1. A shopkeepers charges are 20% over cost price. He allows his customers 10% off their bills for cash payment. His net gain per cent is

1. 12 2. 8 3. 10 4. 15

Ans: 2

Explanation

Let CP = 100

Marked price, MP = 120

Discount = 10% of MP = 12

SP = MP – Discount = 120 -12 =108

Profit = SP – CP = 108 -100 = 8

Gain= 8

2. What is the speed of a car if its wheel is 0.7 m in diameter and makes 500 revolutions per minute ?

1. 2.2 kmph 2. 60 kmph 3. 66 kmph 4. 100 kmph

Ans: 2

Explanation

Distance travelled in one minute = $\pi DN = \pi \times 0.7 \times 500$ m/min.

Distance travelled in one hour in kilometer = $\pi \times 0.7 \times 500 \times \frac{60}{1000}$ =65.94 km

∴ Speed = 66 kmph

3. If the areas of the three adjacent faces of a cuboid are x, y and z, then the volume of the cuboid is

1.xyz 2.2xyz 3.$\sqrt{xyz}$ 4. 3$\sqrt{xyz}$

Ans:3

Explanation

Let the length, breadth and height of the cuboid be l, b and h respectively.

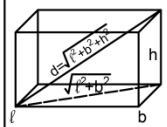
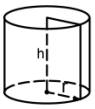
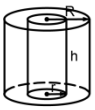
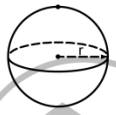
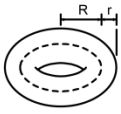
∴ The area of its faces are x=lb, y=bh, z=lh

∴ Volume V

$xyz = l^2b^2h^2 = (lbh)^2 = xyz$

∴ V = lbh = $\sqrt{xyz}$

Table - Surface area and volume of of solids.

Shape	Figure	Lateral / Curved surface area,(LSA) in square units	Total surface area,(TSA) in square units	Volume, V in cubic units	Nomenclature
1. Cuboid		$2(\ell b + bh + h\ell)$	$2(\ell b + bh + h\ell)$	$\ell \times b \times h$	ℓ = length, b = breadth, h = height $d = \sqrt{\ell^2 + b^2 + h^2}$
2. Cube		$4a^2$	$6a^2$	a^3	a = edge of cube $d = a\sqrt{3}$
3. Right circular cylinder		$2\pi rh$	$2\pi r(r+h)$	$\pi r^2 h$	r = radius h = height
4. Hollow cylinder		$2\pi(R+r)h$	$2\pi(R^2 - r^2) + 2\pi(R+r)h$	$\pi(R^2 - r^2)h$	R= radius of outer cylinder r = radius of inner cylinder h = height
5. Sphere		—	$4\pi r^2$	$\frac{4}{3}\pi r^3$	r = radius of the sphere
6. Hemisphere		$2\pi r^2$	$2\pi r^2 + \pi r^2 = 3\pi r^2$	$\frac{2}{3}\pi r^3$	r = radius of the hemisphere
7. Right circular cone		$\pi r\ell$	$\pi r(\ell+r)$	$\frac{1}{3}\pi r^2 h$	r = radius of base, h=height, ℓ =slant height $= \sqrt{h^2 + r^2}$
8. Frustum of a right circular cone		$\pi(R+r)\ell$ where $\ell = \sqrt{h^2+(R-r)^2}$	$\pi [R^2+r^2+(R+r)\ell]$	$\frac{\pi h}{3}[R^2+r^2+Rr]$	r = radius of top circle R = radius of the base circle h=height, ℓ=slant height
9. Torus		-	$4\pi^2 rR$	$2\pi^2 r^2 R$	R = Torus radius r = Tube radius V = Volume

4. If the area of one face of the cube is numerically 1.5 times it perimeter, the volume (in cm^3) of the cube is

1. 125 2. 144 3. 216 4. 312

Ans: 3

Explanation

Given: Face area of a cube, $a^2 = 1.5 \times P$ where a is the side and perimeter is P (P=4a)

i.e., $a^2 = 1.5 \times 4a = 6a \rightarrow a=6, \therefore V= a^3 = 216$

5. The volume (in cm^3) of a right circular cone of height 12 cm and base radius 6 cm is

1. 12π 2. 36π 3. 72π 4. 144π

Ans: 4

Explanation $V = \frac{1}{3}\pi r^2 h$

Given: h= 12 ; r = 6. $\therefore V = \frac{1}{3}\pi x 6^2 x 12 = 144\pi$

6. If the height and the radius of the cone are doubled, then the volume of the cone becomes

1. 3 times 2. 4 times 3. 6 times 4. 8 times

Ans:4

Explanation: $V = \frac{1}{3}\pi r^2 h$

$r \rightarrow 2r$

$h \rightarrow 2h$

$\therefore V \rightarrow \frac{1}{3}(2r)^2 \times 2h = \frac{1}{3} x 8r^2 h = 8V$

7. The ratio of volume of a right circular cylinder and right circular cone of the same base and height will be

1.1 : 3 2. 3 : 1 3.4 : 3 4.3 : 4

Ans: 2

Explanation

Vol of Cyliner $\pi r^2 h$/ Vol of cone $1/3\ \pi r^2 h$

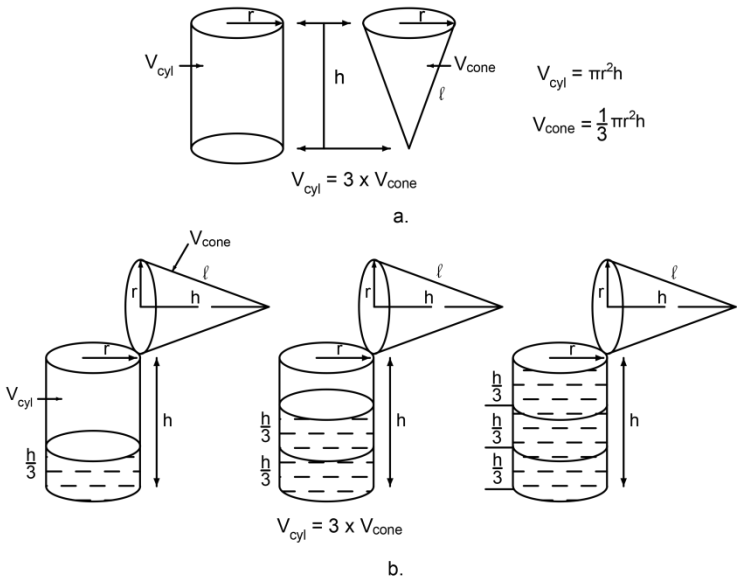


Figure : Comparison of volume of a cone and a cylinder.

8. If the diameter of a cylinder is 28 cm and its height is 20 cm, then the surface area (in cm^2) is

1. 2998 2. 2992 3. 2292 4. 2230

Ans: 2

Explanation

Given: Dia. D = 28 cm→ r = 14cm ; h = 20 cm

Total surface area, TSA= $2\pi r^2 + 2\pi rh$

$= 2\pi(14)^2 + 2\pi(14)(20) = 2992\ cm^2$

9. If the ratio of the volumes of two spheres is 1: 8, then the ratio of their surface areas is

1. 1 : 2 2. 1 : 4 3. 1 : 8 4. 1 : 16

Ans: 2

Explanation

$V_1 : V_2 = a_1^3 : a_2^3 = 1^3 : 2^3 = 1 : 8. \therefore a_1 : a_2 = 1 : 2$

$\therefore S_1 : S_2 = 6a_1^2 : 6a_2^2 = a_1^2 : a_2^2 = 1 : 4$

Note: For two cubes of sides a_1 and a_2,

The ratio of sides: $a_1 : a_2$

The ratio of surfaces: $S_1 : S_2 = a_1^2 : a_2^2$

The ratio of volumes : $V_1 : V_2 = a_1^3 : a_2^3$

10. If the height of the cone is half the radius of the sphere, then the radius of the base of a cone which has the same volume as a sphere of 5 cm radius, is

1. 10 cm 2. $10\sqrt{2}$ cm 3. $5\sqrt{2}$ / 2 cm 4. $10\sqrt{2}/2$ cm

Ans: 2

Explanation

Let the radius of cone be, r. Given

Volume of the sphere, $V_s = \frac{4}{3}\pi \times 5^3 = \frac{500}{3}\pi$ Sphere Cone

Volume of the cone, $V_c = \frac{1}{3}\pi r^2 \times \frac{5}{2} = \frac{5}{6}\pi r^2$ $r = 5$ $h = \frac{r}{2}$

$\therefore \frac{5}{6}\pi r^2 = \frac{500}{3}\pi$ $V_{Cone} = V_{Sphere}$

$r = 10\sqrt{2}$

11. A cube of side 6 cm is cut into number of cubes of side 2 cm. The number of cubes will be

1. 6 2. 9 3. 12 4. 27

Ans: 4

Explanation

Volume of cube of 6 cm side, $V_1 = 216$ cm ^{3}

Volume of cube of 2 cm side, $V_2 = 8$ cm ^{3}

No .of small cubes = $\frac{6 \times 6 \times 6}{2 \times 2 \times 2} = \frac{216}{8} = 27$

12. Which of the following numbers is prime ?

15, 16, 17, 18 and 20

1. 17 2. 18 3. 15 4. 16

Ans: 1.

Box: prime numbers.

Prime number

A prime number is a whole number greater than 1 whose only factors are 1 and itself. A

factor is a whole numbers that can be divided evenly into another number. The few prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29. Numbers that have more than two factors are called composite numbers. The number 1 is neither prime nor composite. Prime numbers up to 1000 are hereunder.

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73,79,83,89,97,
101,103,107,109,113,127,131,137,139,149,151,157,163,167,173,179,181,191,193,197,199,
211, 223, 227, 229, 233, 239, 241, 251, 257, 263, 269, 271, 277, 281, 283, 293,
307, 311, 313, 317, 331, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 397,
401, 409, 419, 421, 431, 433, 439, 443, 449, 457, 461, 463, 467, 479, 487, 491, 499,
503, 509, 521, 523, 541, 547, 557, 563, 569, 571, 577, 587, 593, 599,
601, 607, 613, 617, 619, 631, 641, 643, 647, 653, 659, 661, 673,
677, 683, 691, 701, 709, 719, 727, 733, 739, 743, 751, 757, 761, 769, 773, 787, 797,
809, 811, 821, 823, 827, 829, 839, 853, 857, 859, 863, 877, 881, 883, 887,
907, 911, 919, 929, 937, 941, 947, 953, 967, 971, 977, 983, 991, 997.

13. $\sin^2 30° + 4\cot^2 45° - \sec^2 60°$ is equal to

1. 0 2. $\frac{1}{4}$ 3. 4 4. 1

Ans: 2

Explanation

$= \left(\frac{1}{2}\right)^2 + 4\times 1^2 - 2^2 = 1/4$ $\left(\because \sec 60 = \frac{1}{\cos 60} = \frac{1}{\frac{1}{2}}\right)$

Box: Supplementary and complementary angles

Two angles are called complementary when their sum is 90°. Each angle is the complement of the other; thus θ and 90° – θ are complementary angles.

$\sin(90° - \theta) = \cos\theta$; $\cos(90° - \theta) = \sin\theta$;

$\tan(90° - \theta) = \cot\theta$; $\cot(90° - \theta) = \tan\theta$;

$\sec(90° - \theta) = -\operatorname{cosec}\theta$; $\operatorname{cosec}(90° - \theta) = \sec\theta$;

Illustration

$\sin 60° = \sin(90° - 30°) = \cos 30° = -\frac{\sqrt{3}}{2}$

$\cos 30° = \sin(90° - 60°) = \sin 60° = -\frac{\sqrt{3}}{2}$

$\sin(90° + \theta) = -\cos\theta$;

$\cos(90° + \theta) = \sin\theta$;

$\tan(90° + \theta) = \cot\theta$;

cot (90° + θ) = tan θ;

sec (90° + θ) = - cosec θ;

cosec (90° + θ) = sec θ;

Illustration

sin 120° = sin (90°+30°) = cos 60° = $-\frac{\sqrt{3}}{2}$

cos 120° = cos (90°+ 30°) = -sin 30° = $-\frac{1}{2}$

Supplementary Angles

Two angles are called supplementary when their sum is 180°. Each angle is the supplement of the other; thus θ and (180° – θ) are supplementary angles.

sin (180° - θ) = sin θ; cos (180° - θ) = - cos θ;

tan (180° - θ) = - tan θ; cot (180° -θ) = - cot θ;

sec (180° -θ) = - sec θ; cosec (90° -θ) = cosec θ;

14. The value of sin 79° cos 11° + cos 79° sin 11° is equal to

1. 1 2. 1/√2 3. 1/2 4. 0

Ans:1

Explanation

It is known: cos θ = sin (90 – θ) and sin θ = cos (90-θ)

∴ cos 11° =sin 79° and sin 11° = cos 79°

As per the formula: $\sin^2\theta+\cos^2\theta = 1$

Given sum → sin 79°.sin 79° + cos 79° .cos 79° =1

15. The value of $\sin \pi/6 + \cos \pi/3 - \tan^3 \pi/4$ is

1. 1 2. 0 3. -1 4. None

Ans: 2

Explanation

The given sum → sin30° +cos60° - $\tan^3 45 = \frac{1}{2} + \frac{1}{2}$ - 1 = 0. Trigonometric ratios of specific angles are given below:

Trigonometric ratios of some specific angles

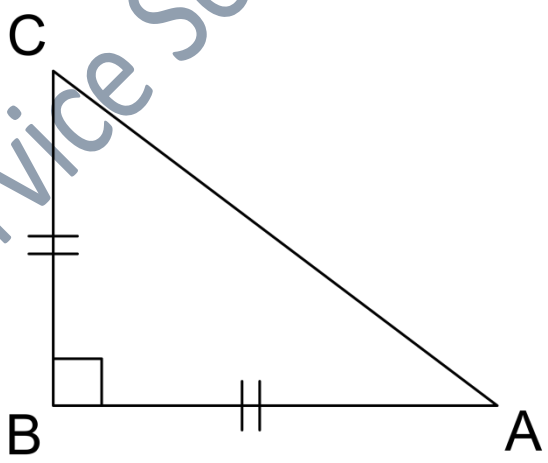
θ	$0°$ 0	$30°$ $\frac{\pi}{6}$	$45°$ $\frac{\pi}{4}$	$60°$ $\frac{\pi}{3}$	$90°$ $\frac{\pi}{2}$	$180°$ π	$270°$ $\frac{3\pi}{2}$	$360°$ 2π
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0	-1	0	1
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined	0	Not defined	0
$\operatorname{cosec}\theta$	Not defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1	Not defined	-1	Not defined
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not defined	-1	Not defined	1
$\cot\theta$	Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0	Not defined	0	Not defined

16. The angle of elevation of the moon when the length of the shadow of a pole is equal to its height, is

1. 30° 2. 45° 3. 60° 4. 90°

Ans: 2

Explanation



Let BC be the pole,

Given, BC = Shadow length, AB

This condition in a right angle triangle is met if A and B are equal and hence 45° each.

17. $(64)^{-½}$ - $(-32)^{-4/5}$ equals

1. 1/16 2. 1/8 3. 3/16 4. 3/8

Ans: 1

Explanation

$\frac{1}{\sqrt{64}} - [-32]^{-4/5} = \frac{1}{8} - \left[-2^5\right]^{\frac{-4}{5}} = \frac{1}{8} - \frac{1}{(-2)^4} = \frac{1}{8} - \frac{1}{16} = \frac{2-1}{16} = \frac{1}{16}$

18. A is five times as large as B. By how much per cent is B less than A ?

1. 20% 2. 25% 3. 75% 4. 80%

Ans: 4

Explanation

A = 5B,

B = $\frac{A}{5}$ = 20% A

∴ B is less by 80% of A

19. The simple interest on a sum of money is 1/9 of the principal and the number of years is equal to the rate per cent per annum. The rate per cent per annum is

1. 3 2. 1/3 3. $3\frac{1}{3}$ 4. $\frac{10}{3}$

Ans:4

Explanation

Let the principal be P

Given, SI = P/9 and N = Rate = R (since time is same as rate)

∴ SI = PNR/100

From given conditions, SI = $\frac{P}{9} = \frac{P.R.R}{100} \rightarrow R^2 = \frac{100}{9} \rightarrow R = \frac{10}{3}$

20. If A : B = 3 : 4, B : C = 8 : 9 and C : D = 12 : 13, then A : D is equal to

1. 13: 8 2. 2 : 3 3. 4 : 9 4. 8:13

Ans: 4

Explanation

$\frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D}$

$= \frac{3}{4} \times \frac{8}{9} \times \frac{12}{13} = 8:13$

Guidance:

$$\frac{a}{b} = \frac{c}{d} \Rightarrow a : b = c : d$$

$$a : b = c : d$$
$$\text{x} \quad \text{x}$$

21. If x : y = 3:2, then (5x + 4y) : (5x - 4y) is equal to

1 .23 : 7 2. 15 : 8 3. 9 : 1 4. 27 : 2

Ans: 1

Explanation

From given conditions, $2x = 3y$, $\therefore\ x = \frac{3y}{2}$

$\therefore$ The given sum $\rightarrow (5 \times \frac{3y}{2} + 4y) : (\frac{5 \times 3y}{2} - 4y) = \frac{23y}{2} : \frac{7y}{2} \rightarrow 23:7$

22. If a:b = b:c, then $a^4 : b^4$ is equal to

1. $ac : b^2$ 2. $a^2 : c^2$ 3. $c^2 : a^2$ 4. $b^2 : ac$

Ans: 2

Explanation

$\frac{a}{b} = \frac{c}{d} \rightarrow b^2 = ac$

$\therefore\ b^4 = a^2c^2$; $\therefore\ a^4 : b^4 = a^4 : a^2c^2 = a^2 : c^2$

23. The average of three numbers is 15. If two numbers are 7 and 28, the third is

1. 14 2. 21 3. 5 4. 10

Ans: 4

Explanation

Let the three numbers be a, b, c → 7, 28 and c

Average of 3 numbers, a, b and c = (a+b+c)/3 = 15

i.e., (7+28+c) = 45 $\therefore$ c =10

24. If the altitude of an equilateral triangle is $\sqrt{6}$ cm, its area (in cm²) is

1. $2\sqrt{2}$ 2. $2\sqrt{3}$ 3. $3\sqrt{3}$ 4. $6\sqrt{2}$

Ans: 2

Explanation

For an equilateral triangle,

(i) If height or altitude h is given, $A=\frac{h^2}{\sqrt{3}}$

(ii) If side a is given area, $A = \frac{\sqrt{3}}{4}a^2$

(Note: $h = \frac{\sqrt{3}}{2}a$ and $a = \frac{2h}{\sqrt{3}}$)

For the given sum: $A = \frac{h^2}{\sqrt{3}} = \frac{\sqrt{6} \times \sqrt{6}}{\sqrt{3}} = \frac{6}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$

25. Sound travels at 330 m/s. How many kilometres away is a thunder cloud when its sound follows the flash after 10 seconds ?

1. 3.3 2. 33 3. 0.33 4. 3.33

Ans:1

Explanation

Speed of sound = 330 m /s

Time taken for the sound to reach = 10 sec

Distance = speed × time

∴ Distance of source of thunder = 330 × 10 =3300m = 3300 /1000 km = 3.3km

26. A train moving with a uniform speed of 60 kmph crosses a pole in 6 seconds. The length of the train (in metres) is

1. 200 2. 150 3. 120 4. 100

Ans: 4

Explanation

Let the length of the train be L meter.

Train crossed the pole is 6 sec. So distance covered in 6 sec. is L meter.

Train Speed, $V = 60 \times \frac{5}{18}$ m/s

Given: $\frac{L}{V} = 6$;∴ $L = 6 \times V = 6 \times 60 \times \frac{5}{18} = 100$ m

27. Mari rides a cycle at 8 kmph. After every 10 km travel, he rests for 20 minutes. Time taken to cover a distance of 40 km is

1. 5 hr
2. 5 hr 20 minutes
3. 6 hr
4. 6 hr 20 minutes

Ans:3

Explanation

Time taken for 10 km distance travelled at 8kmph = $\frac{10}{8}$= 1 hr 15 min.

Time taken to cover the given distance of 40 km as per given condition: 10 km distance travelled at 8kmph and rest time of 20 minutes between travels are given below:

1 hr 15 min.+ 20 min +1 hr 15 min. + 20 min +1 hr 15 min. + 20 min + 1 hr 15 min. = 6 hr

28. If x men can do a piece of work in 8 days and (x+4) men can do the same work in 6 days, then x is equal to

1. 6
2. 10
3. 12
4. 24

Ans: 3

Explanation

Men	No. of days
x	8
x + 4	6

For the same work, man days (man x number of days) are equal,

i.e., $8x = 6(x+4) \rightarrow x = 12$.

29. A tap can fill a tank in 25 minutes and another can empty it in 50 minutes. If both are opened simultaneously when will the tank be full ?

1. 23 minutes
2. 22½ minutes
3. 50 minutes
4. None

Ans: 3

Explanation

Let t be the time taken to fill the tank if both the taps are opened

$\frac{1}{t} = \frac{1}{25} - \frac{1}{50} = \frac{2-1}{50} = \frac{1}{50}$

$\therefore$ t = 50

30. The diagonals of a rhombus measures 4 cm and 6 cm. Its area (in sq. cm) is

1. 6
2. 8
3. 12
4. 24

Ans: 3

Explanation: A =½ d_1d_2= 4 x 6 /2 = 12

31. If the area of an equilateral triangle is $\sqrt{3}$ cm², its side (… cm) is

1. 1 2. 2 3. 3 4. 4

Ans:2

Explanation: For an equilateral triangle of side a, the area, A= $\frac{\sqrt{3}a^2}{4}$

As per the given condition, A = $\sqrt{3}$ =$\frac{\sqrt{3}a^2}{4}$ → a^2= 4, a = 2

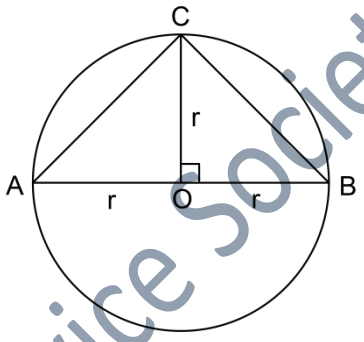
32. The area of the largest triangle, that can be inscribed in a semicircle whose radius is r cm, is

1. 2r cm² 2. r^2 cm² 3. 2r² cm² 4. ½ r^2 cm²

Ans: 2

Explanation

Refer the figure given below: The sides of right angle Δ are r$\sqrt{2}$, r$\sqrt{2}$ and hypotenuse is 2r (the diameter =2r)



For the above figure,

AC = BC = r$\sqrt{2}$ and angle ACB is 90° .

∴ Area of ΔABC, A = $\frac{1}{2}$ b.h =$\frac{1}{2}$ .2r. r =r^2 (base b = 2r and height h is r)

33. Suppose you know that $\sqrt{15}$ is approximately 3.88. Which of the following is the best approximation to $\frac{\sqrt{5}}{3}$?

1. 0.747 2. 1.89 3. 1.29 4. 1.63

Ans: 1

Explanation

The given sum → to $\frac{\sqrt{5}}{3} = \frac{\sqrt{3}\times\sqrt{5}}{\sqrt{3}\times 3} = \frac{\sqrt{15}}{\sqrt{3}\times 3} = \frac{3.88}{3X1.732}$ =0.747

34. The inner and outer circumferences of a circular ring are 22 cm and 44 cm respectively. The thickness (in cm) of the ring is

1. 3.5 2. 3 3. 11 4. 22

Ans: 1

Explanation

Let d and D be the inner circle and outer circle diameters respectively (i.e., inner radius r and outer radius R)

Thickness, t = $\frac{D-d}{2}$ = R-r

∴ d = 22/π ; D = 44/π, ∴ t = $\frac{44-22}{2\times\pi}$; = $\frac{44-22}{2\times\frac{22}{7}} = 3.5$

OR

In terms of (inner radius r and outer radius R)

∴ r = 22/2π ; R = 44/2π, ∴ t= 3.5

35. The value of

$$\left(1+\frac{1}{2}\right)\left(1-\frac{1}{2}\right)\left(1+\frac{1}{3}\right)\left(1-\frac{1}{3}\right)\left(1+\frac{1}{4}\right)\left(1-\frac{1}{4}\right) \text{ is}$$

1. 0.625 2. 1.25 3. 0.75 4. 1.0

Ans: 1

Explanation

The given sum :$\frac{3}{2}\times\frac{1}{2}\times\frac{4}{3}\times\frac{2}{3}\times\frac{5}{4}\times\frac{3}{4} = \frac{1}{2}\times\frac{5}{4} = \frac{5}{8}$

= 0.625

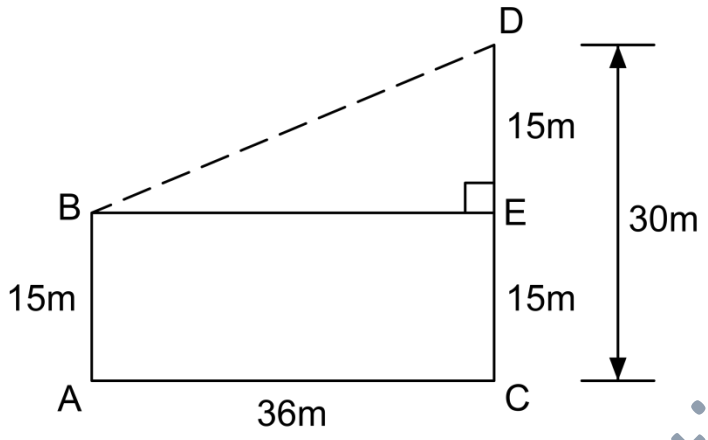
36. Two poles, 15 m and 30 m high, are 36 m apart. The distance between their tops is

1. 45 m 2. 40 m 3. 39 m 4. 35 m

Ans:3

Explanation

Refer to the figure given below:



AB and CD are poles

By Pythagoras theorem,

$BD^2 = BE^2 + ED^2$

$= (36)^2 + (15)^2 = 1521$

= 39m

37. The product of two numbers is 1452. The first number is 1/3rd of the second number. Find the first number?

1. 11 2. 22 3. 132 4. 66

Ans: 2

Explanation

Let the 1st number be x and therefore the second number = 3x

Therefore, their products/multiplication: $3x^2 = 1452$

$\rightarrow x^2 = 484 = 22^2 \rightarrow x = 22$

38. If $\sqrt{2^n} = 64$, then the value of n is

1. 2 2. 4 3. 6 4. 12

Ans: 4

Explanation: The given sum is $(2^n)^{1/2} = 64 = 2^6 \rightarrow n/2 = 6, \quad \therefore n = 12$

39. The length, breadth and height of a cuboid are in the ratio 1:2:3. The length, breadth and height are increased by 100%, 200% and 300% respectively. The increase in the volume of the cuboid is

1. 5 times 2. 6 times 3. 12 times 4. 17 times

Ans: 4

Explanation

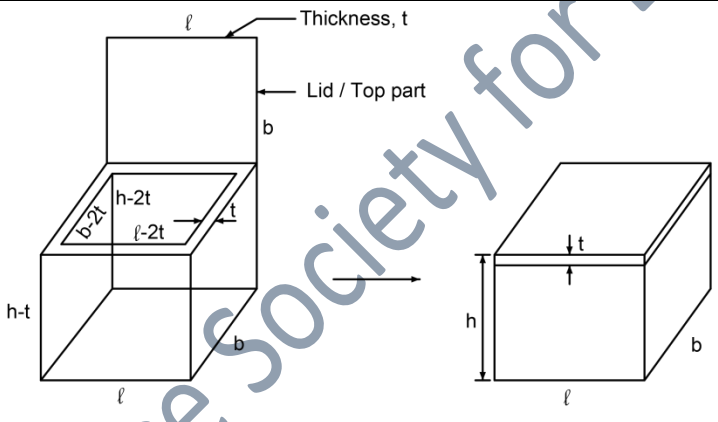
Let V_1 be the initial volume and the length, breath and height of the cuboid be x, 2x, and 3x respectively and V_2 the changed volume and the length, breath and height of the cuboid be 2x, 6x, and 9x respectively after change .

$V_1 = x \times 2x \times 3x = 6\ x^3$

$V_2 = 2x \cdot 6x \cdot 9x = 108x^3$

$\frac{V_2}{V_1} = \frac{108x^3}{6x^3} = 18$

$\therefore$ Volume increase = 17 times

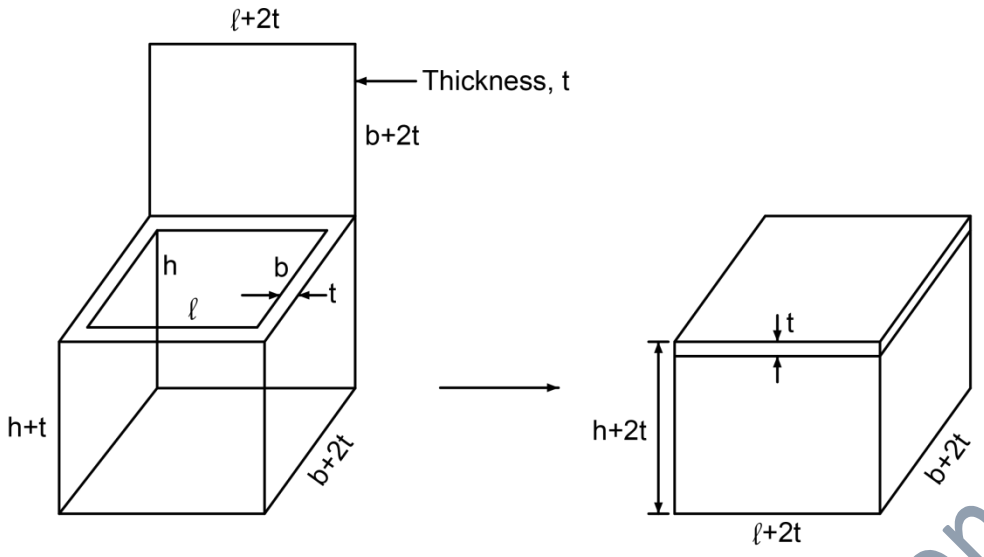


i. ii.

External Volume = ℓbh

Internal Volume = (ℓ-2t) (b-2t) (h-2t)

a. Volume in terms of external dimensions ℓ,b,h and t (if external dimensions are given).

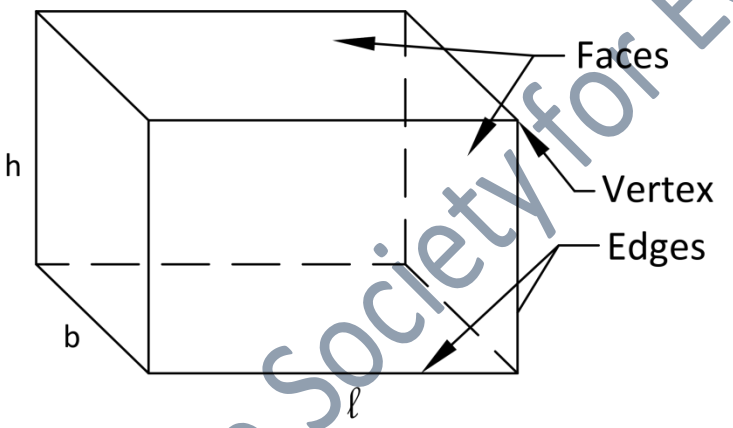


i. ii.

External Volume = (ℓ+2t) (b+2t) (h+2t)

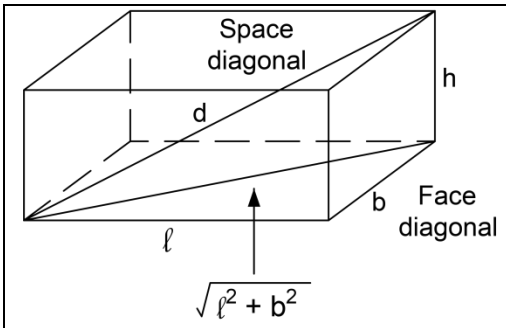
Internal Volume = ℓbh

b. Volume in terms of internal dimensions ℓ,b,h and t (if internal dimensions are given).



No.of faces = 6
No.of vertices = 8
No.of edges = 12

c. Cuboid.



Diagonal d = $\sqrt{\ell^2 + b^2 + h^2}$

TSA = 2 (ℓb + bh + ℓh)

Volume = ℓbh

40. The diameter of a sphere whose volume is $179\frac{2}{3}$ cubic metre is (given $\pi = 22/7$)

1. 3.5 m 2. 7 m 3. 10.5 m 4. 14 m

Ans:1

Explanation

Volume of sphere, $V = \frac{4}{3}\pi r^3$

Given $V = 179\frac{2}{3} = \frac{537+2}{3} = \frac{539}{3} = \frac{4}{3} \times \frac{22}{7} \times r^3$ $\therefore r^3 = \frac{539 \times 7}{4 \times 22} = \frac{7x\ 7x11x7}{4\ x2x11} \rightarrow r = \frac{7}{2} = 3.5$ m

41. The sum of the ages of A and B is now 110 years, and their ages 20 years ago were in the ratio of 4:3. The age of A (in years) is

1. 60 2. 55 3. 50 4. 35

Ans: 1

Explanation: Define ages of A and B as follows:

	A	B
Age at present:	x_1	x_2
Age before 20 years	x_1-20	x_2-20

Given:

$x_1 + x_2 = 110$ …… (1)

$x_1 - 20 : x_2 - 20 = 4:3$ …… (2)

Eqn.(2) → $3x_1 - 4x_2 = -20$ …….(3)

Eqn.(1) × 3 → $3x_1 + 3x_2 = 330$ …….(4)

Eqn.(4) – Eqn.(3) → $7x_2 = 350$ → $x_2 = 50$; ∴ $x_1 = 60$

42. The marks obtained by Mani and Raju are in the ratio of 4:5 and the marks obtained by Raju and Moorthy are in the ratio of 3:2. Therefore, the marks obtained by Mani and Moorthy are in the ratio of

1. 4:2 2. 5:3 3. 6:5 4. 5:6

Ans: 3

Explanation

Mani		Raju		Moorthy
4	:	5		
		3	:	2

∴ Mani: Raju: Moorthy::12: 15 : 10

∴ Mani:Moorthy = 12 : 10 = 6: 5

43. A can do 3/4 of a work in 12 days. He can finish 1/2 of the work in how many days ?

1. 4 2. 8 3. 12 4. 16

Ans: 2

Explanation

$\frac{12}{3/4} \times \frac{1}{2} = 8$

44. The length of a rectangle is increased by 60%. By what per cent would the width have to be decreased to maintain the same area ?

1. 37.5 2. 60 3. 75 4. 120

Ans: 1

Explanation

Let the length and breadth of the rectangle be l and b and therefore Area,A =lb.

Area of the rectangle for the given conditions: $\ell_1 b_1 = \ell_2 b_2$

It is given that $l_2 = 1.2\ l_1 \rightarrow \ell_1 b_1 = 1.6\ \ell_1 \times b_2 \rightarrow \therefore b_2 = \frac{1}{1.6} b_1 = \frac{5}{8} b_1$

$= 0.625\ b_1 =$ 62.5% b_1 ∴ To be reduced by 0.375 = 37.5%

45. A man rows upstream 13 km and downstream 28 km taking 5 hours each time. The velocity (in km/hour) of the current is

1. 0.5 2. 1 3. 4.1 4. 2

Ans: 3

Explanation

Let x be man's swimming speed and y be the water current speed.

Given:

Upstream speed: x-y=13/5 km/hr =2.6 km/hr .....(1)

Downstream speed: x+y=28/5 km/hr =5.6 km/hr .....(2)

Therefore, speed of current, y : $(\frac{1}{2}\{Eq.(2)$ - Eqn.(1)$\}=\frac{1}{2}$(5.6+2.6) km/hr =4.1 km/hr

46. The L.C.M. of the numbers 4,8,12 and 16 is

1. 8 2. 12 3. 16 4. 48

Ans: 4

Explanation

Given numbers can be written as" 1 ×4, 2 × 4, 3 × 4, 4 × 4

∴ LCM = 3 × 4 × 4 =48

47. A spherical lead of radius 10 cm is melted and small lead balls of radius 0.5 cm are made. The total number of small lead balls is

1. 20 2. 125 3. 400 4. 8000

Ans:4

Explanation: Let volume V_1 be the sphere of radius R to be melted and volume of one small ball of radius r made be v_2 .

For a sphere, $V = \frac{4}{3}\pi r^3$.

$\therefore \frac{V_1}{v_2} = \frac{R^3}{r^3} = \frac{10^3}{(0.5)^3} = (20^3) = 8000$

48. A wire, bent in the form of a square, encloses an area of 484 cm². If the same wire is bent so as to form a circle, then the area enclosed will be (given π = 22/7)

1. 484 cm² 2. 538 2/7cm² 3. 616 cm² 4. 644 cm²

Ans:3

Explanation

Area, A of the square of side a = a^2=484cm^2

∴ Side of the square =$\sqrt{484}$ = 22cm ⇒ Perimeter of the square, 4 a =4×22=88cm

Now the wire is bent as a circle of radius r and it is given:

Circumference of the circle = Perimeter of the square

$2\pi r=88 \therefore r = \frac{88}{2\pi}$ ∴ r = 14cm

∴ Area of the circle = πr^2 = $\frac{22}{7}$×14×14cm^2 = 616cm^2

49. Two cylindrical pots contain the same amount of water. If their diameters are in the ratio 2:3, the ratio of their heights is

1. 2 : 3 2.4: 9 3. 9 : 3 4. 9 : 4

Ans: 4

Explanation

r_1, h_1 and r_2, h_2 be the radii and height of the two cylinders and V_1 and V_2 be cylinder volumes respectively.

Given: $V_1 = V_2$, i.e., $\pi r_1^2 h_1 = \pi r_2^2 h_2$

$\therefore r_1^2 h_1 = r_2^2 h_2$

$\frac{h_1}{h_2} = \frac{r_2^2}{r_1^2} = \left(\frac{3}{2}\right)^2 = 9:4$

50. The area of the base of a right circular cone is 51 m^2. Find its vertical height if its volume is 68 m^3.

1. 5 m 2. 4.5 m 3. 4m 4. 3.5 m

Ans: 3

Explantion

Volume of cone, V = $\frac{1}{3}\pi r^2 h$ = $\frac{1}{3}$ A . h = $\frac{1}{3}$ × 51 × h = 68; ∴ h =4