THE ULIMATE BOOK for Application Sums (Printed Edition)

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Easy level

1) If the radius and heights of two cylinders are in the ratio of 5: 6 and 2: 5 respectively, then find the ratio of volume of two cylinders?
a) 6 : 17   b) 8 : 15   c) 5 : 18   d) 7 : 19   e) None of these

Solution:
Volume of cylinder = $\pi r^2 h$
The ratio of volume of two cylinders
$= > [(22/7)*(5x)^2*(2y)] : [(22/7)*(6x)^2*(5y)]$
$= > [25x^2 * 2y] : [36x^2 * 5y]$
$= > 5 : 18$

2) The perimeter of a rectangular field is twice the perimeter of a square field. If one of the sides of the square field is 20 m and breadth of the rectangular field is 30m then find the area of the rectangular field?
a) 1250 Sq m   b) 1300 Sq m   c) 1350 Sq m   d) 1500 Sq m   e) None of these

Solution:

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Perimeter of square field= 20*4 = 80m
Perimeter of the rectangular field = 160m
Let the length of the rectangular field be x,
160 = 2*(x+30)
160 – 60 = 2x
X = 50 m
Area of the rectangular field = 50*30 = 1500 Sq m

3) The ratio of length and breadth of the rectangular park is 3: 2. If the man cycling along the boundary of the park at the speed of 12 km/hr completes one round in 10 minutes, then find the area of the park?
a) 160000 Sq. m   b) 280000 Sq. m   c) 220000 Sq. m   d) 240000 Sq. m
e) None of these

Solution:
The ratio of length and breadth of the rectangular park = 3 : 2 (3x, 2x)
Distance = S*T = 12*(10/60) = 2 km = 2000 m
Perimeter = 2*(3x + 2x)
10x = 2000
X = 200
Length = 600 m, Breadth = 400 m
Area of the park = 600*400 = 240000 Sq. m

4) There are two circles of different radii. The area of a square is 196 sq cm, whose side is half the radius of the larger circle. The radius of the smaller circle is three sevenths that of the larger circle. What is the circumference of the smaller circle?
a) 32π cm   b) 12π cm   c) 16 π cm   d) 24 π cm   e) 18 π cm

Solution:
Area of the square = 196 sq cm
Side of the square = 14 cm
Radius of the larger circle = 28 cm
Radius of the smaller circle = 28 × (3/7) = 12 cm
Circumference of the smaller circle = 2 × π × 12 = 24 π cm

5) The ratio of the angles of a quadrilateral is 3 : 4 : 6 : 7. Half the second largest angle of the quadrilateral is equal to the smaller angle of a parallelogram. What is the value of the adjacent angle of the parallelogram?
a) 126°   b) 94°   c) 196°   d) 96°   e) None of these

Solution:
Sum of angle = (3x + 4x + 6x + 7x) = 3600 or, 20x = 360°
x = 18°

Second largest angle = 6 x 18° = 108°
Smaller angle of parallelogram = (½)*108° = 54°
Value of adjacent angle = 180° - 54° = 126°

Moderate level 1

6) The length and breadth of a rectangular piece of land are in the ratio of 3: 2. The owner spent Rs. 3250 for fencing it from all the sides at the rate of Rs 6.50 per meter. The difference between length and breadth is?
a) 50 m   b) 70 m   c) 90 m   d) 85 m   e) 65 m

Solution:
Perimeter of the field = 3250/6.50 = 500 m
The ratio of length and breadth of the rectangle = 3: 2(3x, 2x)
According to the question,
2*(3x + 2x) = 500
10x = 500
X = 50
So, length = 150 m & breadth = 100 m
Difference between length & breadth
= > (150 – 100) m = 50 m

7) The length of a rectangle is 12 m more than the side of the square and the breadth of the rectangle is 5 m less than the side of the square. If the area of the square is 784 Sq m. what is the area of the rectangle?
a) 840 Sq m   b) 780 Sq m   c) 920 Sq m   d) 660 Sq m   e) None of these

Solution:
Area of square = 784 Sq m
Side of the square = 28 m
Length of the rectangle = 28 + 12 = 40 m
Breadth of the rectangle = 28 – 5 = 23 m
Area of the rectangle = 40*23 = 920 Sq m

8) A hemispherical bowl contains milk of internal radius 36cm. This milk is to be filled into cylindrical shaped bottles of diameter 12 cm and height 16cm. How many bottles will be needed to empty the bowl?
a) 54   b) 58   c) 60   d) 45   e) None of these

Solution:
Volume of hemisphere = $(2/3)*\pi r^3$
Volume of bowl = $(2/3)*\pi*36*36*36 = 31104\pi$ cm^3
Volume of cylinder = $\pi r^2 h$

Here r = 12/2 = 6cm
Height h =16 cm
Volume of 1 bottle = (п*6*6*16) cm^3 =576п cm^3
Number of bottles = volume of bowl / volume of 1 bottle
= > 31104п/576п = 54

9) The volume of a brick 1296 dm^3. Its dimensions are in the ratio 3:2:1. If its entire surface is painted at 50 paise per dm^2 then cost will be?
a) Rs. 360   b) Rs. 385   c) Rs. 396   d) Rs. 350   e) None of these

Solution:
Let the dimensions be 3x and 2x respectively,
Then 3x*2x*x = 1296
$6x^3$ = 1296
X^3 = 1296
X= 6
So the dimensions of the block are 18, 12 and 6,
Surface area = 2*[(18*12) + (12*6) + (18*6)]
= > 2*(216+72+108)
= > 2*(396) =792 dm^2
Cost of painting = Rs. (50* (792/100)) = Rs. 396

10) The area of the trapezium is 950 cm^2. The discord between 2 parallel sides of trapezium is 8 cm and the perpendicular distance between them is 38 cm. Find the length of the parallel sides?
a) 22, 28   b) 21, 29   c) 23, 26   d) 21, 26
e) None of these

Solution:
Let the 2 parallel sides of the trapezium be x and y respectively,
Then x - y = 8 --→(1)
(½)*(x + y) * 38 = 950
19*(x + y) = 950
X + y = 950/19 = 50
X + y = 50 ---→ (2)
Adding (1) and (2) we get
2x = 58
X = 58/2 = 29
Put x value in (1),
Y = 29 – 8 = 21
So the 2 parallel sides are 21cm and 29 cm

Moderate level 2

11) The perimeter of equilateral triangle is 4 more than the perimeter of square. The diagonal of the square is 14√2 cm. What is the area of the equilateral triangle?
a) 100√3 sq cm   b) 64√3 sq cm   c) 144√3 sq cm   d) 80√3 sq cm
e) None of these

Solution:
The diagonal of the square is 14√2 cm
=> d = 14√2
Area of square = (½)*d^2 = (½)*196*2 =196
a^2 = 196 = > a = 14
Perimeter of square = 4a = 56 cm
Perimeter of equilateral triangle = 56 + 4 = 60 cm
= > 3a = 60
= > a = 20
Area of equilateral triangle = (√3/4)*a^2
= > (√3/4)*20*20
= > 100√3 sq cm

12) A drum in the form of a frustum of a cone, having radius of the top and bottom as 18 m and 9 m respectively. The height of the frustum is equal to the side of the cube where volume of the cube is 21952 cm^3. Find the capacity of the drum?
a) 16632 cm^3 b) 13632 cm^3 c) 17382 cm^3 d) 15728 cm^3 e) 14642 cm^3

Solution:
Given that volume of the cube=21952 cm^3
Then Side of the cube= $\sqrt[3]{21952}$ = 28 cm
Height of the frustum = side of the cube=28 cm
Then capacity of the drum = (1/3)*π*h*(R^2 + R*r + r^2)
= > (1/3)*(22/7)*28*(324+162+81)
= > (1/3)*(22/7)*28*(567)
= > 16632 cm^3

13) A rectangular sheet, when folded into 2 corresponding parts had a perimeter 102cm for each part folded along one set of sides and the same is 114 cm when folded along the other set of sides. What is the area of the sheet?
a) 1520 sq.cm   b) 1402 sq.cm   c) 1310 sq.cm   d) 1260 sq.cm
e) None of these

Solution:
When folded along breadth, we have 2*(l/2 + b) = 102

L + 2b = 102   ---→ (1)
When folded along length, we have 2*(l + b/2) = 114
2l + b = 114   ---→ (2)
Multiply (2) by 2, we get
4l + 2b =228 ---→ (3)
Subtract 1 from 3,
3l = 126 = > l = 42
Put l value in (1) we get b = 30
Area of the sheet = (42*30) =1260 sq.cm

14) A water tank is 20m long, 12m wide and 30 m deep. It is made of iron sheet which is 2m wide. The tank is open at top. If the cost of the iron sheet is Rs 18 per meter, then what is the total cost of the iron sheet required to build the tank?
a) Rs. 18000   b) Rs. 17000   c) Rs. 18450   d) Rs. 19440   e) Rs. 14555

Solution:
Surface area of the open tank
= > 2*(l*w + w*d + l*d) − (l*w)
= > 2*(20*12 + 12*30 + 20*30) − 20*12
= > 2400 − 240 = 2160 m^2
Length of iron sheet = 2160/2 = 1080 m^2
Total cost of iron sheet= 1080*18 = Rs. 19440

15) If the length and breadth of a rectangular seminar hall are each increased by 2m, then the area of floor is increased by 42 sq m. If the length is increased by 2m and breadth is decreased by 2m then the area is decreased by 10 sq m. The perimeter of the floor is?
a) 36 m   b) 38 m   c) 34 m   d) 32 m   e) None of these

Solution:
Let length = x metres
Breadth = y metres
Then (x+2)(y+2) − x*y = 42
X*y + 2x + 2y +4 − x*y = 42
2x + 2y = 42 − 4
2x + 2y = 38
X + y = 19 --→ (1)
And x*y − [(x+2) (y-2)] = 10
X*y − [x*y − 2x + 2y + 4] = 10
X*y − x*y + 2x − 2y + 4 = 10
2x − 2y =6
X − y = 3 --→ (2)
Adding (1) & (2)

2x = 22
X=11
Put x value in (1)
Y = 19 -11 = 8
So length = 11m and breadth = 8m
Perimeter = 2*(l + b) = 2*(11+8) = 38 m

Hard level

16) The length and breadth of the floor of the room is 60 feet and 40 feet respectively. Square tiles of 6 feet dimension having three different colours are placed on the floor. The first row (breadth is 18 feet) of tiles on all sides is of grey colour, out of the remaining area, one third is of brown colour and the remaining is of white colour. How many brown coloured tiles are there in the room?
a) 43.5   b) 26   c) 17   d) 13.5   e) 14.9

Solution:
Total area covered by grey coloured tiles
= > (60+60)*6 + (18+18)*6
= > 120*6 + 36*6
= > 936 square feet
Remaining area = (60*40) – 936 = 1464 square feet
Then total area covered by brown coloured tiles
= > (1/3)*1464
= > 488 square feet
Thus required number of brown coloured tiles
= > 488/(6*6)
= > 13.5 tiles

17) Height of a right circular cone and a right circular cylinder is same. Radius of the right circular cylinder is 14 cm and diameter of the right circular cone is 42 cm. Volume of the cylinder is approximately what percent of the volume of the cone?
a) 110 %   b) 120 %   c) 135 %   d) 150 %   e) 165 %

Solution:
Let the height of the cylinder and the cone = h cm
Volume of the cylinder = $\pi r^2 h$
= > (22/7)*14*14*h
= > 616h cm^3
Volume of the cone = (1/3)*$\pi r^2 h$
= > (1/3) x (22/7) x (42/2) x (42/2) x h
= > (1/3) x (22/7) x 21 x 21 x h

= >462h cm^3

Required percentage = (616/462)*100 = 133.33 % = 135 %

18) The curved surface area of the cylinder is 3955 cm^2 and if the ratio of the curved surface area to the total surface area of the solid cylinder is 9:7 means, then find the height of the cylinder?

 a) 3.5 cm   b) 4.5 cm   c) 4 cm   d) 7.5 cm   e) None of these

Solution:

Area of cylinder = 2πrh

Total surface area of cylinder = 2πrh +2πr^2

= > 9*3955/7 = 5085 sq.cm

Circumference of base of cylinder = 5085 – 3955 =1130

Surface Area = circumference of base *h

3955 = 1130*h

H= 3955/1130 = 3.5m

19) The floor of a rectangular auditorium of length 50 feet and breadth 18 feet is to be covered with a wall to wall carpet. Find the total cost, if the carpet costs Rs 32/sq. feet and the pasting charges are Rs. 9/sq. feet?

 a) Rs. 42500   b) Rs. 36900   c) Rs. 25400 d) Rs. 24500   e) None of these

Solution:

Substituting the values in the area formula we get-

Area = 18 x 50 = 900 sq. feet

So the area of the auditorium to be carpeted is 900 sq. Feet

Total Cost of Carpeting/ Sq. Feet = Cost of the Carpet + Cost of Pasting

Total Cost = 32+9 = 41

Total Cost = Total Area x Total Cost of Carpeting/ Sq. Feet

Total Cost = 900*41

Total Cost = Rs. 36900

20) It will cost Rs. 12000 to etch a glass plate of 1m × 1m dimension, if cost of fetching a glass with design varies directly as the square of its area. What would be the loss to the artist if he were to etch 4 pieces of dimension 1/2 m × 1/2 m instead of the 1m × 1m piece and find profit percentage worker?

 a) 75%   b) 55%   c) 45%   d) 60%   e) None of these

Solution:

Since the cost of C α A^2 => C = XA^2

8000 = XA^2 => X = 12000

If he were to etch a ½ m x ½ m glass, it will have an area of ¼ sq m.

C = 8000 x (1/4)^2 = 12000 x 1/16 = 750

And 4 such glasses will fetch him Rs.3000.

Therefore, his loss will be Rs.9000.

= > (9000/12000)*100 = 75%