1. The surface area of a cube is 384 sq.m. What is its volume?

1. 200 cu m 2. 512 cu m 3. 460 cu m 4. 216 cu m

Ans: 2

Explanation

Surface area, S of a cube of side, a= $6a^2 = 384 \rightarrow a^2 = 64. \therefore a = 8$, $V = a^3 = 512$

or

$V = \frac{Sa}{6} = \frac{384 \times 8}{6} = 512.$

2. An electric train runs from a station A to a station B at a speed of 60 kmph and immediately runs from B to A at a speed of 40 kmph. The average speed of the train, in kmph, is

1. 60 2. 50 3. 48 4. 46

Ans: 3

Explanation

$V_{avg} = \frac{2v_1v_2}{v_1+v_2} = \frac{2 \times 60 \times 40}{60+40} = 48$

3. The mean of 8 numbers is 15. If each number is multiplied by 2 what will be the new mean?

1. 20 2. 30 3. 40 4. 45

Ans:2

Explanation

Mean = $\frac{\text{Total value of the quantities}}{\text{Quantity (or number of items)}}$

1. Total of 8 numbers = 8x15 = 120

2. After multiplying each number by, 2, the total of the numbers = 2 x 120 = 240

$\therefore$ The new mean = $\frac{240}{8} = 30.$

(The sum is to be solved mentally in few seconds - the number of items remain same and new sum is twice the original sum, therefore new average is 2 times the initial average.)

4. $283^2 - 243^2 = ?$

1. 32327 2. 33255 3. 30140 4. 21040

Ans: 4

Explanation

Ans: (283+243) (283-243) = 526 ×40 = 21040

5. 63.4561 + 8.17 + 0.6285= ?

1. 82.906 2. 72.2546 3. 70.0046 4. 74.5472

Ans: 2

6. 0.00722 ÷ 25 =?

1. 0. 0028880 2. 0.002888 3. 0.0002888 4. 0.28880

Ans: 3

Explanation

$\frac{72.2 \times 10^{-4}}{25}$ = 2.888 × 10^{-4} = 0.000 2888

7. 4.53875 ÷ 1.25 =?

1. 0.3631 2. 3.631 3. 36.31 4. 363.1

Ans: 2

Explanation

It is a tricky sum - just at a glance of the given options, one can find the answer:

Approximate value of the given sum ≈ 4.5 /1.25 ≈ 3.5

8. The flowers in a basket became double after every minute. In half an hour the basket is full. After how many minutes, the basket would be half filled?

1. 15 2. 25 3.29 4. 18

Ans:3

Explanation

29^{th} minute half and 30^{th} minute full

9. The side of a square is doubled, by what percentage does the area increase?

1. 200% 2. 300% 3. 100% 4. 400%

Ans: 2

Explanation

Given a→ 2a,A = $(2a)^2 = 4a^2 = 4A$

∴ Increase in area = 3A

10. The average of two numbers is 6. The cube of their sum is:

1.1628 2. 1728 3. 1528 4. None of the above.

Ans: 2

Explanation

Let the numbers be x and y. Their average is $\frac{x+y}{2} = 6$ ∴ x+y = 12→ $(x+y)^3$

= $12^3 = 1728$

11. If the price of coal increases 25%, by what percentage must the consumption be reduced to keep the expenditure same?

1. 20% 2.18.37% 3.25% 4. 22%

Ans:1

Explanation

$x_1y_1 = x_2y_2$

(where x is the price per unit quantity and y is the quantity that can be purchased)

$x_1y_1 = 1.25x_1 . y_2$

∴ $y_2 = \frac{1}{1.25} y_1 = 0.8\ y_1$, ∴ reduce = 20%

12. If (a+b) = 7 and ab=10, find the value of (a-b)

1. 2 2.3 3. 5 4. 6

Ans : 2

Explanation

$(a+b)^2 - (a-b)^2 = 4ab$

∴$7^2 - (a-b)^2 = 4 \times 10$, ∴ $49 - 40 = (a-b)^2$,∴ a-b = $\sqrt{9} = \pm 3$

OR

$(a-b)^2 = (a+b)^2 - 4ab = 49-40 = 9 \rightarrow \boldsymbol{a - b} = \pm 3$

13. The area of a triangle three sides as 3 cm, 4 cm and 5 cm will be-

1. 6 sq.cm 2. 60 Sq.cm 3. 30 Sq.cm. 4. 36 Sq.cm.

Ans: 1

Explanation

The given values pertains to a right angle triangle with sides 3, 4 and hypotenuse 5

∴ Area, A = ½ × 3 × 4 = 6.

One can use Heroin's formula also; but it will consume more time; Always be alert and immediately check if the given sides pertains to one of the Pythagorean triples. A list of first few Pythagorean Triples are given below.

List of the first few Pythagorean Triples

(3, 4, 5)	(5, 12, 13)	(7, 24, 25)	(8, 15, 17)
(9, 40, 41)	(11, 60, 61)	(12, 35, 37)	(28, 45, 53)
(15, 112, 113)	(16, 63, 65)	(17,144,145)	(19,180,181)
(20, 21, 29)	(20,99,101)	(21,220,221)	(23,264,265)
(24,143,145)	(25,312,313)	(27,364,365)	(28,45,53)
(28,195,197)	(29,420,421)	(31,480,481)	(32,255,257)
(33,56,65)	(33,544,545)	(35,612,613)	(36, 77,85)
(36,323,325)	(37, 684,685)	….Infinitely many more….	

14. A man borrowed Rs.8000 at 10% per annum simple interest and immediately lent the whole sum at 10% per annum compound interest. What does he gain at the end of 2 years?

1. Rs.60 2.Rs.80 3.Rs.100 4. Rs.120.

Ans: 2

Explanation

The difference between CI and SI for 2 years =P $\left(\frac{R}{100}\right)^2$ = 8000 ×$\left(\frac{10}{100}\right)^2$ = 80

(Note this formula is applicable only for 2 yrs)

15. A spherical lead of radius 20 cm is melted and small lead balls of radius 2 cm are made. The total number of possible small lead balls is:

1.8000 2. 800 3. 80 4.1000

Ans: 4

Explanation
Let big ball radius be R and r be that of small ball and their volume be V and υ.
N = number of small balls made from big ball

$$= \frac{\text{volume of big sphere to be melted}}{\text{volume of small balls to be made}} = \frac{V}{\upsilon} = \frac{R_1^3}{r^3}$$

$N = \left(\frac{20}{2}\right)^3 = 1000$

16. Convert 90 kmph into m/s:

1. 18 m/s 2. 15 m/s 3. 22 m/s 4. 25 m/s.

Ans: 4

Explanation
$90 \times \frac{5}{18} = 25$ m/s.

17. $(a^2+b^2)\,(a+b)\,(a-b)$ is:

1. a^4+b^4 2. a^4-b^4 3. a^3+b^3 4. a^3-b^3.

Ans: 2

Explanation
The sum → $(a^2 + b^2)\,(a^2 - b^2) = a^4 - b^4$

18. If a number, when divided by 4, is reduced by 21, the number is:

1.18 2. 20 3. 28 4. 38

Ans: 3

Explanation
Let the number be x
$\frac{x}{4} = x - 21$
$x = 4x - 84$
$\therefore x = \frac{84}{3} = 28$

19. The average age of 30 boys in a class is 15 years. If the teacher's age is included, the average increases by one. What is the teacher's age?

1. 30 years 2. 45 years 3. 40 years 4. 46 years.

Ans: 4

Explanation
Let the teacher age be x
Total age of boys = 30 × 15 = 450
It is given that the average age of the class of 31 persons (30 boys + 1 teacher) is 16.
Total age of boys plus teacher = 450 + x = 31 × 16
∴ x = 496 – 450 = 46
Age of teacher = 46 years

20. A man divided his two properties among his four sons in the ratios 2:3:4:5 and 5:4:3:2; the second property was twice the first. Who got the maximum share?

1.First son 2. Second son 3. Third son 4. Fourth son.

Ans: 1

Explanation
Let the amount of 1st property be A and 2nd property be 2A.
∴ Share of first property to 4 sons: 2x, 3x, 4x and 5x
Share of second property to 4 sons: 10x, 8x, 6x and 4x.
Total share for the sons are (add shares from both the properties) = 12x, 11x, 10x and 9x. Therefore first son got maximum share.

21. The mean/average of the squares of the first n natural numbers is

1. $n + 1$ 2. $\frac{n^4+1}{n}$ 3. $\frac{(n+1)(2n+1)}{6}$ 4. $\frac{n(n+1)\,(n+2)}{n}$

Ans: 3.

Explanation

The sum of squares of the first n natural numbers = $\frac{n(n+1)(n+2)}{6}$

∴ Their average = $\frac{n(n+1)(n+2)}{6} \div n = \frac{(n+1)(n+2)}{6}$

22. At what rate % p.a. will a certain sum of money amount to Rs.8400 in one year and to Rs.8820 in two years, reckoning CI?

1. 8 2. 5 3. 6 4. None of the above.

Ans: 2

Explanation

i. At the first year end: A = P +SI

$8400 = P + \frac{PNR}{100}$ …. (i)

ii. At the second year end: $A = P_1 + SI = 8400 + SI = 8820$

SI for the second year =8820-8400 = 420

$\therefore 420 = \frac{PNR}{100} = 8400 \times 1 \times \frac{R}{100}$

$\therefore R = 5$

(Note: The amount at the end of 1 yr, both for SIand CI is the same.

23. If 2x + 3y=47 and 11x = 7y then what is the value of y-x?

1. 4 2. 6 3. 7 4. 5

Ans:1

Explanation

Given:

2x+3y = 47……(1)

x = 7y / 11 …….. (2) (11x=7 is the given condition)

Substitute Eqn.(2) in Eqn.(1) → $2 \times \frac{7y}{11} + 3y = 47$, i.e., $\frac{14y}{11} + 3y = 47$

∴14y +33y = 517, 47y = 517 → ∴ y = 11 and $x = \frac{7y}{11} = 7$.∴ y –x = 11 -7 = 4

24. What is the LCM of 25, 30, 35 and 40?

1. 3800 2.4200 3.4400 4. None of these.

Ans: 2

Explanation

Given numbers are 25, 30, 35, and 40

i.e., the factors are: 5×5, 5×2x3 , 5×7, 5×2x4,

∴LCM = 5 x 5 x 2x3 x 7 x 4 =4200

25. What is the greatest number which divides 852, 1065, 1491 and 2982 exactly?

1. 193 2. 183 3. 223 4. 213

Ans:4

Explanation

To find the greatest number which divides 852, 1065, 1491 and 2982 exactly, find the HCF of these numbers. These numbers can be written as

852 = 2× 2×3 ×71

1065 = 3× 5 ×71

1491 = 3 ×7 ×71

2982 = 2 × 3 × 7 ×71.

From the factors of the 4 numbers, the common numbers are 3 and 71.

∴ HCF of 852, 1065, 1491 and 2982 = 3 ×71 = 213

26. A man performs $\frac{2}{15}$ of the total journey by rail, $\frac{9}{20}$ by a car and the remaining 10 km on foot. His total journey is -

1.15.6 km 2. 12.6 km 3. 16.4 km 4. 24 km

Ans: 4

Explanation

By rail $\frac{2}{15}$, by car $\frac{9}{20}$ and remaining 10 km on foot

∴ Travel by foot $= 1 - \frac{2}{15} - \frac{9}{20} = 1 - \frac{8+27}{60} = 1 - \frac{35}{60} = \frac{25}{60} = \frac{5}{12} = 10$ km (Given)

∴ Full part of journey = $\frac{10}{5/12} = 10 \times \frac{12}{5}$ = 24 km

27. 582x582 + 582x224=?

1. 469092 2. 496008 3. 309608 4. None of these.

Ans: 1

Explanation

Ans: The sum → 582 (582 +224) = 582 × 806 = 469092

28. A's income is 20% less than B's. How much is B's income more than A's ?

1. 20% 2. 25% 3. 18% 4. 12.5%

Ans: 2

Explanation

A's and B's income is shown below:

A	B
80	100

It is seen that B's income is Rs. 20 more than that of A's income of (Rs.80)

$= \frac{20}{80} \text{x } 100 = 25\%$ more.

29. The number of persons travelling by first and second class of a train are in the ratio of 1:40 and the ratio of first and second class fares is 3:1. If the total fare collected is Rs.1720, total first class fare collected is

1. Rs.120 2. Rs.90 3.Rs.105 4. Rs.125.

Ans: 1

Ratio of number of passengers: I:II class =1:40
Ratio of first and second class fares =3:1
∴ Ratio of total amount =3×1:1×40=3:40
The total amount is 3x +40x =1720 → x =40.
∴ Amount collected from first class passengers = Rs. 40x3 = Rs. 120.

30. 380 mangoes were distributed among 85 children (both boys and girls) so that each boy gets 4 mangoes and each girl gets 5 mangoes. The number of girls is

1. 40 2. 45 3. 30 4.55

Ans: 1

Explanation
Let x be number of boys and y be the number of girls.
Mangoes distribution: $4x + 5y = 380$ ……(1)
Total boys and girls: $x + y = 85$ ……..(2)
Eqn.(2) x 4 – Eqn.(1) → $y = 40$ and ∴ $x = 45$ and $y = 40$.

31. Weight of a bucket when filled fully with water is 15 kg. If the weight of the bucket filled half of it with water is 12.5 kg, what is the weight of empty bucket?

1. 10 kg 2. 9 kg 3. 11.5 kg 4. 12 kg

Ans: 1

Explanation
Let the bucket weight be x and full quantity of water weight be y.
It is given that the weight of bucket with full of water as: $x + y = 15$ ….. (1)
It is also given that forhalf filled bucket weight as: $x + \frac{1}{2} y = 12.5$ …(2)
2 x Eq. (2) → $2x + y = 25$ …. (3)
Eq. (3) – Eq. (1)→ $x = 10$.

Or

From Eqn.(1) and Eqn.(2), $\frac{1}{2} y = 2.5 \rightarrow y = 5$ and ∴ $x = 10$.

32. The value of $(0.6)^2-(0.5)^2$ is equal to

1. 1.1. 2. 0.11 3. 0.21 4. 0.101

Ans: 2

Explanation

The given sum → (0.6 + 0.5)(0.6 – 0.5) = 1.1 × 0.1 = 0.11

33. If one seventh of a number exceeding its eleventh part by 100, then the number is

1. 1900 2.1925 3.700 4.725

Ans: 2

Explanation

Given condition: $\frac{x}{7} - \frac{x}{11} = 100$

11x – 7x = 7700

4x = 7700

∴ x = 1925

34. $[(0.6)^4-(0.5)^4]/[(0.6)^2+(0.5)^2]$ is equal to

1. 1.1 2. 0.11 3. 0.011 4.11

Ans: 2

Explanation

Given sum is of the form: $\frac{a^4-b^4}{a^2+b^2} = a^2 - b^2$ (where a = 0.6, b = 0.5)

∴ $a^2 - b^2 = 0.6^2 - 0.5^2 = 0.36 - 0.25 = 0.11$

35. Find x in the following equation-

130x-400 = 2200

1. 20 2. 24 3. 18 4.28

Ans:1

Explanation

Given: 130x – 400 = 2200

i.e., 130x = 2200 +400,∴ x = 2600/130, x = 20

36. The sides of a square are increased by 40% and 30% respectively. The area of the resulting rectangle exceeds the area of the square by

1. 45% 2. 82% 3. 65% 4. 70%

Ans: 2

Explanation

Let the side of the square be a.

Area, $A = a^2$

Now side, a is changed to 1.4 a and 1.3 a (now it is a rectangle).

∴ A →lb =1.4a x 1.3a = 1.82 a^2
Increase in area ≈0.82 = 82%

37. Find the value of $x^3 - \frac{1}{x^3}$ if $x - \frac{1}{x} = a$

1. $a^3 + 3a^2$ 2. $a^3 + 3a$ 3. $a^3 + 3a^3$ 4. $a + 3a^3$

Ans: 2

Explanation

The given sum: $x^3 - 1/x^3 = \left(x - \frac{1}{x}\right)^3 + 3\left(x - \frac{1}{x}\right) = a^3 + 3a$

38. If a =4, b=3, c=2 and d = 5, Find the value of $\frac{a^2b^2c^2}{d^2}$

1. 25.07 2. 21.16 3. 29.14 4. 23.04

Ans: 4

Explanation

Substitute the given values of a, b and c in the given sum→$4^2 \times 3^2 \times 2^2/5^2 = \frac{576}{25} = 23.04$

39. Find the geometric mean (GM) of 4, 8, 16 is

1.9 2. 8 3. 4 4. 16

Ans: 2

Explanation
GM of 3 given numbers: $(4 \times 8 \times 16)^{1/3} = (4 \times 2 \times 4 \times 4 \times 4)^{1/3}$
$= (4^3 \times 2^3)^{1/3} = 4x2=8$

40. What is the value of cos 45° ?

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

Ans: 2. (Note: $\sin 45^\circ = \frac{1}{\sqrt{2}}$ and $\tan 45^\circ = 1$)

41. In an election between two candidates, one got 55% of the total valid votes and 20% of the votes were invalid. If the total votes are 7500, what is the number of valid votes that the other person got?

1. 2400 2. 2700 3. 2800 4. 3300

Ans: 2

Explanation

Given: Total votes (both valid and invalid votes) = 7500
Number of invalid votes = 20% $of\ total\ votes\ polled$ = 1500
∴Valid votes = 7500-1500 = 6000
One gets 55% of valid votes and the other gets balance 45% = 45% × 6000 = 2700

42. The average age of the 32 students is 10 yrs, if the teacher's age is also included, the average age increases by one year. What is the age of the teacher?

1. 43 2. 38 3. 45 4. 37

Ans: 1

Explanation
Total age of 32 students of avg. age 10 years= 32 × 10

Given: Average age of the class after adding teacher's age = 33

i.e., Total age of 32 students and one teacher = 33 x 11

∴Teacher's age = 33 × 11 - 32× 10 = 43

43. The surface area of a cube is 216 m^2. Find its volume.

1. 205cu.m 2. 210 cu.m 3. 216 cu.m 4. 180cu.m

Ans: 3

Explanation
For a cube of side a, surface area, S =$6a^2$

Given: S= 216

∴ a^2 = 216/6 = 36, ∴ a= 6∴ Volume, V = a^3= 6^3 = 216

or

V = $\frac{S}{6}\ a = 216 \times \frac{6}{6} = 216$

44. What is the volume of sphere when 'r' is radius?

1. $4\pi r^3$ 2. $3/2\ \pi r^3$ 3. $3\pi r^3$ 4. $\frac{4}{3}\pi r^3$

Ans: 4

45. Two trains approach each other at 35 kmph and 25 kmph from two places 360 km apart. When will they meet?

1. 4 hr 2. 5 hr 3. 6 hr 4. 7 hr

Ans: 3

Explanation
Two trains are travelling in opposite directions.
Assume they met after time, t hour
Distance travelled by the 2 trains in time, t, i.e., approaching each other = 35t + 25t

= 360

∴ 60t = 360 ∴ t=6

46 The area of the rectangle ABCD is 108 cm and the ratio of two sides is AB : BC :: 3 :4; then the sides are

1. 7 cm, 6 cm 2. 7.5cm, 8cm 3. 8 cm, 9cm 4. 9cm, 12cm

Ans: 4

Explanation

Let the sides of rectangle be 3x, 4x cm

∴ Area, A = lb= $12x^2 = 108$, ∴ $x^2 = 108/12 = 9$; ∴x = 3 ∴ Sides are 9 and 12.

Note: Since the sum involves simple multiplication, from the given options, substitute in the area formula and find the correct option.

47. Oranges were purchased at Rs.200 per hundred and sold at Rs.3 per orange. If the profit of Rs.2,000 was made how many oranges were purchased.

1. 1000 2. 3000 3. 2000 4. None of these

Ans: 3

Explanation
Let the number of oranges purchased be x.

The profit is Rs. 2000.

Given: Cost of each orange = 200/100 = Rs 2.

Selling price of each orange = Rs,3. ∴ Profit = Re. 1 per orange.

∴ To earn a profit of Rs. 2000, number oranges to be purchased are

= 1 x 2000 = 2000 Nos

48. Find the value of $x^3 + y^3 + 3xy$, if x+y =1

1. 1 2. 0 3. 2 4. 6

Ans: 1

Explanation

Given: x+y=1

Desired value = $x^3 + y^3 + 3xy$

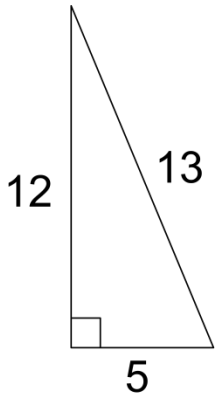
$\therefore (x+y)^3 = x^3 + y^3 + 3xy(x+y)$,

$1^3 = x^3 + y^3 + 3xy.1 = 1$

49. If a ladder 13m long reaches a window of house 12m above the ground, then find the distance of the foot of the ladder from the wall of the house.

1. 6m 2. 5 m 3. 4 m 4. 3 m

Ans: 2



$12^2 + x^2 = 13^2 \rightarrow x^2 = 169 - 144 = 25$

$\therefore$ $x = \pm 5$, i.e., x = 5 (side is positive)

Short cut method/Simpler method: Use Pythagorean triples (5, 12, 13).

50. The sum of the angles around a point is

1. 90^o 2. 180^o 3.270 4. 360^o

Ans:4. (Refer the figures given below.