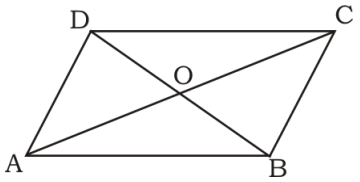
Quadrilateral: 4 sided polygon

Sum of internal angles = 360

Sum of external angles = 360

Number of diagonals = 2

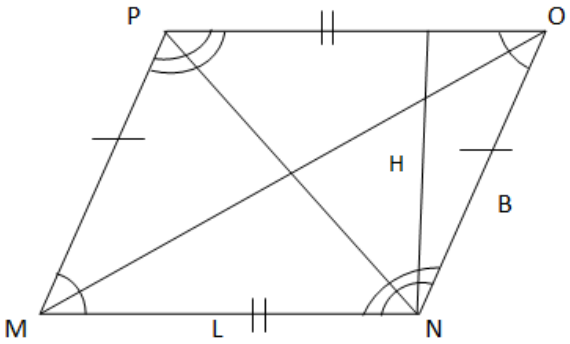
Parallelogram: Quadrilateral formed by joining mid points of the sides of any quadrilateral.



1. Opposite sides are ||.
2. Opposite sides are equal.
3. Opposite angles are equal.
4. The diagonals bisect each other i.e.
   OA=OC & OB=OD

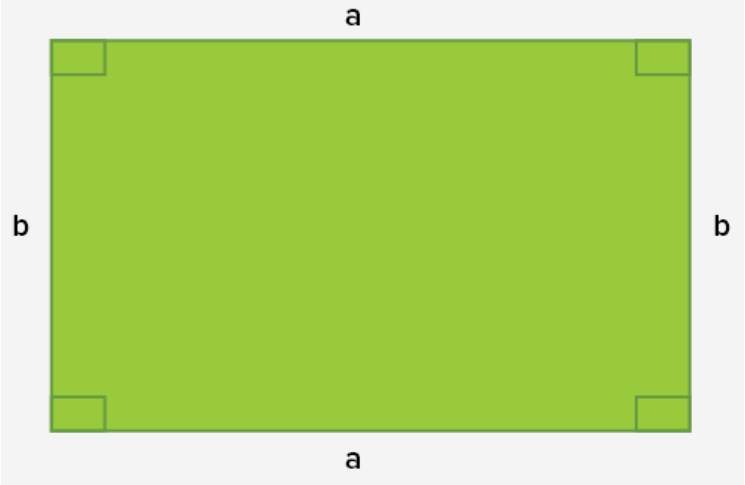
Area = base ×height

= ab Sinθ, a & b are sides and θ is any angle



Rectangle: Special parallelogram with

1. Equal angles.
2. Equal diagonals.
3. Maximum area.



Area = Base ×Height

Diagonal = $\sqrt{a^2+b^2}$

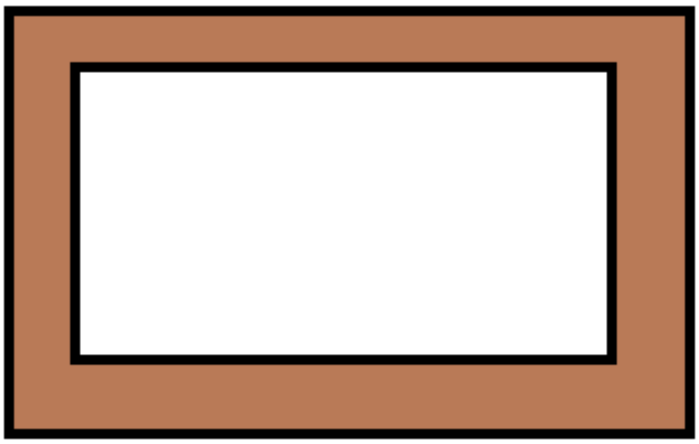
Problem: There is a rectangular garden with dimensions 14m×16m. There is a path of width 5m all along outside the garden. Find the area of the path?

Problem: There is a rectangular garden with dimensions 14m×16m. There is a path of width 5m all along outside the garden. Find the area of the path?

Area of path = Area of outer rectangle – Area of inner rectangle

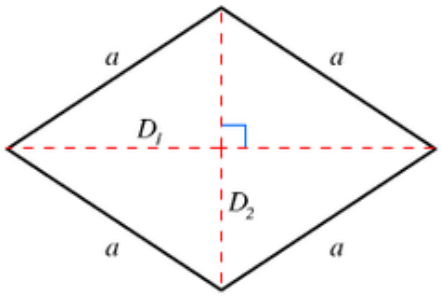
= 24×26 - 14× 16

= 400



Rhombus: Special parallelogram with

1. Equal sides.
2. Diagonals bisect at 90°.
3. Diagonals are angle bisectors.
4. 4 smaller triangles are congruent.



$$\text{Area} = \frac{1}{2} \times d_1 \times d_2$$

Note: In any quadrilateral if diagonals are perpendicular then its area = $\frac{1}{2} \times d_1 \times d_2$

Problem: If diagonals of a Rhombus are 24cm and 32cm then find the perimeter of the Rhombus?

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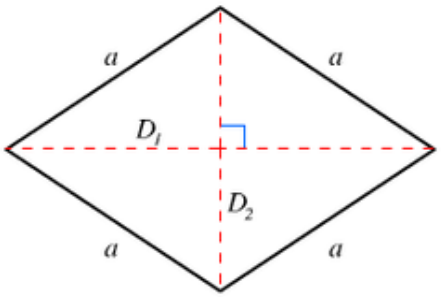
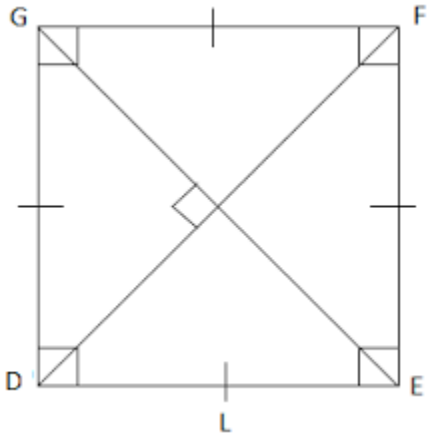
Side = $\sqrt{12^2+16^2}$ = 20

Perimeter = 4×20 = 80



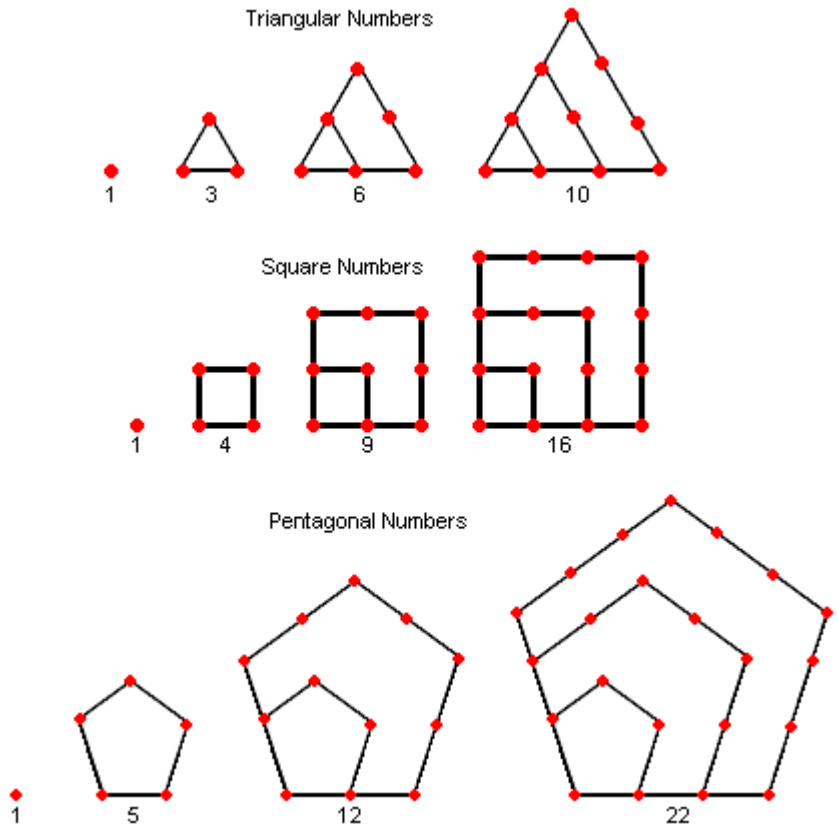
Square: Special Rectangle & Rhombus

1. Equal sides.
2. Diagonals bisect at 90°.
3. Diagonals are angle bisectors.
4. Equal angles.
5. Equal diagonals.



Area = $(\text{Side})^2$

Diagonal = $\sqrt{2} \times \text{Side}$



Problem:

Find the ratio of area of square to rhombus if both are having same sides and one angle of rhombus is 30°.

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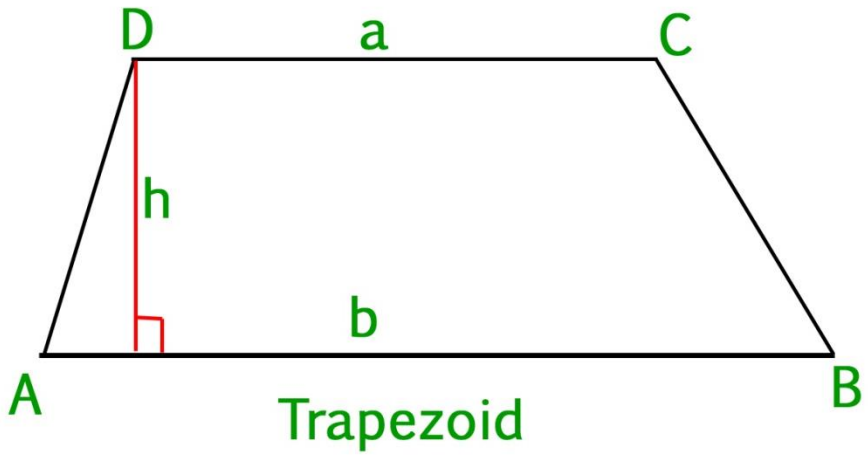
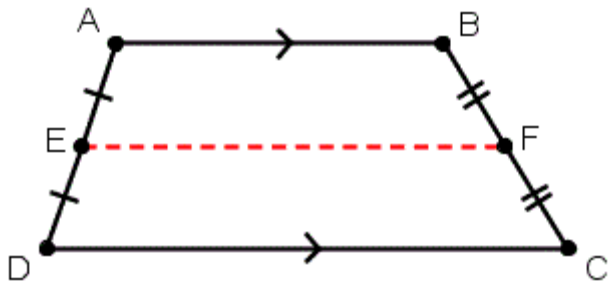
Let a is the side of square as well as rhombus.

$$\frac{\text{Area of square}}{\text{Area of rhombus}} = \frac{a^2}{a^2 \text{Sin}30^0} = \frac{1}{\frac{1}{2}} = 2$$

Trapezium(Trapezoid): 2 sides are ||.



$$\text{Area} = \frac{1}{2} \times \text{height} \times \text{sum of || sides}$$

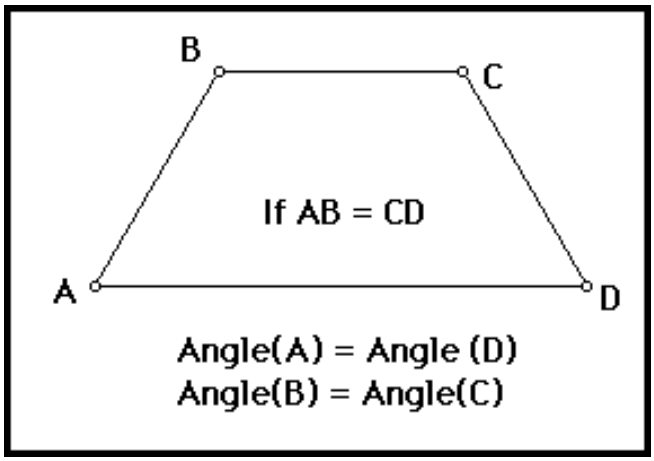


E & F are mid points of AD and BC then

$$EF = \frac{AB+CD}{2}$$

Isosceles Trapezium:

1. Oblique sides (Non-parallel sides) are equal.
2. Diagonals are equal.
3. It is cyclic i.e. sum of opposite angles is 180.



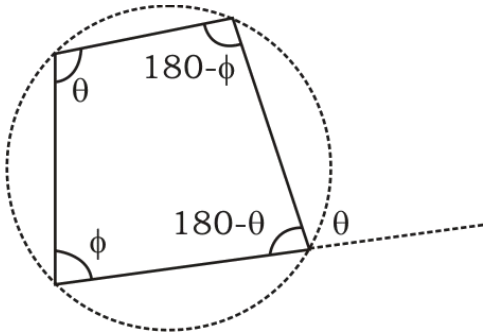
Note: If a trapezium is cyclic then must be an isosceles.

Cyclic quadrilateral:

Sum of opposite angles is 180°.

Or

Quadrilateral inscribed in a circle.



Area = $\sqrt{(S-a)(S-b)(S-c)(S-d)}$, S:Semiperimeter

Problem: Find the area of cyclic parallelogram with sides 5cm & 10cm

Problem: Find the area of cyclic parallelogram with sides 5cm & 10cm

Area = 5×10

Note: Cyclic parallelogram is a Rectangle.

Solids: Regular & Non-Regular

Regular: Cube, cuboid

Non-Regular: Cone, Pyramid

In Cube/Cuboid

No. of faces = 6

No. of edges = 12

No. of corners/Vertices = 8

For any Solid

Edges + 2 = Faces+ Corners

LSA/CSA: Area without top & bottom.

TSA/SA: Sum of area of the all the visible surfaces

Or

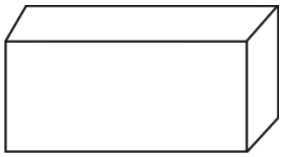
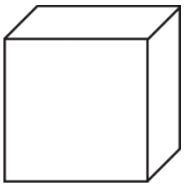
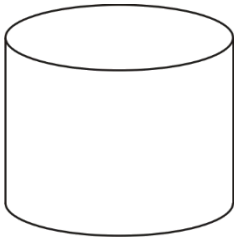
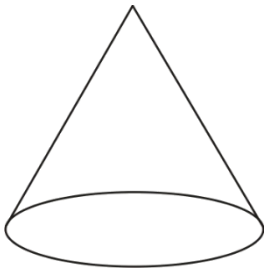
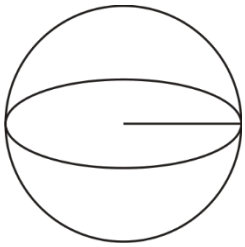
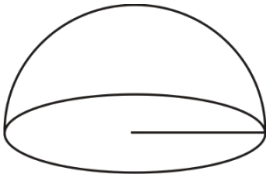
LSA + Area of top & bottom.

Volume: Capacity

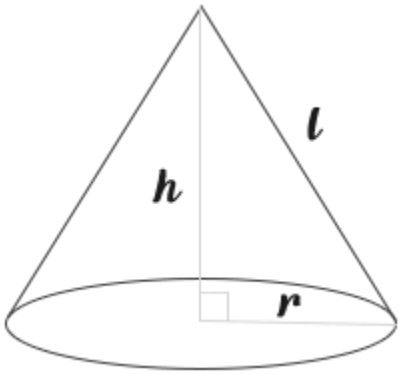
Diagonal:

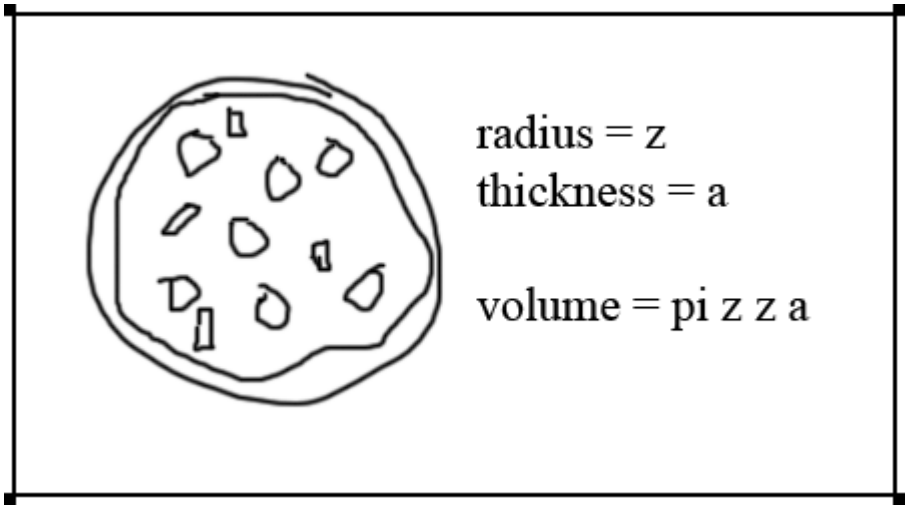
Cube = $\sqrt{3}$ a

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

S. No	Name	Figure	Lateral/Curved Surface Area	Total Surface Area	Volume
1.	Cuboid		$2 \times h \times (l \times b)$ h – height l – length b – breadth	$2(lb + bh + lh)$	$l \times b \times h$
2.	Cube		$4a^2$ a – edge	$6a^2$	a^3
3.	Right Circular Cylinder		$2\pi rh$ r – radius h – height	$2\pi r (r + h)$	πr^2h
4.	Right Circular Cone		πrl h – height r – radius l – slant height $l^2 = r^2 + h^2$	$\pi r (r + l)$	$\frac{1}{3} \times \pi r^2 h$
5.	Sphere		$4\pi r^2$ r – radius	$4\pi r^2$ r – radius	$\frac{4}{3} \times \pi r^3$
6.	Hemi-sphere		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3} \times \pi r^3$

Volume of any Pyramid = $\frac{1}{3}$×Base area×height

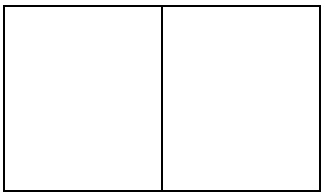




Problem: 2 cubes each of side 5 cm are joined together to form a cuboid. Find its surface area?

2 cubes each of side 5 cm are joined together to form a cuboid. Find its surface area?

Each cube is having 6 faces and therefore, total 12 faces out of which only 10 are visible.



Therefore

SA = 10× Area of each face = 10 × 25

Problem: Find the length of the longest rod that can be kept inside the cylinder formed by folding a square with sides 10πcm?

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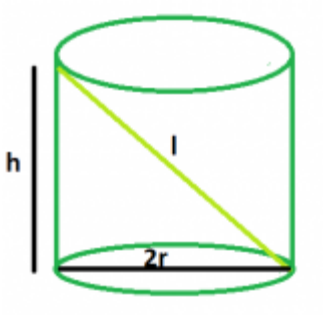


Height of cylinder = 10π

Circumference of base = 2πR = 10π

R = 5cm

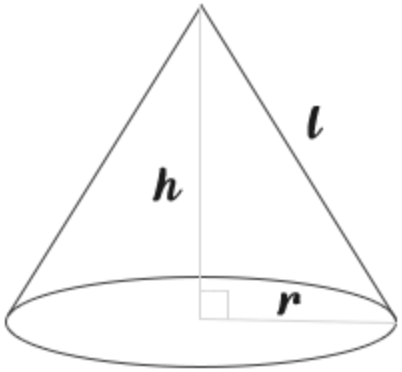
Longest rod = $\sqrt{(2R)^2+h^2}$

$\sqrt{10^2+(10\pi)^2}=\sqrt{100+100\pi}$

Problem:

Find the volume of the right circular cone with slant height 10cm and diameter 16cm.

Find the volume of the right circular cone with slant height 10cm and diameter 16cm.



R = 8, l = 10

As we know, $h^2+r^2=l^2$

Triplet is (6,8,10)

Therefore, h = 6

$$v = \frac{1}{3}\times 8\times 8\times 6\pi = 128\pi$$

Problem:

A right circular cylinder with radius 6cm and height 14 cm is cut into 2 equal parts by cut perpendicular to its base then find the increase in the surface area?

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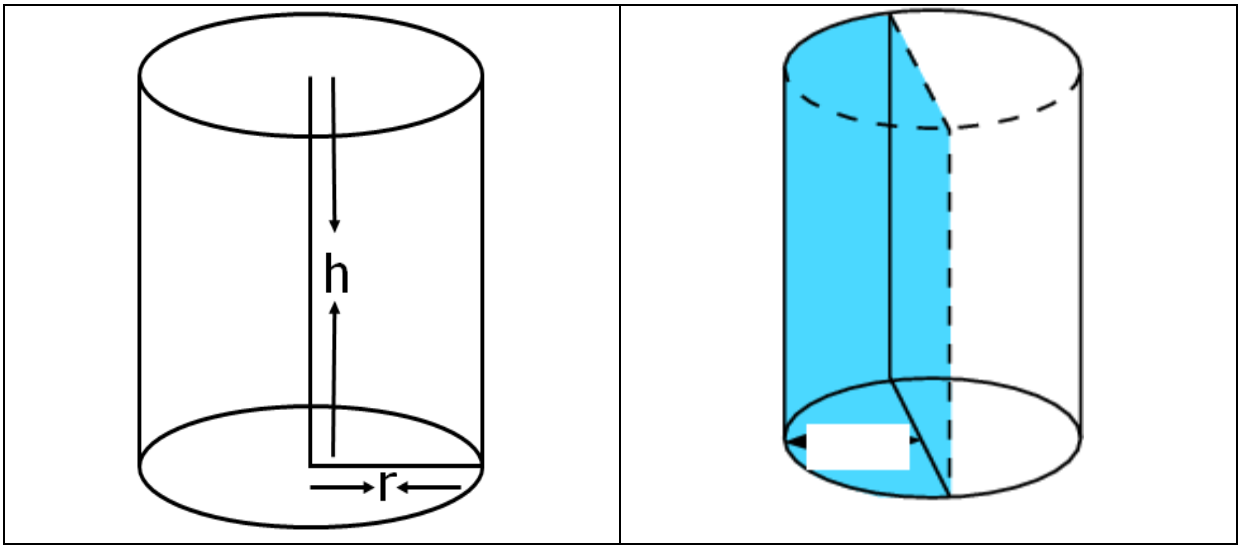

Increase in SA = Area of 2 rectangles

$= 2\ (2r \times h)$

$= 2 \times 2 \times 6 \times 14 = 336$