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DAY - 19

MATHS

formulas

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DAY-9 FINAL

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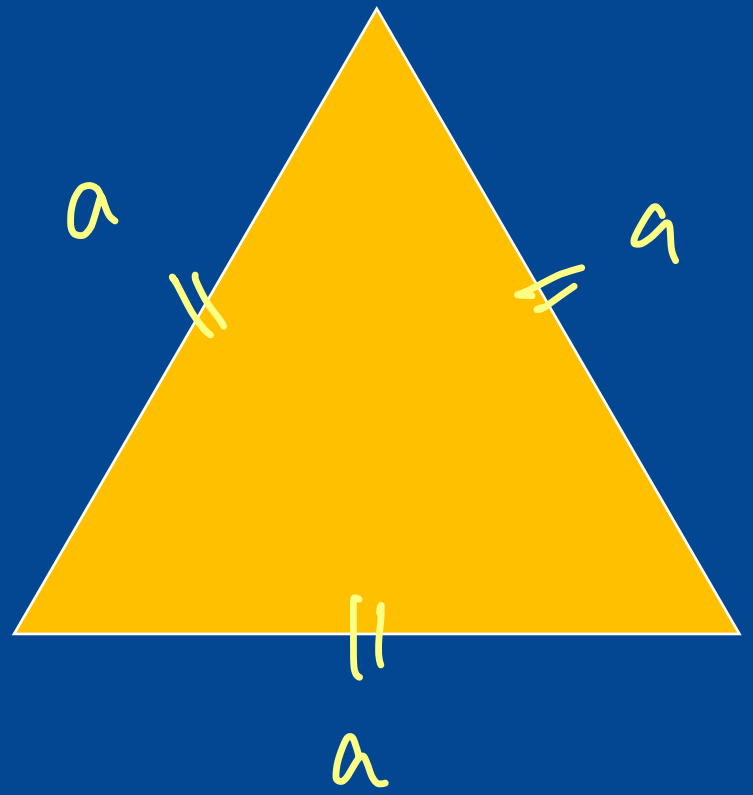
Basic MATHS

BASIC AREAS

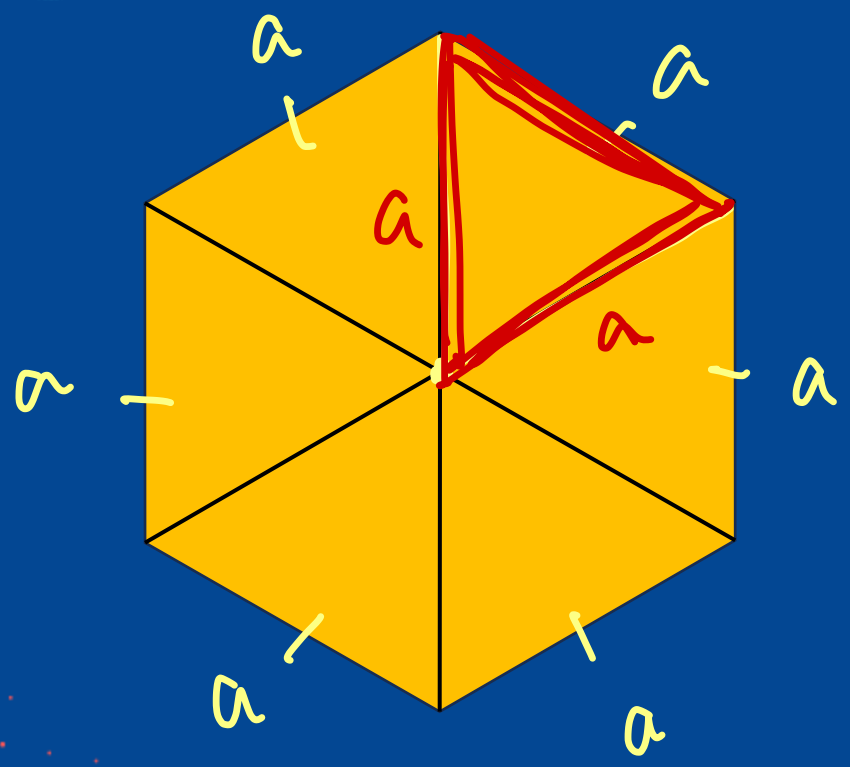
Area of equilateral triangle



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

Area of regular hexagon

$6 \times \frac{\sqrt{3}}{4} a^2$



6 equ. Δ

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

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DO REMEMBER

$\sqrt{2} = 1.41$

Calculator

$\sqrt{3} = 1.73$

$\sqrt{5} = 2.23$

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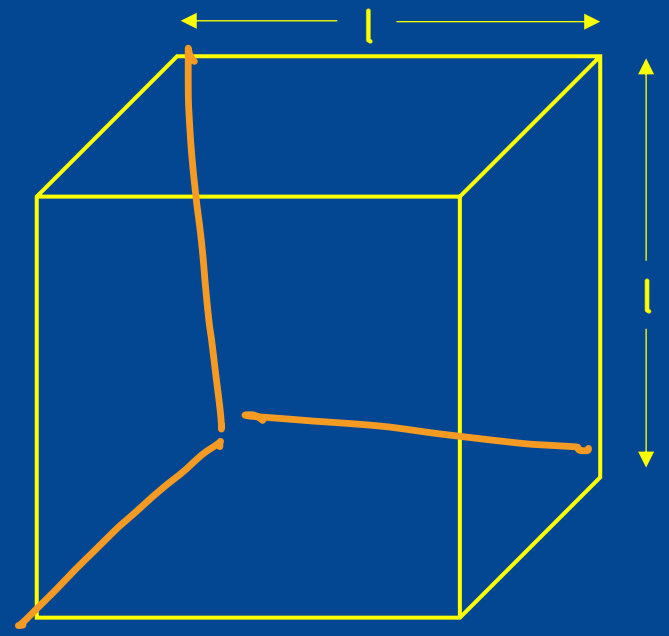
3D

A(Sq) = Side = l^2

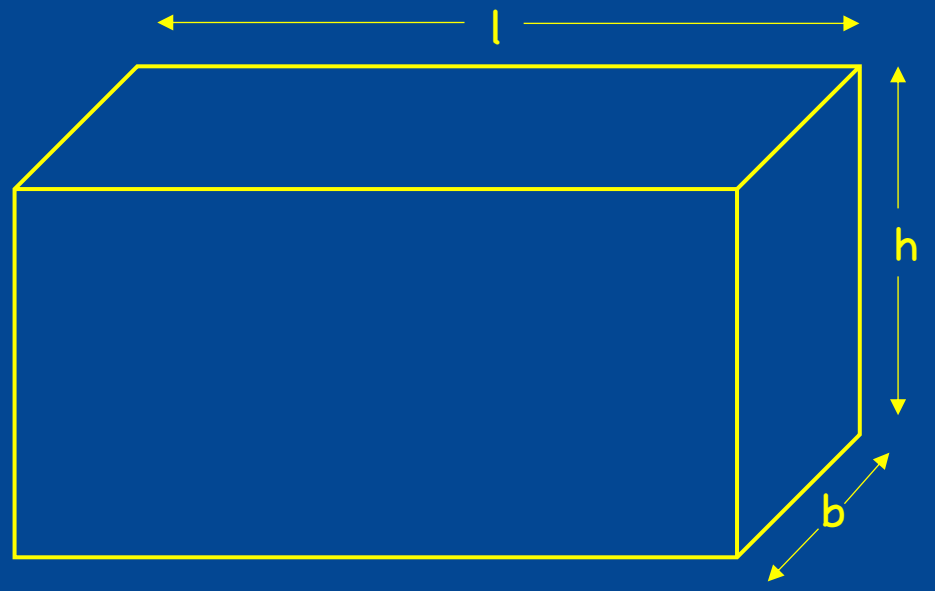


Cube:

Lateral surface area $= 4l^2$

Total surface area $= 6l^2$

Volume $= l^3$



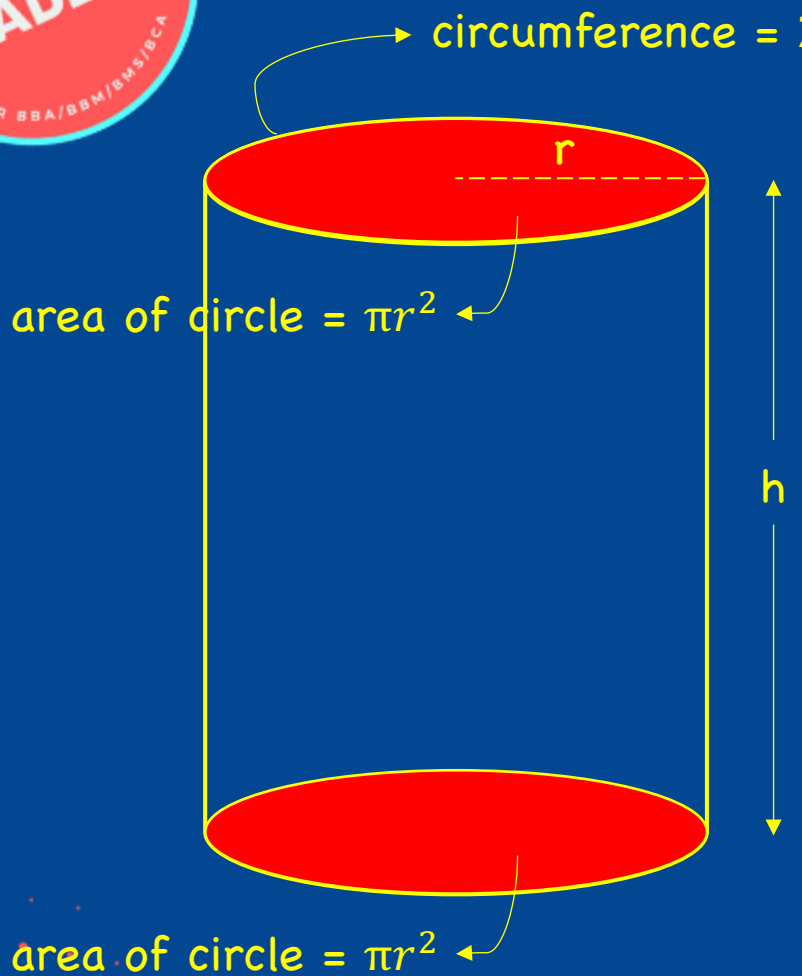
Cuboid:

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

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

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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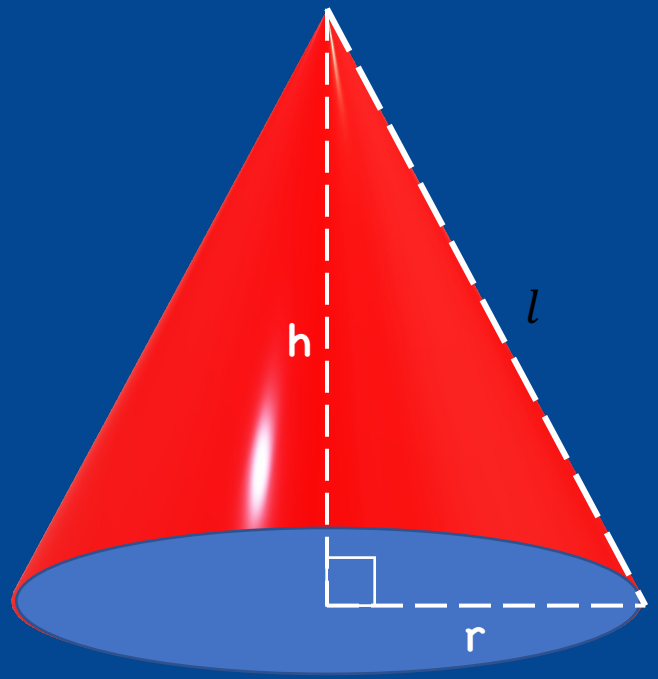

$l^2 = h^2 + r^2$

h, l, r

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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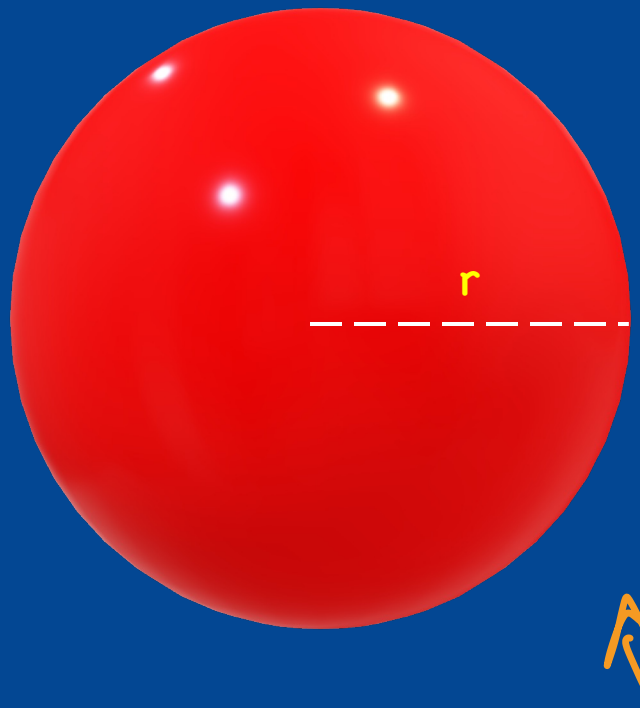

Sphere:

$4 \times \pi r^2$

Surface area $= 4\pi r^2$

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

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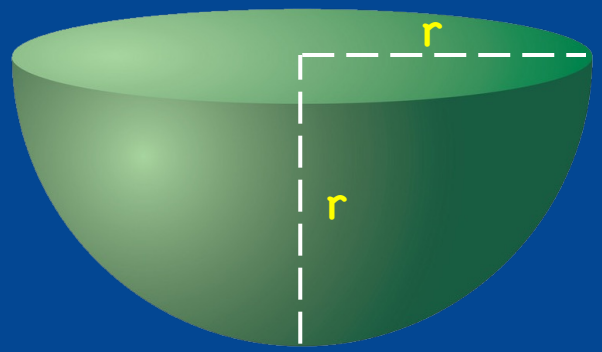


Hemisphere:

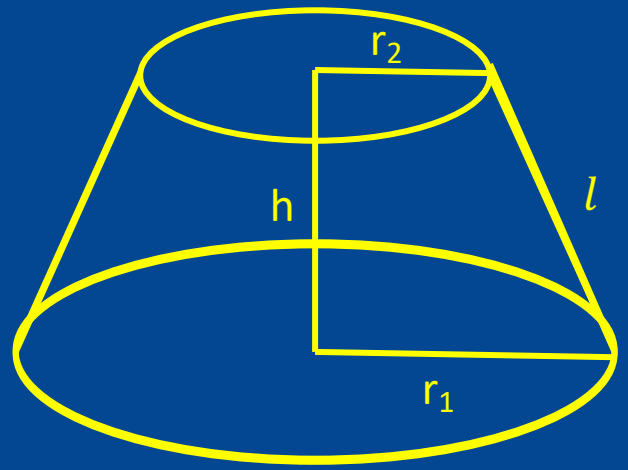
Curved Surface area $= 2\pi r^2$

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 $= \pi(r_1 + r_2)l$

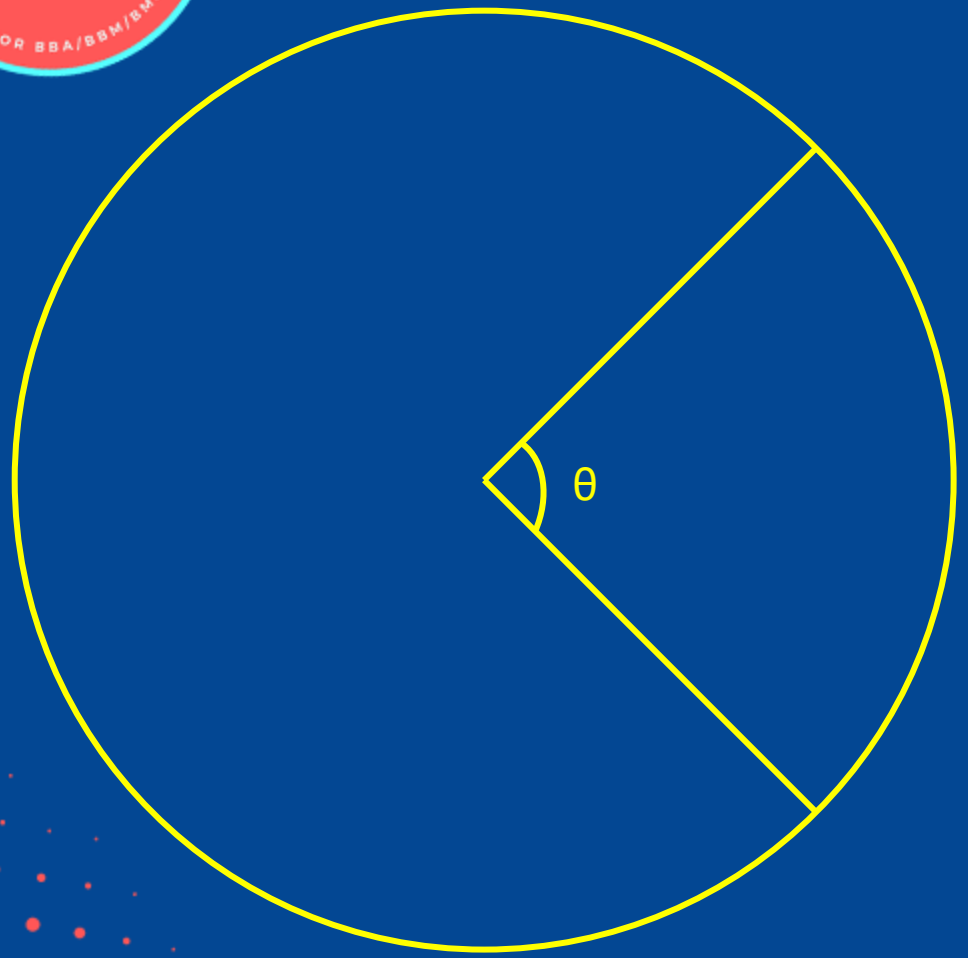
Total surface area

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

$Volume\ of\ the\ frustum$

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

Length of an arc & Area of a Sector



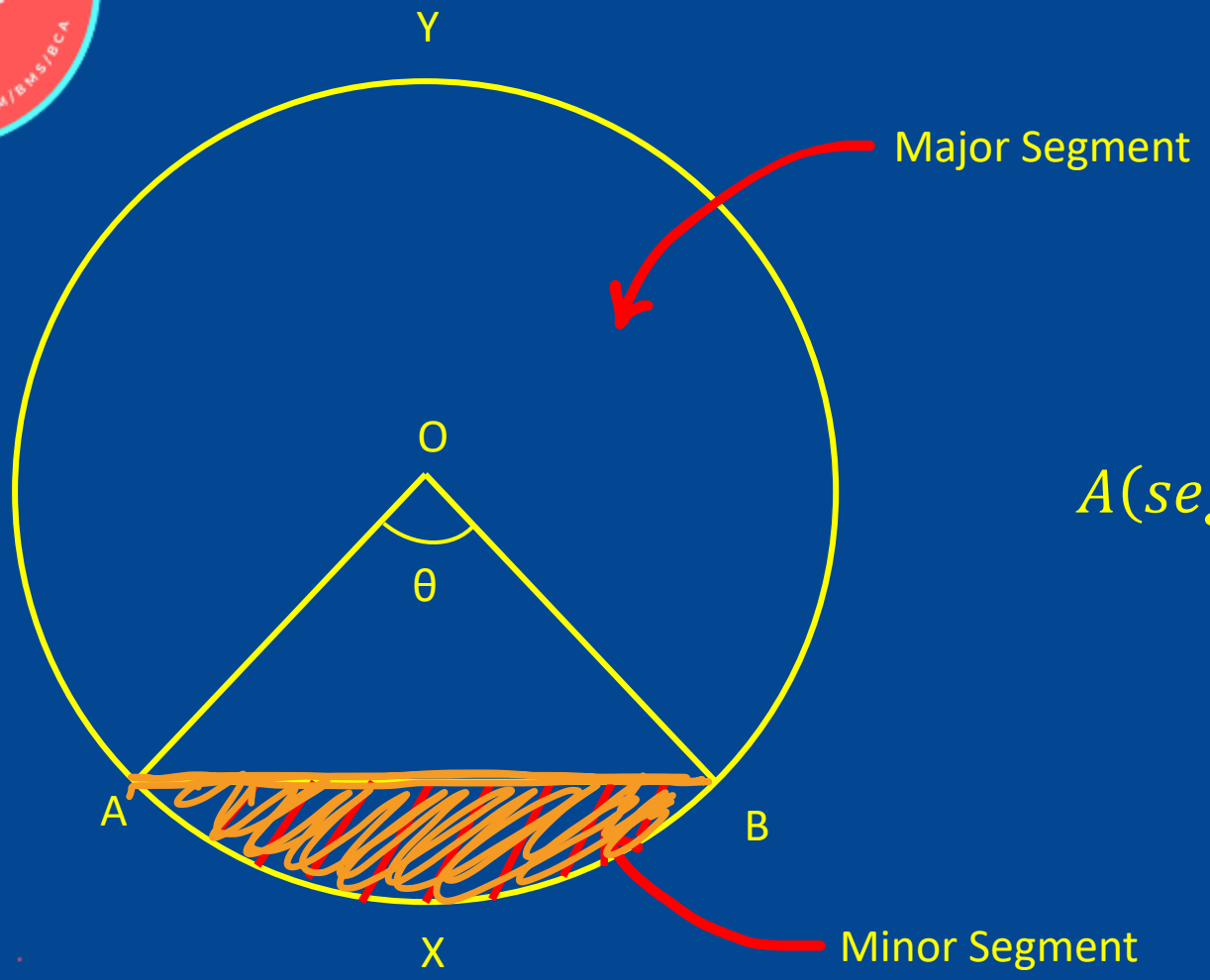
Area of the sector $= \frac{\theta}{360} \times \pi r^2$

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

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

$$A = \frac{lr}{2}$$

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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1. If the side of a equilateral triangle is 4cm then what is it's area?

A. 6.928 cm^2
B. 6 cm^2
C. 7.218 cm^2
D. None

(A)

Formula

$\frac{\sqrt{3}}{4} \times 4 \times 4$

1.73×4

$= 6.92$

r_2

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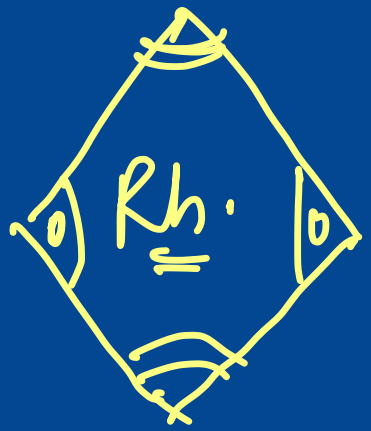
2. What is this shape: it has 4 equal length sides and 2 pairs of equal angles?

A. Square
B. Rectangle
C. Rhombus
D. Parallelogram

C



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3. If the circumference of a circle is doubled then the area of the circle

A. Increases four times
B. Increases two times
C. Decreases four times
D. Remains same

πr^2

A

$C = 2\pi r$

$2C = 2\pi R_1$

$2 \times 2\pi r = 2\pi R_1$

$R_1 = 2r$

$A = \pi r^2$

$= \pi (2r)^2$

$= 4\pi r^2$

$1 = 100$ $50\% = 0.5$

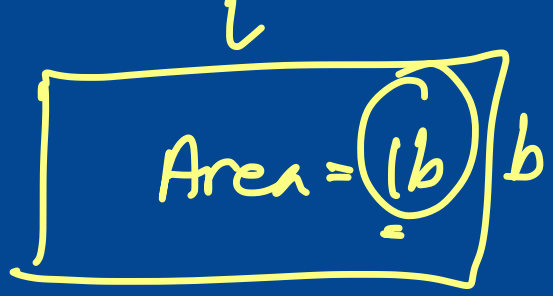
4. The length of a rectangle is halved, while its breadth is tripled. What is the percentage change in area?

A. 25% increase
B. 50% increase
C. 50% decrease
D. 75% decrease

B

$L_1 = 0.5 \times L$

$B_1 = 3 \times b$



new Area $= L_1 \times B_1$

$= 0.5 \times L \times 3 \times b$

$= 1.5\ lb$

$0.5\ lb$

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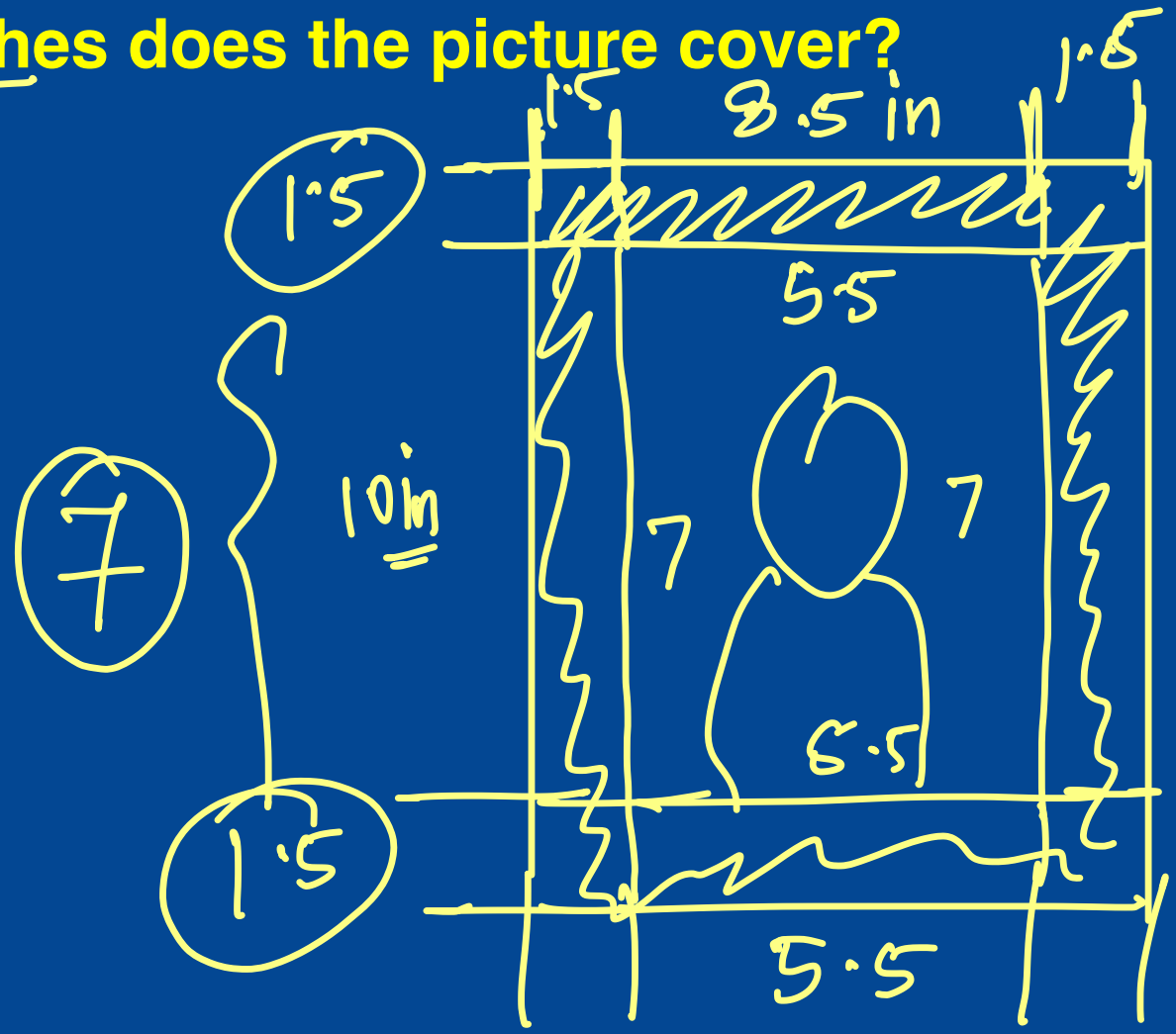
5. A picture is copied onto a sheet of paper 8.5 inches by 10 inches. A 1.5 inch margin is left all around.
What area in square inches does the picture cover?

A. 76
B. 65
C. 59.5
D. 38.5

7×5.5

$= 38.5$



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6. What is the area of BCDEF?

A. 77 sq.cm.
B. 78 sq.cm.
C. 90 sq.cm
D. 86 sq.cm

B

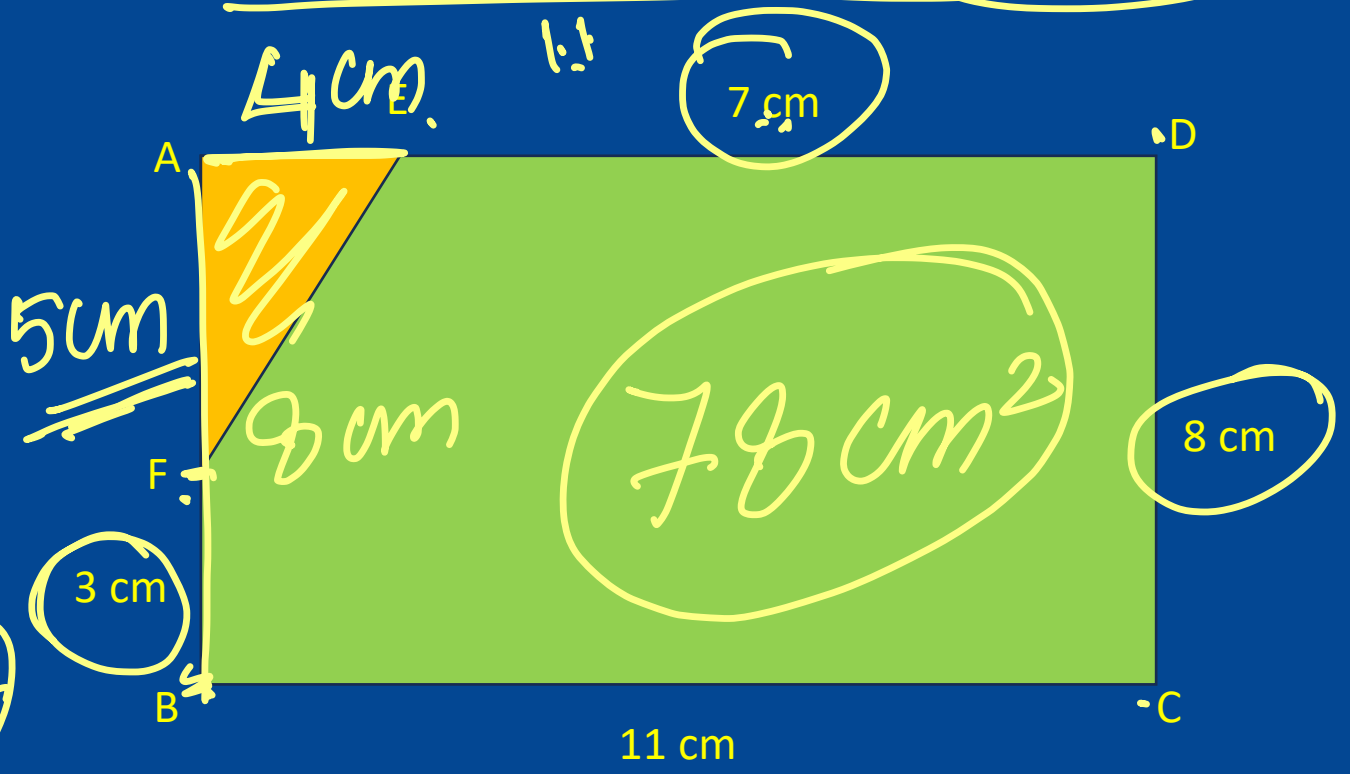
$\frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 5 \times 4^2$

$= 10\ cm^2$

Area (Rec) $= 11 \times 8$

$= 88\ cm^2$



$90 \times 110 = 9900$

7. The length of a rectangular park is 20m more than its breadth. If the cost of fencing the park at Rs. 53 per metre is Rs. 21,200, then what is the area (In square metres) of the park?

A. 9504
B. 8925
C. 9240
D. 9900

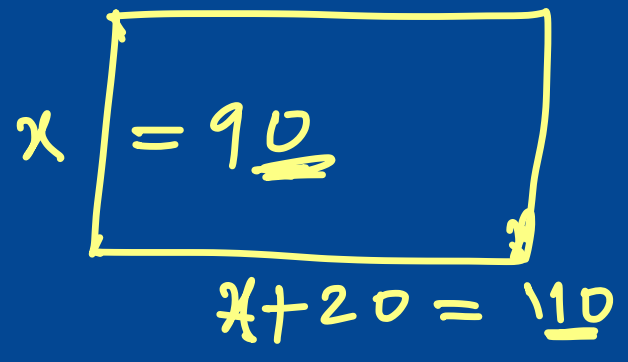
D

$$\begin{array}{r} 400 \\ \cancel{21,200} \\ \hline \cancel{53} \\ 1 \end{array}$$

$x = 90$

$x + 20 = 110$

Perimeter $= 400$



$2(l+b) = 400$

$2(x+20+x) = 400$

$2(2x+20) = 400$

$4x + 40 = 400$

$4x = 400 - 40$

$4x = 360$

$x = \frac{\cancel{360}\ 90}{4} = 90$

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8. The volume of a right circular cone is 924 cubic cm. If it's height is 18 cm, then the area of it's base (In square cm) is:

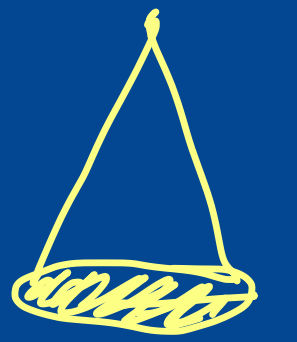
A. 154
B. 132
C. 176
D. 198

A

Vol. (cone) = 924 cm^3

h = 18 cm

$$\text{Vol.(cone)} = \frac{1}{3}\pi r^2 h$$



r

πr^2

$$924 = \frac{1}{3}(\pi r^2)\,18$$

$$\frac{924 \times 3}{18} = \pi r^2 \Rightarrow 154$$

154

CSA = 440 cm^2 r = 7cm

9. The radius of the base of a cylinder is 7 cm and its curved surface area is 440 square cm. Its volume (in cubic cm) will be: (Take $\pi = 22/7$)

A. 1760
B. 1430
C. 1540
D. 1650

C ✓

$CSA = 2\pi rh$

$440 = 2\pi rh$

$\frac{440}{2} = \pi rh$

$\pi rh = 220$

Volume $= \pi r^2 h = \pi rh \times r$

$= 220 \times 7$

$= 1540$

Length = l breadth = b

10. If each side of a rectangle is decreased by 11%, then its area will decrease by :

Area of rectangle = lb

A. 21.69%
B. 13.13%
C. 20.79%
D. 26.78%

(C)

1 = 100%

11% = 0.11

89% = 0.89

$L_1 = 0.89l$

$B_1 = 0.89b$

Now Area = $0.89l \times 0.89b$

$= lb(\quad)$

0.89
0.89
7921

100 − 79.21% = 20.79

$= 0.7921\,lb$

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11. Diagonals of a rhombus are respectively 4 cm and 12 cm. Its area (in cm^2) is equal to :

A. 12
B. 24
C. 36
D. 8

B

$$\text{Rhombus} = \frac{1}{2}(d_1 \times d_2)$$

$$= \frac{1}{2}(4 \times 12)$$

$$= 24\,cm^2$$

Volume of cube = a^3

12. A right circular cylinder of maximum volume is cut out from a solid wooden cube. The material left is what percent of the volume (nearest to an integer) of the original cube ?

A. 19
B. 28
C. 23
D. 21

D

Volume of cube − cylinder

$$\left(a^3 - \frac{\pi a^3}{4}\right)$$

cylinder ⇒ $r = a/2$

$h = a$

$$\frac{a^3 - \frac{\pi a^3}{4}}{a^3} \times 100$$

$$\Rightarrow \frac{\cancel{a^3}\left(1 - \frac{\pi}{4}\right)}{\cancel{a^3}} \times 100$$

$$= \left(1 - \frac{22}{7 \times 4}\right) \times 100$$

$$\frac{6}{28} \times 100$$

$$\frac{\cancel{600}^{21}}{\cancel{28}_{1}}$$

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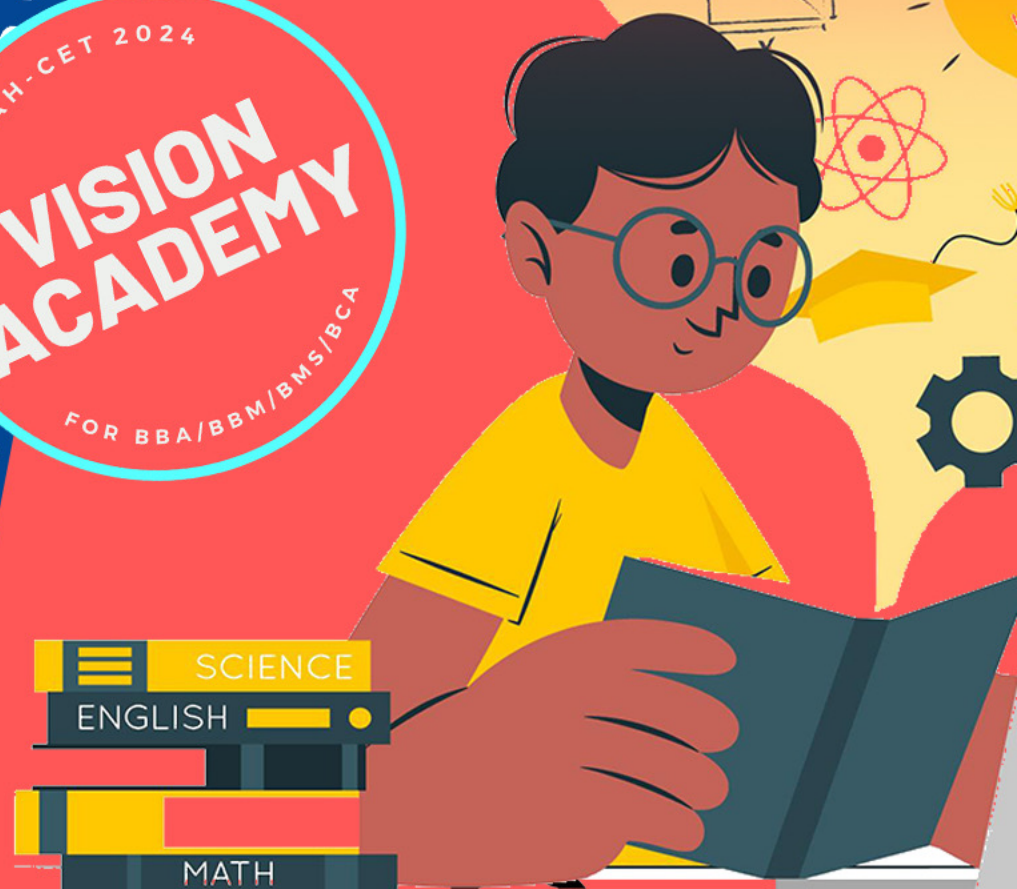

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