1) If the length of a rectangle is 17 cm and its perimeter is 48 cm, then find the area of the rectangle.

a) 113 cm^2 b) 121 cm^2
c) 132 cm^2 d) 119 cm^2

Question 1: The length of a rectangle is 12 cm and its perimeter is 40 cm. Find its area.

Question 2: A rectangular field has a perimeter of 60m and a width of 10m. Find the area of the field.

2) The base of a parallelogram is twice its height. If the area of the Parallelogram is 72 Sq. cm, then find the height.

a) 4 cm b) 12 cm
c) 6 cm d) 8 cm

Question 1: The base of a parallelogram is three times its height. If the area is 108cm^2, find the height.

3) A rectangular piece of paper 22 x 7 cm is folded without overlapping to make a cylinder of height $\frac{7}{2}$ cm. Find the volume of the cylinder.

a) 133.50 cm^3 b) 134.50 cm^3
c) 134.75 cm^3 d) 135.70 cm^3

Question 1: A rectangular sheet of paper 44cm X 10cm is rolled along its length to form a cylinder of height 10cm. Find the volume.

Question 1: A rectangular sheet of paper 11 cm X 4 cm is rolled along its length to form a cylinder of height 4 cm. Find the volume.

4) A rectangular box measures internally 1.6 m long, 1 m broad and 60 cm deep. The number of cubical blocks who's each of edge 20 cm that can be packed inside the box is.

a) 30 b) 60
c) 53 d) 120

Question 1: A wooden crate measures 1.2m,90cm, 60cm. How many cubical tea packets of edge 30 cm can be fit into it?

5) The area of a trapezium shaped field is 360 m^2 , the distance between the parallel sides is 15 m and one of the parallel sides is 33 m. find the other parallel side.

a) 13 m b) 14 m
c) 16 m d) 15 m

Question 1: The area of a trapezium is 105 cm^2 and its height is 7cm. If one of the parallel sides is 12 cm, find the other.

6) A 7 m wide road runs outside around a circular park whose circumference is 176 m. Find the area of the road.

a) 1386 Sq. m b) 1472 Sq. m
c) 1512 Sq. m d) 1760 Sq. m

Question: A path 3.5m wide runs around the outside of a circular lawn whose radius is 10.5m. Find the area of the path.

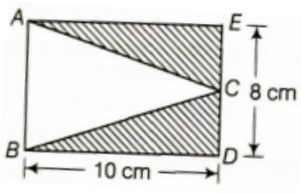
Question: A circular track has an inner circumference of 440 m. If the track is 14 m wide, find the area of the track.

7) Area of a circular track having diameter 14 m is equal to.

a) 516 m^2 b) 154 m^2
c) 625 m^2 d) 308 m^2

8) The area of a △ ABC in the given figure.

a) 50 cm^2
b) 45 cm^2
c) 55 cm^2
d) 40 cm^2



10) Area of rhombus whose one side measures 10 cm and one of the diagonals is equal to 12 cm.

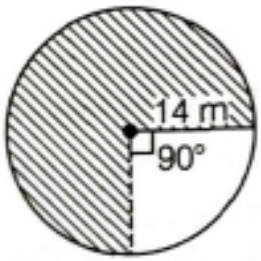
a) 40 cm^2 b) 96 cm^2
c) 64 cm^2 d) 60 cm^2

Question 1: Find the area of a rhombus whose side is 5 cm and one diagonal is 8 cm.

11) If an edge of a cube is x cm, then its surface area is equal to.

a) $7x^2$ b) $12x^2$
c) $6x^2$ d) $8x^2$

12) A framer grows crop in the shaded portion of a circular field as shown in the below figure. If radius of circular field is 14 m, then the area in which the farmer grows crop is.



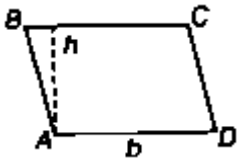
a) 616 m^2
b) 462 m^2
c) 308 m^2
d) 412 m^2

Question: A horse is tethered to a corner of a square field of side 20 m by a rope 14 m long. Find the area of the part of the field in which the horse can graze

Question: A horse is tethered to a corner of a square field of side 20 m by a rope 14 m long. Find the area of the part of the field in which the horse can graze (This creates a quadrant).

Question 3: The diameter of a circular park is 28m. A semicircular portion is planted with roses. Find the area of the rose garden.

13) A parallelogram is given in the figure, if DC = 10 cm and area of parallelogram is 35 cm^2 . Then, the value of h is equal to.



a) 7 cm
b) $\frac{7}{2}$ cm
c) 3 cm
d) 5 cm

14) If two circles have areas in the ratio 1 : 4 , then the ratio of their diameters will be.

a) 1 : 2 b) 2 : 1
c) 4 : 1 d) 1 : 4

Question 1: If the areas of two circles are in the ratio 9 : 25, what is the ratio of their radii?

Question 2: The ratio of the circumferences of two circles is 2 : 3. What is the ratio of their areas?

Question 3: The area of one circle is 16 times the area of another. What is the ratio of their diameters?

Question 4: The circumference of two circles is in the ratio 3 : 7. Find the ratio of their areas.

Question 5: The area of a circular garden is 25 times that of a smaller circular pond. What is the ratio of the radius of the pond to the radius of the garden?

Question 6: If the radius of a circle is doubled, what happens to its area?

15) If area of a triangle whose all sides are equal, is $16\sqrt{3}$ cm. Then, the height of the perpendicular from the vertex to its base is.

a) 2 $\sqrt{3}$ cm b) 4 $\sqrt{3}$ cm
c) 2 cm d) 4 cm

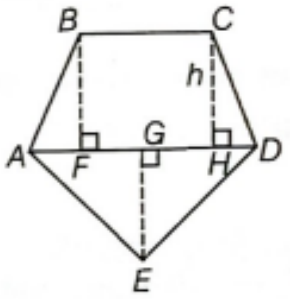
Question 3: The area of an equilateral triangle is . $4\sqrt{3}$ cm^2 Find its perimeter.

16) Four cows are tethered with equal ropes at 4 corners of a square field of side 70 m, so that they can reach one another. Then, the area left ungrazed by cows is.

a) 1225 m^2 b) 1100 m^2

c) 1050 m^2 d) 4900 m^2

17) The area of the pentagon ABCDE, if AD = 8 cm, AH = 6 cm, AG = 4 cm, AF = 3 cm, BF = 3 cm, CH = 3 cm and EG = 2.5 cm, is.



a) 43.5 cm^2
b) 33.5 cm^2
c) 26.5 cm^2
d) 53.5 cm^2

18) Assertion: If area of square is 64 cm^2 , then, its one side will be 4 cm.
Reason: Area of any square is side x side.
Which of the following statement is correct?
a) Both (A) and (R) are true and (R) is correct explanation of (A)
b) Both (A) and (R) are true but (R) is not the correct explanation of (A)
c) (A) is true and (R) is false
d) (R) is true and (A) is false

Assertion (A): If the radius of a circle is doubled, its area becomes four times the original area.
Reason (R): The area of a circle is calculated using the formula
a) Both A and R are true and R explains A
b) Both true, but R doesn't explain A
c) A is true, R is false
d) A is false, R is true.

19) Rakesh walks around a circular track of radius 7 m, with a speed of 4 km / h. If he takes 10 rounds of the track, then, how much time does he walk?
a) 6 min b) 7 min
c) 6 min 36 sec d) 6 min 30 sec

A person runs around a circular park of diameter 28 m at a speed of 12 km/h. How many minutes will it take to complete 15 rounds?

An athlete completes 8 rounds of a circular track with a radius of 14 m in exactly 11 minutes. Calculate the speed of the athlete in km/h.

Cyclist A and Cyclist B are racing. Cyclist A moves around a track of radius 21 m, while Cyclist B moves around a track of radius 35 m. If both travel at 5 m/s, what is the difference in time taken to complete 1 round?

A circular wire has a radius of 70 cm. If a toy car travels along the wire at a speed of 22 cm/s, how many rounds will it complete in 2 minutes?

A cyclist travels around a circular track of radius 140 meters. If they complete 10 rounds in 12 minutes, what is their speed in km/h?

Two cars, X and Y, are on a circular track. Car X travels on an inner track of radius 7 m, and Car Y travels on an outer track of radius 14 m. If both cars travel at the same speed, what is the ratio of rounds completed by Car X to Car Y in the same amount of time?

A runner completes 5 rounds of a circular path in 4 minutes at a constant speed of 11 m/s. What is the radius of the circular path?

A wheel has a diameter of 70 cm. If it rotates at a speed of 4.4 meters per second, how many seconds will it take to complete 50 revolutions?

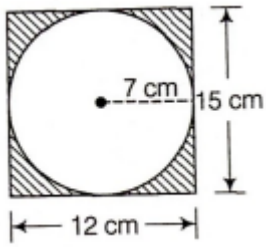
20) A field has a circular pond and a circular path along its boundary. A person walks around it exactly once keeping close to the edge. If his step is 132 cm long and he takes 400 steps to go around the field. Then, the diameter of the pond is.
a) 132 m b) 168 m
c) 154 m d) 200 m

A boy with a step length of 66 cm walks around a circular garden of radius 21 meters. How many steps will he take to complete one full round?

A jogger takes 500 steps to complete a single lap around a circular track with a diameter of 140 meters. What is the average length of his step in cm?

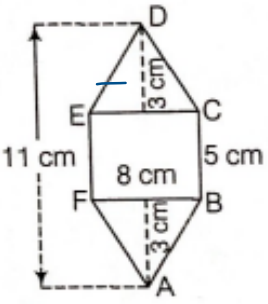
A man walks at a speed of 1.5 meters per second. He takes 800 steps to go around a circular field, and each step is 90 cm long. How many minutes does he spend walking?

21) in the given figure, radius of a circle is 7 cm and dimension of the ground is given in the figure. The ratio of the area of field to the area of shaded region is.



a) 90 : 13
b) 30 : 90
c) 13 : 90
d) 90 : 30

22) The area of the regular hexagon, shown in the figure,



a) 64 cm^2
b) 54 cm^2
c) 27 cm^2
d) 32 cm^2

23) A fountain pen with a cylindrical barrel of diameter 2 cm and height 10.5 cm, filled with ink can write 6600 words. How many words can be written with that pen using 200 ml of ink? (take, 1 cm^3 = 1 ml)

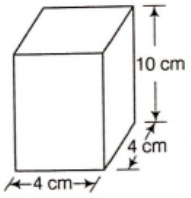
a) 40000
b) 20000
c) 10000
d) 15000

A pen with a cylindrical barrel of diameter 1.4 cm and height 10 cm can write 4,400 words. How many words can be written with 154 ml of ink?

A cylindrical ink bottle contains 300 ml of ink. If the ink is used to fill a pen barrel with a radius of 0.5 cm and it can write 5,000 words per refill, how many total words can be written if the barrel height is 7 cm?

Ratio and Proportion Pen A has a barrel radius of r and height h. Pen B has a barrel radius of 2r and height h/2. If Pen A can write 3,000 words, how many words can Pen B write with one full refill?

24) total surface area of the given figure is .



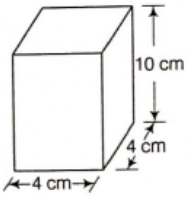
a) 160 cm^2
b) 192 cm^2
c) 352 cm^2
d) 320 cm^2

25) The lateral surface area of a cylinder, if its total surface area is 1760 cm^2 and radius is 7 cm, is.

a) 880 cm^2
b) 1452 cm^2
c) 1840 cm^2
d) 900 cm^2

26) If we interchange the length of the base with the height of the cuboid to get another cuboid. Then, its lateral surface area will.

a) Change
b) Remain same
c) less than first cuboid
d) More than first cuboid



A rectangular water tank has dimensions l, w,and h. If the height is doubled and the length is halved while the width remains constant, the Volume will:

a) Increase by 50%
b) Decrease by 50%
c) Remain the same
d) Double

If a cube of side a is melted and recast into a cuboid with a square base of side a and height h, what must be the relationship between the TSA of the cube and the TSA of the cuboid?
a) TSA cube > TSA cuboid
b) TSA cube < TSA cuboid
c) TSA cube = TSA cuboid
d) Cannot be determined without h

A solid metal cylinder and a cone have the same radius and the same height. If they are both melted to form a single sphere, what is the ratio of the volume of the cylinder to the volume of the cone?
a) 1:3 b) 3:1 c) 1:1 d) 2:3

The perimeter of the base of a cuboid is P and its height is h. If the height is tripled and the base dimensions are reduced such that the perimeter P remains the same, the new Lateral Surface Area will be:
a) P X 3h b) 1/3 (P X h)
c) 3 X (P X h) d) Both a and c are correct

27) Number of employees in an office room will be given by
a) $\frac{Perimeter}{Space\ occupied\ by\ a\ person}$
b) $\frac{volume\ of\ the\ room}{Space\ occupied\ by\ a\ person}$
c) $\frac{Surface\ of\ the\ room}{Volume}$
d) None of the above

Question: An office room is 10m long, 8m wide, and 3m high. If each employee requires 5m^3 of air space, how many employees can fit?

Question: In an office room, each employee is allotted 4m^2 of floor space and 12m^3 of air space. If the room is 4m high, which requirement limits the number of employees, and what is the maximum capacity if the floor area is 80m^2?

Question: A supervisor decides to move his team of 40 employees from Room A to Room B. Room B has twice the length and width of Room A, but only half the height. If Room A was exactly at full capacity, will Room B be:
a) Overcrowded b) Half empty
c) At the same capacity d) At double capacity

Question: A small meeting room measures 5m X 4m X 3m. If each person consumes 0.5m^3 of air per hour, how many people can stay in the room for 4 hours before they have consumed half of the total air in the room?

Problem: A cylindrical tank has a radius of 7 m and a height of 10 m. The cost of increasing the height of the tank is ₹500 per additional meter. A person invests ₹35,000 at 10% Simple Interest per annum. After how many years will the interest earned be enough to increase the tank's height by 2m?

Problem: The cost of painting the four walls of a room 12m X 8m X 4 m is ₹5 per m^2. If the total cost is to be covered by the interest earned on a 2-year investment at 8% SI, find the Principal.

Problem: A cube of side 10 cm is made of silver. The cost of silver is ₹100 per cm^3. Alternatively, the same amount of money could be invested at 12% SI. In how many years will the Simple Interest earned be equal to the value of the silver cube?

A rectangular courtyard is 20 m long and 15 m wide. The cost of paving it with bricks is ₹20 per m^2. A man has ₹4,000 in a savings account. At what Rate of Simple Interest must he invest this money for 3 years so that the interest earned covers exactly half the cost of paving?

Two solid metallic spheres of radii 3cm and 4 cm are melted and recast into a single sphere. The cost of the metal is ₹10 per cm^3. The total value of the new sphere is invested at 10% SI. How much Interest will be earned in 5 years?

A hollow cylindrical pipe is 21dm long. Its outer and inner diameters are 10 cm and 6 cm respectively. The cost of the copper used is ₹2 per cm^3. If this cost is equal to the Simple Interest earned on ₹1,056 invested for 2 years, find the Rate of Interest.

Problem: A solid metallic cube of side 20cm is purchased for ₹8,000. It is melted and recast into small solid spheres, each of radius 2cm. If each sphere is sold for ₹100, what is the profit percentage?

Problem: A rectangular sheet of tin measures 50 cm X 40 cm. A manufacturer makes open boxes by cutting squares of side 5cm from each corner. The cost of the tin sheet is ₹0.10 per cm^2. If the manufacturer wants to make a 20% profit on the cost of the raw material, at what price should he sell the box?

Problem: A carpenter buys a circular wooden log of radius 14cm and length 1m for ₹2,000. He carves the largest possible square beam (cuboid) out of it. He sells the finished square beam at a price that gives him a 25% profit on his purchase price. What is the selling price?

Problem: A sphere of radius 7cm is made of silver and costs ₹5,000. The cost of polishing the surface is ₹2 per cm^2. After polishing, the sphere is sold at a 10% profit on the total cost (Material + Polishing). Find the Selling Price.

Problem: A goldsmith buys a solid gold cylinder r = 3.5cm, h = 10cm at ₹5,000 per cm^3. He melts it to make solid bullets of radius 0.5cm and height 3cm. During the melting process, 10% of the metal is wasted. If he sells the remaining bullets at a 20% profit on his total purchase price, what is the Selling Price of the entire lot?

Problem: A cube of wood with side 10cm is painted entirely in red. The cost of the wood is ₹500 and the painting cost is ₹1 per cm^2. The cube is then cut into 1cm smaller cubes. If the retailer sells only the cubes that have at least one side painted at ₹2 each, and the unpainted cubes at ₹0.50 each, does he make a profit or loss?

Problem: A large metal cylinder (r=10 cm, h=21cm) is melted to form small cones (r=5 cm, h=3 cm). The cylinder was bought for ₹3,000. If each cone is sold at a price that results in a total profit of ₹1,200, what is the Selling Price of one cone?

TIME & WORK

1. The Digging Problem

Two workers, A and B, are tasked with digging a cylindrical well. Worker A can dig a well with a radius of 2m and a depth of 10m in 8 days. How many days will it take Worker B, who is twice as efficient as A, to dig a well with a radius of 4m and a depth of 5m

2. The Painting Problem

A cubical room has a side length of 10ft. A painter can paint 200sq ft of wall area in 3 hours. If he only paints the four side walls (excluding the floor and ceiling), how long will it take him to finish the job?

3. The Pipe and Cistern Variation

A cylindrical tank has a radius of 7m and a height of 10m. Water flows into the tank through a rectangular pipe of cross-section 20 cm X 10 cm at a speed of 5km/h. How long will it take to fill the tank completely?

4. The Melting and Recasting Task

A workshop must melt down 100 small metal spheres of radius 3cm and recast them into a

single large cone with a height of 30cm. If the melting process for one small sphere takes 2 minutes, and the recasting setup takes 15 minutes, what is the total time required? Also, find the radius of the resulting cone.

The Wall Construction Challenge

A mason can build a brick wall of dimensions 4m X 3m X 0.5 m in 6 hours. How many masons of the same efficiency are required to build a wall of dimensions 8m X 6m X 0.25m in exactly 4 hours?

The Polishing Rate Task

A carpenter has two solid wooden objects: a cube with a side of 6 cm and a sphere with a radius of 3 cm. If it takes him 54 minutes to polish the entire surface of the cube, how many minutes will it take him to polish the sphere?

The Reservoir and Drainage Pipe

A hemispherical bowl of radius 21cm is full of water. It is connected to a drainage pipe that removes water at a rate of 154cm^3/ second. How many seconds will it take to empty the bowl completely?

The Road Roller Efficiency

A cylindrical road roller has a diameter of 1.4m and a width (height) of 2m. It makes 5 revolutions every 10 seconds. How many minutes will it take the roller to level a rectangular playground measuring 88 m x 50 m?

PARTNERSHIP

Three farmers, A, B, and C, rent a triangular grazing field with sides 30m, 40m, and 50m for ₹7,200 per month. A grazes his cows on 20% of the area, B on 30%, and C on the remaining area. How much rent should C pay?

Two merchants, X and Y, rent a cylindrical godown of radius 7m and height 10m. Merchant X occupies a space shaped like a cone with the same radius and height as the godown. Merchant Y occupies the remaining space. If the total monthly rent is ₹30,000, what is the share of Merchant Y?

Two painters, P and Q, agree to paint a large solid wooden sphere of radius 7 cm. Painter P paints the upper hemisphere, and Painter Q paints the lower hemisphere. If the cost of paint is ₹5 per cm^2, and they decide to split the total cost based on the surface area they covered, how much does each pay?

Two neighbors, X and Y, share a circular garden of radius 14 m. X maintains a smaller circular inner portion of radius 7m, while Y maintains the remaining outer ring (annulus) area. If the total maintenance cost is ₹4,800, what is the share of neighbor Y?

Three trekking groups (A, B, and C) rent a conical tent. Group A occupies the top portion of the cone up to half its vertical height. Groups B and C share the remaining bottom frustum area equally. If the total rent is ₹14,000, how much should Group A pay?

A and B rent a rectangular warehouse of 20m x 15m. A uses a triangular portion formed by joining two adjacent corners to the midpoint of the opposite side. B uses the rest. If the rent is ₹10 per square meter, find the difference between the rent paid by A and B.

Two sculptors, Ram and Shyam, are given a solid metallic sphere to melt and create their own statues. Ram takes enough metal to make a sphere of radius 3cm. Shyam takes the remaining metal to make a sphere of radius 4cm. What is the ratio of their "investment" (volume of metal taken)?

PROBLEMS ON AGES

The length of a rectangular garden is equal to the age of Arjun, and the breadth is equal to the age of his younger sister, Sneha. Arjun is 5 years older

than Sneha. If the sum of their ages is 25, find the Area and Perimeter of the garden.

A builder is designing a pillar. The radius of the pillar (in meters) is equal to 1/10th of a father's age, and the height is equal to the son's age. The father is 30 years older than the son. In two years, the father will be twice as old as the son. Find the Volume of the pillar.

The radius of a circular track is equal to the age of a coach. The coach is currently 3 times as old as his star athlete. 10 years ago, the coach was 5 times as old as the athlete. Find the Circumference of the track.

The side of a cubical box is equal to the age of a child. The child's age is the square root of her grandfather's age. If the grandfather is 64 years old, find the Total Surface Area and Volume of the box.

The length of a rectangular courtyard is equal to the age of Mr. Sharma, and the breadth is equal to the age of his son. Mr. Sharma is twice as old as his son. The difference between their ages is 25 years. What is the Perimeter of the courtyard?

The radius of a circular pond is equal to the age of Reena. Reena is 4 years older than her brother, Rahul. The product of their ages is 96. What is the Area of the pond?

28) The thickness of a hollow metallic cylinder is 2 cm. It is 70 cm along with outer radius of 14 cm. The volume of the metal used in making this cylinder assuming that, it is open at both ends.

a) 11440 cm^3 b) 10440 cm^3
c) 10500 cm^3 d) 9440 cm^3

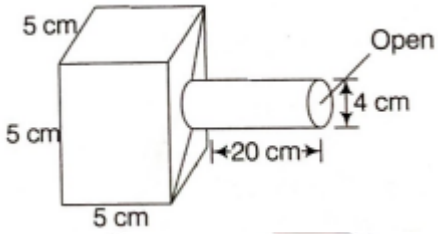
29) A cuboidal tin box is opened at top, has dimensions 20 cm x 16 cm x 16 cm. The total area of metal sheet required to make such box.

a) 256 cm^2 b) 640 cm^2
c) 1472 cm^2 d) 1792 cm^2

30) A cylindrical tank has a radius of 154 cm. It is filled with water to a height of 3 cm. If water to a height of 4.5 cm is poured into it. Then, the increase in the volume of water.
(in KL) ($1L^3 = 1KL$)

a) 1 KL b) 0.11 KL
c) 10 KL d) 2 KL

31) The surface area of the given figure,



a) 410.4 cm^2 b) 150 cm^2
c) 276.5 cm^2 d) None of these

32) The ratio between the curved surface area and the total surface area of a right circular cylinder is 1 : 2. The ratio between the height and radius of cylinder is.

a) 2 : 1 b) 1 : 2
c) 1 : 1 d) 1 : 3

33) Three cubes of side 3 cm, 4 cm and 5 cm are melted and a new cube if formed. The side of the new formed cube is.

a) 3 cm b) 4 cm
c) 6 cm d) 8 cm

34) How many soap cakes can be placed in a box of size 56 cm x 0.4 m x 0.25 m, if the size of a soap cake is 7 cm x 5 cm x 2.5 cm?

a) 200 b) 300
c) 400 d) 640

35) A metal sheet 27 cm long, 8 cm broad and 1 cm thick is melted to form a cube. The difference between the surface arears of two solids is.

a) 284 cm^2 b) 286 cm^2
c) 296 cm^2 d) 250 cm^2