yz + xz} \; days$$

Important Concept 6b 🚀

If A and B can do a work in x days, B and C can do it in y days and A and C can do it in z days, then all of them working together can do it in

$$\frac{2xyz}{xy + yz + xz}\ days$$

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Important Concept 6c 🚀

If A, B, C can do a piece of work in x, y and z days respectively, the contract of the work is for Rs. r then

$$Share\ of\ A = Rs.\frac{ryz}{xy + yz + xz}$$

$$Share\ of\ B = Rs.\frac{rxz}{xy + yz + xz}$$

$$Share\ of\ C = Rs.\frac{rxy}{xy + yz + xz}$$

Important Concept 6d 🚀

If A can do a work in x days. With help of B, A can do it in y days. If they get Rs.a for the work, then

$$Share\ of\ A = \frac{ay}{x}$$

$$Share\ of\ B = \frac{a(x-y)}{x}$$

Important Concept 7a 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

A and B working together can finish the work in

$$\frac{kn}{k^2 - 1} \; days$$

Important Concept 7b 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

A working alone can finish work in

$$\frac{n}{k-1}\ days$$

Important Concept 7c 🚀

If A is k times efficient than B and is therefore able to finish the work in ‘n’ days less than B then,

B working alone can finish work in

$$\frac{kn}{k-1}\ days$$

Important Concept 8 🚀

If A working alone takes ‘a’ days more than A and B working together. B alone takes ‘b’ days more than A and B working together. Then number of days taken by A and B working together to finish the job is $\sqrt{ab}$

Important Concept 9 🚀

If A and B can complete a work in x days and A alone can finish in y days, then number of days required by B to complete the work alone will be $\frac{xy}{y-x}$ days.

Important Concept 10a 🚀

A can do a work in d_1 days and B can do same work in d_2 days, the the ratio of the wages of A and B are:

A's Share : B's Share = $\frac{1}{d_1} : \frac{1}{d_2} = d_2 : d_1$

Important Concept 10b 🚀

A can do a work in d_1 days and B can do same work in d_2 days and C can do it in d_3 days, the the ratio of the wages of A, B, and C are:

A's Share : B's Share: C's Share = $\frac{1}{d_1} : \frac{1}{d_2} : \frac{1}{d_3} = d_2d_3 : d_1d_3 : d_1d_2$

A can do a work in 12 days. A and B can do it in 7.5 days. Find the time taken by C alone if C takes 3 more days than B alone.

A. 33

B. 30

C. 23

D. 27

A takes 5 days more than B to do a certain job and 8 days more than C. A and B together can do the job in the same time as C. How many days would A take?

A. 5

B. 10

C. 15

D. 20

Rule 1:

B	O	D	M	A	S
Bracket	Of	Division	Multiplication	Addition	Subtraction

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Rule 2: Algebraic Formulaes:

1. $(a+b)^2 = a^2 + 2ab + b^2$
2. $(a-b)^2 = a^2 - 2ab + b^2$
3. $a^2 - b^2 = (a+b)(a-b)$
4. $(x+a)(x+b) = x^2 + (a+b)x + ab$
5. $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \quad = a^3 + b^3 + 3ab(a+b)$
6. $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \quad = a^3 - b^3 - 3ab(a-b)$
7. $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
8. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
9. $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$
10. $\frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ac} = a + b + c$

Rule 3: Law of Indices / Exponents

1. $a^m \times a^n = a^{m+n}$

2. $\frac{a^m}{a^n} = a^{m-n}$

3. $(a^m)^n = a^{m \times n}$

4. $a^m \times b^m = (ab)^m$

5. $\frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$

6. $a^0 = 1$

7. $\sqrt[n]{a} = a^{\frac{1}{n}}$

Average / Mean

Problems based on Ages

1. If a - b = 3 and $a^2 + b^2 = 29$, find the value of ab.

A. 10
B. 12
C. 15
D. 18

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2. $2\frac{4}{5} - 1\frac{3}{8} + 3\frac{1}{2} = ?$

A. $4\frac{17}{40}$

B. $4\frac{37}{40}$

C. $4\frac{27}{40}$

D. $3\frac{11}{40}$

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3. $49^2 \times 7^8 \times 343^3 = 7^?$

A. 3
B. 11
C. 7
D. 9

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4. $2615 - 4361 + 2881 = ? \times 20$

A. 65.75
B. 58.75
C. 54.25
D. 56.75

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5. $\sqrt{?} - 12 = \sqrt{1296}$

A. $\sqrt{2304}$
B. 48^2
C. $\sqrt{48}$
D. 48

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6. $5\%\ of\ 420 \times ?\%\ of\ 150 = 252$

A. 12
B. 5
C. 6
D. 8

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7. $\frac{31}{43} \times \frac{86}{95} \times \frac{41}{93} = ?$

A. $\frac{82}{267}$

B. $\frac{82}{283}$

C. $\frac{83}{265}$

D. $\frac{82}{285}$

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8. If 2x +3y = 30 and (x + y)/y = 11/8, then find the value of 5y + 6x

A. 72
B. 58
C. 64
D. 26

9. $4^{61} + 4^{62} + 4^{63} + 4^{64} + 4^{65}$ is divisible by

A. 3
B. 5
C. 11
D. 17

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10. On simplification of the following, the result will be

$$\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\ldots.\left(1-\frac{1}{100}\right)$$

A. 0.01
B. 0.001
C. 1
D. 0.1

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11. $\left[125^2 \div 50 \times 20\right] \div 25 = ?$

A. 11
B. 100
C. 150
D. 250

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12. $\frac{343 \times 49}{216 \times 16 \times 81}$?

A. $\frac{7^5}{6^7}$

B. $\frac{7^5}{6^8}$

C. $\frac{7^4}{6^8}$

D. $\frac{7^6}{6^7}$

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13. The value of $\frac{(a+b)^2}{(a^2+b^2)}$ is

A. $\frac{ab}{a+b}$

B. $\frac{2ab}{a-b}$

C. $\frac{a+b}{a-b}$

D. None of these

14. If $3x+7y = 75$ and $5x - 5y = 25$, then what is the value of $x + y$?

A. 14
B. 15
C. 16
D. 17

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15. By how much does $\frac{6}{\frac{7}{8}}$ exceed $\frac{\frac{6}{7}}{8}$?

A. $6\frac{1}{8}$

B. $6\frac{3}{4}$

C. $7\frac{3}{4}$

D. $7\frac{5}{6}$

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