DAY 18

MCA CET 2025

MATHS

AREA & PERIMETER

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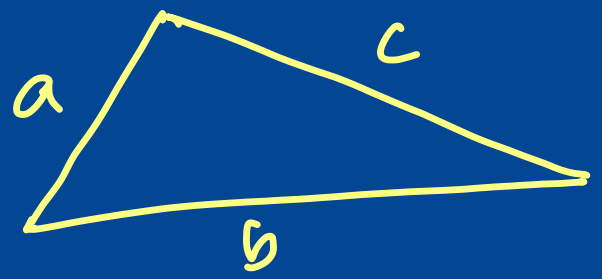
FOR MAH MCA CET 2025

Triangle



1. Area of triangle = $\frac{1}{2} \times base \times height$
2. Perimeter of triangle = sum of all sides
3. Heron's Formula for area of a triangle when all 3 sides are known as a, b, c:

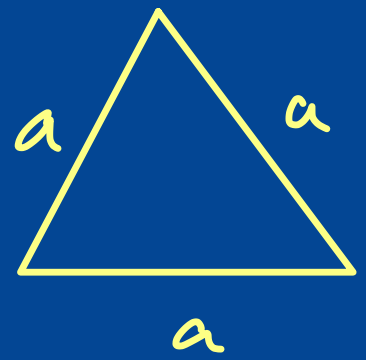
- $s = \frac{a+b+c}{2}$

Semiperimeter

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

Equilateral Triangle

Equiangular

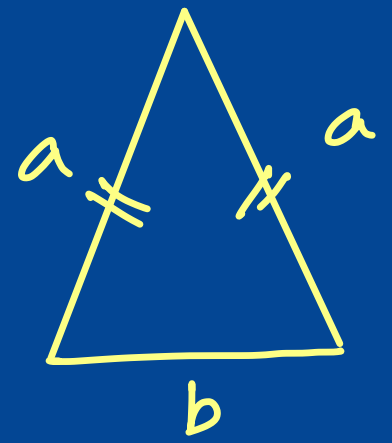


1. Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times side^2$

2. Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times side$

3. Perimeter of equilateral triangle = $3 \times side$

Isosceles Triangle



1. Area of isosceles triangle = $\frac{b}{4} \times \sqrt{4a^2 - b^2}$

   [a = equal sides and b = third side]

2. Height of isosceles triangle = $\frac{1}{2} \times \sqrt{4a^2 - b^2}$

3. Perimeter of isosceles triangle = $2a + b$

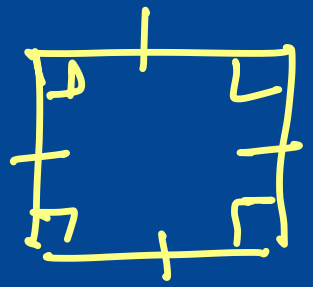
Pythagoras Theorem

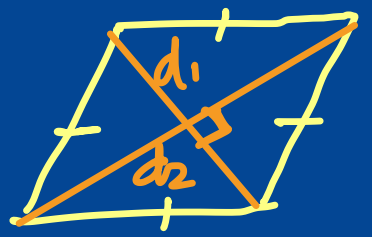
Hypotenuse^2 = (One side)^2 + (Other Side)^2

$AC^2 = AB^2 + BC^2$

Hypo

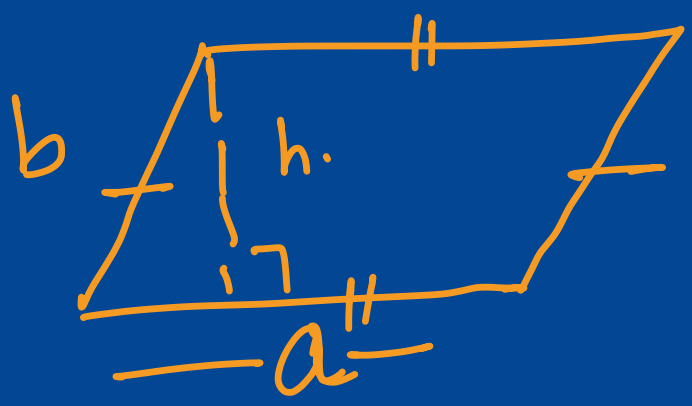
Basic Quadrilaterals





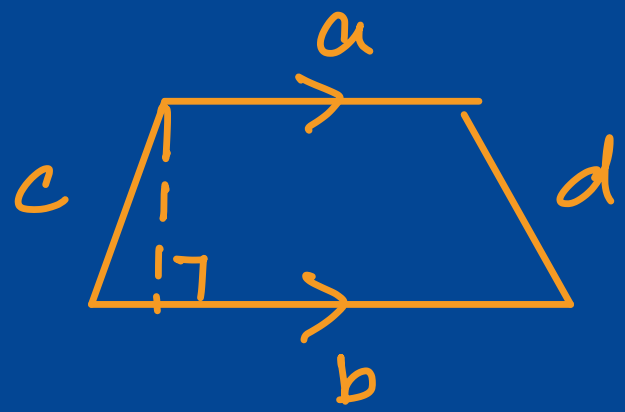
1. Area of square = $(\text{side})^2$
2. Perimeter of square = 4(side)
3. Area of rhombus = ½ x (d_1 x d_2) [d_1 & d_2 are the length of the diagonals]
4. Perimeter of rhombus = 4 x side
5. Side of rhombus = $\frac{1}{2}\sqrt{d_1^2 + d_2^2}$
6. Area of rectangle = l x b
7. Perimeter of rectangle = 2 (l + b)

Parallelogram



1. Area of parallelogram = length x height
2. Perimeter of parallelogram = 2 (a + b)
   - [where a and b are the length of the equal sides of the parallelogram]

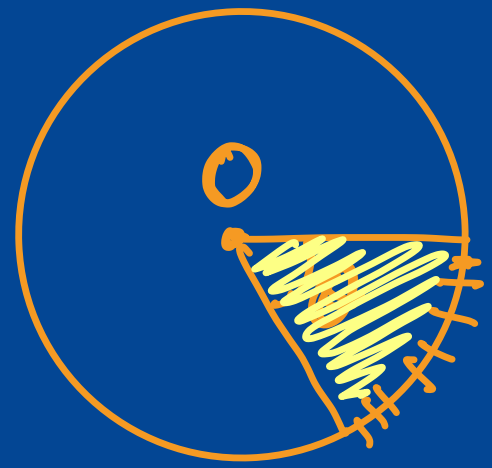
Trapezium

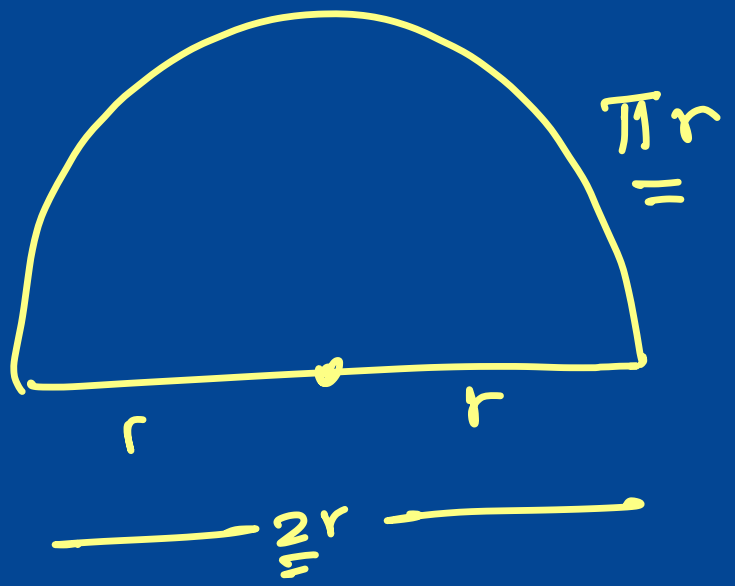


1. Area of trapezium = $\frac{1}{2} \times height \times (a + b)$
   - [where a and b are the length of the parallel sides]
2. Perimeter = Sum of all sides
3. Area if all sides are known = $\frac{a+b}{k}\sqrt{s(s-k)(s-c)(s-d)}$
4. Perpendicular distance between parallel sides = $\frac{2}{k}\sqrt{s(s-k)(s-c)(s-d)}$
   1. $k = b - a$
   2. $s = \frac{k+c+d}{2}$
   3. a and b are the parallel sides and c and d are the non-parallel sides

Circle

1. Area of circle = πr^2
2. Perimeter of circle = Circumference = $2\pi r$
3. Length of an arc = $\frac{\theta}{360} \times 2\pi r$
4. Area of sector = $\frac{\theta}{360} \times \pi r^2$
5. Area of semicircle = $\frac{1}{2}\pi r^2$
6. Perimeter of semicircle = $\pi r + 2r$





Regular Polygons

$\frac{5 \times 4}{2} - 5 = 5$

1. Number of diagonals = $\frac{n(n-1)}{2} - n$
2. Area of regular pentagon = $5a^2 \frac{\sqrt{3}}{4}$
3. Area of regular hexagon = $6a^2 \frac{\sqrt{3}}{4}$
4. Area of a n sided polygon = $\frac{1}{2} n a^2 \sin\left(\frac{2\pi}{n}\right)$
5. Perimeter of n sided polygon = n x Side

Values to remember

$\sqrt{1} = 1$	$\sqrt{6} = 2.4494$
$\sqrt{2} = 1.4142$	$\sqrt{7} = 2.6457$
$\sqrt{3} = 1.732$	$\sqrt{8} = 2.8284$
$\sqrt{4} = 2$	$\sqrt{9} = 3$
$\sqrt{5} = 2.236$	$\sqrt{10} = 3.1622$

$$\text{Height} = \frac{\sqrt{3}}{2} \times \text{side}$$

$$12 = \frac{\sqrt{3}}{2} \times \text{side} \Rightarrow \frac{24}{\sqrt{3}} = \text{side}.$$

If the height of an equilateral triangle is 12 cm, then what is the area of the triangle?

(a) 89.567 cm^2

(b) 96.897 cm^2

(c) 67.9843 cm^2

~~(d)~~ 83.1408 cm^2

$$A(\Delta) = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times \frac{24}{\sqrt{3}} \times \frac{24}{\sqrt{3}}$$

$$= \frac{144}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{144\sqrt{3}}{3}$$

$48 \times 1.73 = 83.04$

$$s = \frac{30}{2} = 15$$

What is the area of a triangle with sides of length 12 cm, 13 cm and 5 cm?

(a) 30

(b) 35

(c) 40

(d) 42

$$A(\Delta) = \sqrt{15(3)(2)(10)}$$

$$= \sqrt{5 \times 3 \times 3 \times 2 \times 2 \times 5}$$

$$= 5 \times 3 \times 2$$

$$15 \times 2 = 30$$

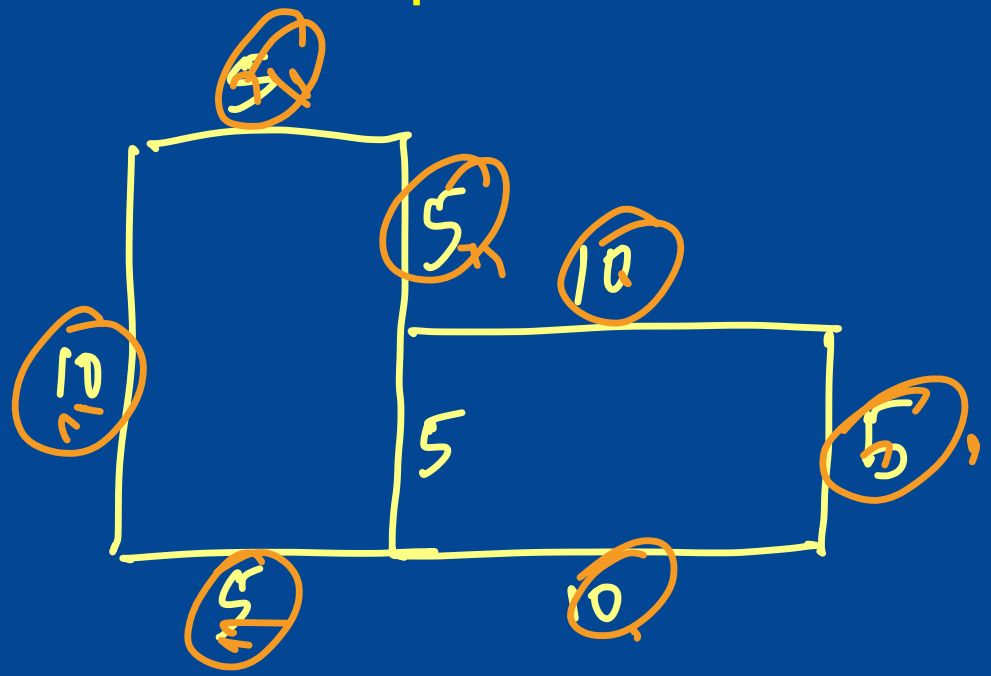
A rectangle of dimensions 10 cm and 5 cm is placed adjacent to another rectangle of the same size to draw an L shape figure. Find the perimeter of the shape so formed.

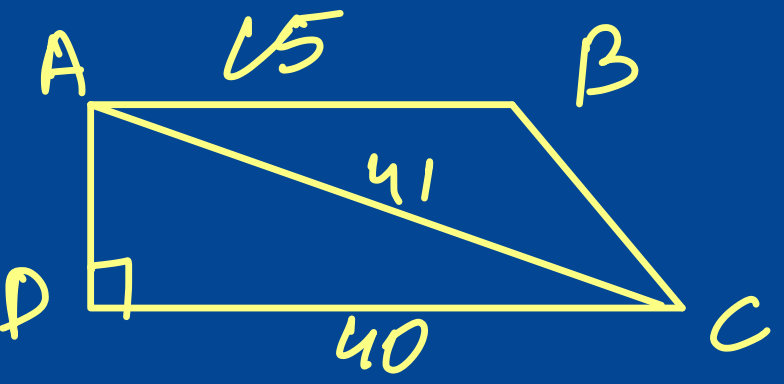
(a) 100 cm

(b) 40 cm

(c) 50 cm

(d) 60 cm





$41^2 = 40^2 + AD^2$

$1681 = 1600 + AD^2$

$AD^2 = 81$

$AD = 9$

In a trapezium ABCD, AB and DC are parallel sides and $\angle ADC = 90°$. If AB = 15 cm, CD = 40 cm and diagonal AC = 41 cm, then the area of the trapezium ABCD is

(a) 245 cm^2

(b) 240 cm^2

(c) 247.5 cm^2

(d) 250 cm^2

$\frac{1}{2} \times \text{height} \times 55$

4.5

$\frac{1}{2} \times 9 \times 55 = 4.5 \times 55$

.5

L = 18 b = 12 30 X 2 = 60

The perimeter of a triangle is equal to perimeter of a rectangle. Length of rectangle is 75% of side of a square and ratio of length to breadth of rectangle is 3: 2. If difference between perimeter of square and that of rectangle is 36 cm, then find perimeter of triangle?

~~(a)~~ 60 cm (b) 48 cm (c) 72 cm (d) 80 cm

$P(\Delta) = P(Rect)$

$L(R) = 75\%$ of $s(sq)$

$L : b = 3 : 2$

$P(sq) - P(Rect) = 36$

$4 \times a - [2(L+b)] = 36$

$0.75a + 0.5a$

$2[1.25a]$

$0.5a$

$4a - 2.5a = 36$

$1.5a = 36 \Rightarrow a = \frac{360}{15} = 24$

'a' sq.

25×3

$0.75a$

The ratio between the length and the breadth of a rectangle is 2: 1. If breadth is 5 cm less than the length, what will be the perimeter of the rectangle?

(a) 30 cm (b) 25 cm (c) 35 cm (d) 40 cm

$$\frac{l}{b} = \frac{2}{1} \Rightarrow l = 2b$$

$$b = l - 5$$

$$b = 2b - 5$$

$$b - 2b = -5$$

$$-b = -5$$

$$b = 5$$

$$l = 10$$

$$P = 2(l + b) = 30$$

Circumference of a circular garden is 66 cm and area of circular garden is 25% more than perimeter of a square hall. Find the area of square hall.

(a) 4802.49 cm^2 (b) 4704.48 cm^2 (c) 4820.49 cm^2 (d) 4822.49 cm^2

4802.49

$2\pi r = 66$

$r = \frac{66}{2 \times \frac{22}{7}} = \frac{21}{2}$

$\text{Area} = \pi r^2 = \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2}$

$= \frac{63 \times 11}{2} = \frac{693}{2} = 346.5$

$A(\text{Cir.}) = 25\% \text{ of } P(\text{sq.}) + P(\text{sq.})$

$346.5 = a + 4a$

$346.5 = 5a$

$a = \frac{346.5}{5} = 69.3$

$4a = P(\text{sq})$

$a = 25\%$

69.3
69.3
+
2079
1237 x
1386 x x
4802.49

$d = 80$ $r = 40\ cm$

The wheels of a car are of diameter 80 cm each. The car is travelling at a speed of 66 km/h. What is the number of complete revolutions each wheel makes in 10 min?

(a) 4275 (b) 4350 (c) 4375 (d) 4450

$$\frac{66 \times 1000 \times 100}{2 \times \frac{22}{7} \times 40 \times 60} = \frac{125 \times 7 \times 5}{1} = 625 \times 7 = 4375$$

176

The radius of the circle is 13 cm more than the breadth of a rectangle. The area of the circle is 3850 cm^2. The circumference of the circle is equal to the perimeter of a rectangle. The area of the rectangle is equal to the area of a square. Find the perimeter of a square.

(a) 352 cm (b) 164 cm (c) 176 cm (d) 188 cm

$r = b + 13$

$35 = b + 13$

$b = 22$

$\pi r^2 = 3850$

$r^2 = \frac{3850 \times 7}{22}$

$r^2 = 25 \times 7 \times 7$

$r = 5 \times 7 = 35$

$2\pi r = 2(l + b)$

$\frac{22}{7} \times 35 = l + 22$

$110 - 22 = l$

$l = 88$

$A(R) = 88 \times 22$

$A = 22 \times 4 \times 22$

A

4x 44

Side^2

A(R) = A(S)

A(R) = 4A(sq)

The area of a rectangle is 4 times the area of a square. The area of the square is 729 cm^2 and the length of the rectangle is 81 cm. What is the difference between the side of the square and the breadth of the rectangle?

(a) 18 cm (b) 27 cm (c) 24 cm (d) 9 cm

|side − breadth|

A(sq) = 729

side = 27

L = 81

$L \times b = \frac{4 \times 729}{81}$ 9

b = 36

27

9 cm

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