1. The sum of the digits of a two digit number is 8. If the digits are reversed, the number is decreased by 54. Find the number

1. 71 2. 63 3. 62 4. 46

Ans: 1

Explanation

Let the digits be a and b – digit b is in one's place.

Given: Sum of digits: a+b=8 →…… (1)

After reversing the number:

10b+a=10a +b– 54 …….. (2)

(∵ reverse of digit decrease the original number by 54)

Eqn.(2) → 9a-9b = 54 ……..(3)

9x Eqn.(1) → 9a + 9b = 72 ……(4)

Add Eqn.(3) and Eqn.(4) → 18a = 126 → a = 7 and ∴ b = 1.

The original number is 71

2. By how much is 4/5 of 70 less than 5/7 of 112

1. 28 2. 56 3. 12.25 4. 24

Ans:4

Explanation:

(5/7 x 112)- (4/5 x 70)

= 80-56 = 24

3. If $2^x = 32$,then the value of x is

1. 5 2. 7 3. 8 4.10

Ans:1

The given sum: $2^x = 32 \rightarrow 2^x = 2^5, \therefore x = 5$.

4. What percent of 270 kg is 108 kg?

1. 36 % 2. 39.75 % 3.40 % 4. 42.5 %

Ans: 3

Explanation

x% of 270 = 108 = $\frac{x}{100} \times 270$

x = $108 \times \frac{100}{270}$, = $\frac{1080}{27} = 40$

5. If the radius of a circle is increased by 20%, its area will increase by

1. 20 % 2. 40 % 3. 44 % 4. 60 %

Ans:3

Explanation

Let the radius of circle be r

Area, $A=\pi r^2$

New Radius is r + 20/100r = 1.2r

New Area → $\pi (1.2r)^2 = 1.44\pi r^2$

Difference in Area = $1.44\pi r^2 - \pi r^2 = 0.44\pi r^2$(Increase)

Area inc. in % = 0.44 × 100 = 44%

6. The average age of 40 students of a class is 15 years. When 10 new students are admitted, the average is increased by 0.2 years. The average age of the new student is

1. 15.2 years 2. 16.2 years 3. 16 years 4. 14.8 years

Ans: 3

Explanation

Given: The average age of 40 students of a class is 15 years

Let the average age of the 10 new students be=x years

Average age of class after 10 new students joined = 15+0.2 = 15.2

∴ Total age of students of full class: 40 × 15 + 10 x = 50 × 15.2

600 + 10x = 760

10x =160

x = 16 years

Box. Average

Let the n quantities be, $x_1, x_2, x_3, \ldots, x_n$

i. Average $= \frac{\text{Sum of n quantities}}{\text{Number of quantities,n}} = \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n}$

ii. Sum of quantities = Average x Number of quantities

iii. Number of quantities $= \frac{\text{Sum of quantities}}{\text{Average}}$

7. A scooter covers a distance of 200 km in 2 hr 40 minutes, while a motorcycle covers the same distance in 2 hours. What is the ratio of their speeds?

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

Ans:4

Explanation

Speed of scooter, $S_1 = D/t_1 = 200/160 = 5/4$

Speed of motor cycle, $S_2 = D/120 = 200/120 = 5/3$,

∴ Speed ratio $S_1:S_2$ = 5/4 : 5/3= 15:20, = 3:4. (Note that the time ratio t_1: t_2 is 160:120 = 4:3)

Short cut method: For the same distance covered with two different speeds, the ratio of the speeds ($S_1 : S_2$ or $\frac{S_1}{S_2}$) will be inverse proportion of time taken, i.e.,

$S_1 : S_2 = t_2 : t_1$ or $S_1t_1 = S_2t2$

$\frac{t_2}{t_1} = \frac{120}{160} = \frac{3}{4}$. (Note $\frac{S_1}{S_2} = \frac{t_2}{t_1}$)

8. If 3x = 8y and 5y = 9z, then x/z = ?

1. 72/15 2. 83/15 3. 9/8 4. 11/83

Ans: 1

Explanation

$\therefore \frac{x}{z} = \frac{x}{y} \times \frac{y}{z} = \frac{8}{3} \times \frac{9}{5} = \frac{72}{15}$

9. The ratio of the number of teachers to the number of students is 1:25. If 36 more students join, the ratio becomes 1:28. The number of teachers in the school is

1. 300 2. 36 3. 12 4. 8

Ans: 3

Explanation

Initially let the ratio of number of teachers and number of students be

x : 25x

Let the ratio after 36 students joined be: x : (25x + 36) = 1 : 28

∴25x + 36 = 28x

∴3x = 36

x = 12

10. A sum of money is to be divided among A, B and C in the ratio 2 : 3 : 7. If the total share of A and B together is Rs. 1,500 less than C, what is A's share in it?

1.Rs. 1,000 2. Rs. 1,500 3.Rs. 2,000 4. Data insufficient

Ans: 2

Explanation

Let the total sum of money be Rs. x.

Ratio of shares =2:3:7

Let the ratio be x. ∴The shares money received by A, B and C be 2x, 3x and 7x.

Given that: 7x-(2x+3x)= 1500

7x-5x=1500

2x=1500

A's share =2x=₹1500

Box: Partnership

(i) If A and B are partners in a business, then share of profit and loss:

$$\frac{\text{Investment of A}}{\text{Investmentof B}} = \frac{\text{Profit of A}}{\text{Profit of B}} \text{ OR } \frac{\text{Investment of A}}{\text{Investment of B}} = \frac{\text{Loss of A}}{\text{Loss of B}}$$

(ii) If A, B and C are partners in a business, then:

Investment of A: Investment of B: Investment of C
= Profit of A: Profit of B : Profit of C {or} loss of A : Loss B : Loss of C

11. What least value must be given to * so that the number 84705*2 is divisible by 9:

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

Ans: 2

Explanation

We can use the last 3 digits to check whether the number is divisible by 9 or not. Now apply the number from 0 to 10 in the place of * like given below.

8470502- last two digits not divisible by 9
8470512- **…….**divisible by 9
8470522- …….not divisible by 9
8470532-……..not divisible by 9
Hence the least possible number in the place of * is 1.

12. If one fourth of one third of one half of a number is 15, the number is:

1. 72 2. 120 3. 180 4. 360

Ans:4

Explanation

Let the number be N
1/4 x 1/3 x 1/2 x N = 15, ∴ N = 15 x 24, =360

13. The sum of three consecutive odd numbers is 21. The middle one is

1. 11 2. 9 3.7 4. 5

Ans:4

Explanation

Let the numbers be x, x+2, x+4 (same for even numbers also)
x+x+2+x+4=21, 3x+6 = 21, ∴ x =5

14. If 10 be added to four times a certain number, the result is 5 less than 5 time the number. The number is:

1. 35 2. 25 3. 20 4. 15

Ans: 4

Explanation

Let the number be x.

5x – 5 = 4x + 10, ∴ x = 15

15. If 3 is added to the denominator of a fraction, if becomes 1/3 and if 4 be added to its numerator, it becomes 3/4. The fraction is:

1. 4/9 2. 3/20 3. 7/24 4. $\frac{5}{12}$

Ans: 4

Explanation

$\frac{x}{y} \rightarrow \frac{x}{y+3} = \frac{1}{3} \rightarrow 3x - y = 3$ ... (1)

$\frac{x}{y} \rightarrow \frac{x+4}{y} = \frac{3}{4} \rightarrow 4x - 3y = -16$ ... (2)

On multiplying equation (1) by 3 we get

9x – 3y = 9 …. (3)

Eq. (3) – Eq(2)→ 5x = 25→ x= 5; ∴y = 12

16. $(475 + 425)^2 - 4 \times 475 \times 425$ is equal to:

1. 3600 2. 3500 3. 2500 4. 3160

Ans: 3

Explanation

Given sum conforms to $(a+b)^2 - 4ab \rightarrow (a-b)^2$

$(475 - 425)^2 = 50^2 = 2500$

17. The value of $\frac{343 \times 343 \times 343 + 257 \times 257 \times 257}{343 \times 343 - 343 \times 257 + 257 \times 257}$ is

1. 8600 2. 800 3. 600 4. 2600

Ans:3

Explanation

Given sum conforms to $\frac{a^3+b^3}{a^2-ab+b^2}$ = a+b = 343+257 =600

Box: Algebraic Expressions

Algebra

1. $(a+b)^2 = a^2 + 2ab + b^2$
1.1 $a^2 + b^2 = (a+b)^2 - 2ab$
2. $(a-b)^2 = a^2 + 2ab + b^2$
2.1 $a^2 + b^2 = (a-b)^2 + 2ab$
3. $a^2 - b^2 = (a+b)(a-b)$
4. $(a+b+c)^2 = a^2 + b^2 + c^2 + b^2 + 2(ab + bc + ca)$
5. $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 = a^3 + b^3 + 3ab(a+b)$

6. $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 = a^3 - b^3 - 3ab(a-b)$

7. $a^3 + b^3 = (a+b)^3 - 3ab(a+b)$
7.1. $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
8. $a^3 - b^3 = (a-b)^3 + 3ab(a-b)$
8.1. $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
9. $\frac{a^3+b^3+c^3-3abc}{a^2+b^2+c^2-ab-bc-ca} = (a+b+c)$
10. $a^4 - b^4 = (a^2+b^2)(a+b)(a-b)$

18. The value of $\left\langle \frac{117\times117\times117-98\times98\times98}{117\times117+117\times98+98\times98} \right\rangle$ is

1. 215 2. 311 3. 19 4. 29

Ans:3

Explanation

Given sum conforms to $\frac{a^3-b^3}{a^2+ab+b^2} = a - b = 117 - 98 = 19$

19. Find $\frac{137\times137+137\times133+133\times133}{137\times137\times137-133\times133\times133}$

1. 4 2. $\frac{1}{4}$ 3. 270 4. 1/270

Ans:2

Explanation

Given sum conforms to $(a^2 + ab + b^2)/(a^3 - b^3)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$\therefore$ *The given sum*: $\frac{a^2+ab+b^2}{a^3-b^3} = \frac{1}{a-b} = \frac{1}{137-133} = \frac{1}{4}$

{Also Note: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$}

20. 6202.5 + 620.25 + 62.2025 + 6.2025 + 0.62025 = ?

1. 68915.9775 2. 689.159775 3. 6891.77525 4. 689159.775

Ans: 3

21. Find 0.2× 0.02 × 0.002 × 20 = ?

1. 0.000016 2. 0.00016 3. 0.00160 4. 0.01600

Ans: 2

Explanation

$2 \times 10^{-1} \times 2 \times 10^{-2} \times 2 \times 10^{-3} \times 2 \times 10^{1} = 16 \times 10^{-5} = 0.00016$

22. If $250/\sqrt{x} = 10$, then the value of x is:

1.25 2. 250 3. 625 4. 2500

Ans:3

Explanation

Given sum →250/ 10 =25= $\sqrt{x}$ ∴ x = $(25)^2$=625

23. The population of a town increases by 5% annually. If it is 15435 now, its population 2 years ago was :

1. 14000 2. 15000 3. 13700 4. 14800

Ans: 1

Explanation

Let P be the population 2 years before.

As per the sum: $P\left(1+\frac{5}{160}\right)^2 = 15435$

$P\left(1+\frac{2r}{100}+\frac{r^2}{10000}\right) = 15435$

$P\left(1+\frac{10}{100}+\frac{100}{10000}\right) = 15435$

$P\left(\frac{10000+1000+25}{10000}\right) = 15435$

$P\left(\frac{11025}{10000}\right) = 15435$

∴ P = 14000.

Box: Formula for population increase or decrease (similar to compound interest formua)

1. Growth : If the rate of growth is constant, then

$V = V_0\left[1+\frac{r}{100}\right]^n$

where r% is the rate of growth per year, N is the number of years, V_0 is the present measure of the quantity and V is the measure of the quantity after n years.

Similarly, if V_0 is the measure of the quantity n years ago and V is the present measure of the quantity, then

$V = V_0\left[1+\frac{r}{100}\right]^n$

24. 15 men take 21 days of 8 hours each to do a piece of work. How many days of 6 hours each would 21 women take, if 3 women do as much work as 2 men ?

1. 20 2. 25 3. 18 4. 30

Ans: 4

Explanation

Given 3 women = 2 men. ∴21 women = 14 men.

	Man	Days	Hrs
	x	y	z
1.	15	21	8
2.	14	?	6

For the same work, $x_1y_1z_1 = x_2y_2z_2$

. $y_2 = \frac{x_1y_1z_1}{x_2z_2} = \frac{15 \times 21 \times 8}{14 \times 6} = 30$

Box.1 –Man-days-hours to complete a work

I. When only 2 parameters are given, i.e., number of people working and the number of days are given, the statement of finishing the work under 2 conditions are given hereunder:

No. of Men	Number of days to finish the work
x_1 x_2	n_1 n_2

The relation to solve the given problem is $x_1n_1 = x_2n_2$.

If there is a unknown, the problem statements are given here under:

i.

No. of Men	Number of days taken
x_1 x_2	n_1 ?

The relation to solve the problem: $x_1n_1 = x_2.?$

ii.

No. of Men	Number of days taken
x_1 ?	n_1 n_2

The relation to solve the problem: $x_1n_1 = ?.n_2$

Box.2 –Man-days-hours to complete a work

II When 3 parameters are given, i.e., number of people working, the number of days taken and the number of hours spent in a day are given, the statement to finish the work is:

No.of Men	Number of days to finish the work	Number of hours spent in a day
x_1 x_2	n_1 n_2	t_1 t_2

The relation to solve the problem: $x_1 n_1 t_1 = x_2 n_2 t_2$

If there is an unknown, the problem statements are given here under:

i.

No. of Men	Number of days taken	Number of hours spent in a day
x_1 x_2	n_1 n_2	t_1 ?

The relation to solve the problem: $x_1 n_1 t_1 = x_2 n_2 .\ ?$

ii.

No. of Men	Number of days taken	Number of hours spent in a day
x_1 x_2	n_1 ?	t_1 t_2

The relation to solve the problem: $x_1 n_1 t_1 = x_2 \ .?. t_2$

iii.

No. of Men	Number of days taken	Number of hours spent in a day
x_1 ?	n_1 n_2	t_1 t_2

The relation to solve the problem: $x_1 n_1 t_1 = ?.n_2 t_2$

25. The simple interest on a certain sum for 2 years at 10% per annum is Rs.90. The corresponding compound interest is :

1. Rs.99 2.Rs.95.60 3.Rs.94.50 4. Rs.108

Ans: 3

Explanation

Given: N = 2, R = 10%, P= ?

1. For SI: $\frac{PNR}{100} = 90$

$\therefore$ P = (100 x 90) / (2 x 10) = Rs. 450

2. C.I. $= P\left(1+\frac{R}{100}\right)^2$ - P

= Rs.{450 x $(1+10/100)^2 - 450$} = Rs. 94.50

26. A sum of money placed at compound interest doubles itself in 5 years. It will amount to eight times itself in:

1. 15 years 2.20 years 3.12 years 4. 10 years

Ans: 1

Explanation

First case: $P\left(1+\frac{R}{100}\right)^5 = 2P$ ……..(1)

$\therefore \left(1+\frac{R}{100}\right)^5 = 2 = 2^1$

Second case: $P\left(1+\frac{R}{100}\right)^n = 8P$

$\therefore \left(1+\frac{R}{100}\right)^n = 8 = 2^3$ ……..(2)

Cube of Eqn.(1) $\rightarrow \left(1+\frac{R}{100}\right)^{15} = 2^3 \rightarrow P\left(1+\frac{R}{100}\right)^n = 8P$

Therefore, n = 15 years.

27. Two taps can separately fill a cistern in 10 minutes and 15 minutes respectively and when the waste pipe is opened they can together fill it in 18 minutes. The waste pipe can empty the full cistern in :

1. 6 minutes 2.9 minutes 3. 13 minutes 4. 23 minutes

Ans:2

Explanation

Let the time taken by the waste pipe to empty the tank be x minutes.

As per given condition, tank filled in one minute: $\frac{1}{10}+\frac{1}{15}-\frac{1}{x}=\frac{1}{18}$

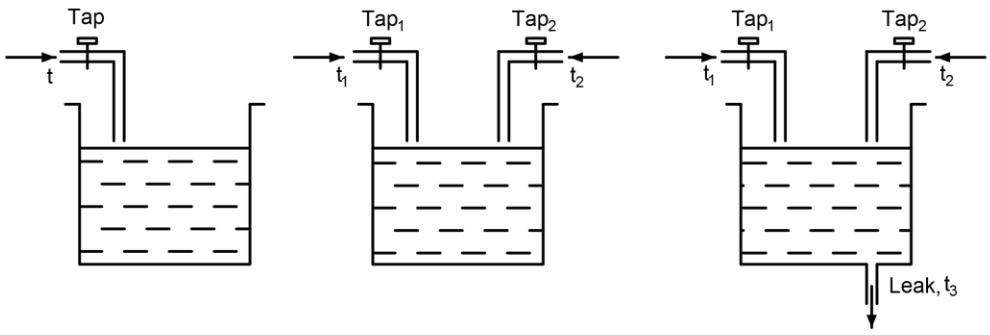
$\rightarrow \frac{1}{10}+\frac{1}{15}-\frac{1}{18}=\frac{1}{x}$

$= \frac{9+6-5}{90} = \frac{1}{x}$, $10/90 = \frac{1}{x}$

$\therefore$ x = 9.

Note: The concept and formulas are shown below in a Table.

Table : Filling by Taps



a. Single tap
b. Time to fill t_1 hr.

Part of tank filled in 1hr $= \frac{1}{t_1}$

a. 2 taps
b. Time to fill t_1 and t_2 individually.
c. Time to fill the tank when both the taps are opened simultaneously, T.

$$T = \frac{1}{\frac{1}{t_1} + \frac{1}{t_2}}$$

a. 2 taps and a leak rate of t_3 to empty
b. Time to fill t_1 and t_2 individually and the leak rate of t_3 to empty the tank.
c. Time to fill the tank when both the taps are opened simultaneously and the leak is also taking place at the same time, T.

$$T = \frac{1}{\frac{1}{t_1} + \frac{1}{t_2} - \frac{1}{t_3}}$$

Figure : Sums on taps and tanks - time taken for filling and emptying (leaks) of vessels by taps.

28. The surface of a cube is 1176 cm^2. The volume of this cube is :

1. 7056 cm^3 2. 4704 cm^3 3.2744 cm^3 4. 3528 cm^3

Ans: 3

Explanation

Cube volume, V in terms of surface area, S is given by: $V = a^3 = \frac{Sa}{6}$ where a is side.

$S = 6a^2 = 1176$, $\therefore a^2 = 176$

$\therefore a = 14$, $V = a^3$

$= 176 \times 4 = 2744$

(Note: To find V, use either a^3 or $\frac{Sa}{6}$ when S and a are known.)

29. If each side of a cube is doubled, then its volume:

1. Is doubled 2.Becomes 4 times
3. Becomes 6 times 4.Becomes 8 times

Ans:4

Explanation

$V = a^3$

Side: $a \rightarrow 2a$, Volume $V \rightarrow (2a)^3 = 8a^3$

30. The number of small cubes with edges of 10 cm that can be accommodated in a cubical box of 1 metre edge is:

1.100 2. 1000 3. 10 4. 10000

Ans: 2

Explanation

No .of cubes, N $= \frac{V}{v} = \frac{Box\ volume}{one\ cube\ volume} = \frac{100x100x100}{10x10x10} = 1000$

31. If the volumes of two cubes are in the ratio 8:1, the ratio of their edges is:

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

Ans: 3

Explanation

$V_1:V_2$, $= a_1^3 : a_2^3 = 8: 1 = 2^3:1^3 \rightarrow a_1: a_2 = 2:1$

32. The radius of a wire is decreased to one third. If volume remains same, length will increase by

1. 1 time 2. 6 times 3. 3 times 4. 9 times

Ans: 4

Explanation

Given : r $\rightarrow \frac{1}{3}r$, V $\rightarrow$ remains same and $\ell \rightarrow \ell_1$ (increases)

Volume of wire = $\pi r^2 \ell$

$\pi r^2 \ell = \pi(r/3)^2 \ell_1$

$\pi r^2 \ell = \pi \frac{r^2}{9} \ell_1$

Simplifying/Cancelling π on both sides,

$r^2 \ell = \frac{r^2}{9}\ell_1$

$9\ell = \ell_1$

So, length is increased by 9 times.

33. Simplify:

0.546 x 0.546 x 0.546 + 0.454 x 0.454 x 0.454 + 3 x 0.546 x 0.454 x (0.546 + 0.454)

1. 0.1 2. 1.0 3. 0.01 4. 0.001

Ans:2

Explanation

Given sum is of the form: $a^3+3ab(a+b)+b^3 = (a+b)^3 = (0.546+0.454)^3 = 1^3 = 1$

34. A father is two times faster than his son. If the son can complete a piece of work in 12 days, how long will it take for both the father and son to complete the same work?

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

Ans: 3

From the given condition, father will complete the work in 6 days. If father and son work together, the number of days taken are

$\frac{6\ x\ 12}{6+12} = 4.$

Or

Work done by Son and Father in a day = $\frac{1}{12} + \frac{2}{12} = \frac{1+2}{12} = \frac{3}{12} = \frac{1}{4}$ →4 days to complete the work

35. A man can row at a speed of 12 km per hour downstream and at a speed of 6 km per hour upstream. Find the speed of the boat in still water, also find the speed of the stream.

1.3km/h, 6km/h 2. 9km/h, 6km/h 3. 9km/h, 3km/h 4.6km/h, 3km/h,

Ans: 3

Explanation

Let the speed of boat be x kmph and that of stream y kmph

Given:

Downstream speed =x+y =12 ……..(1)

Upstream speed = x-y = 6 ……..(2)

Solving Eqn.(1) and eqn.(2) for x and y → x= 9 and y = 3.

36. A train 120 m long takes 6 seconds to pass a man, who is running in the opposite direction at the speed of 12 km/h. Find the speed of the train.

1. 120km/h 2. 30km/h 3. 45km/h 4. 60km/h

Ans: 4

Explanation

Given: Train length L = 120 m

Let train speed be V_1. Given

Man's speed V_2= 12kmph=$\frac{10}{3}$ m/s

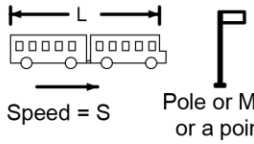
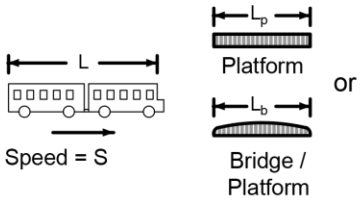
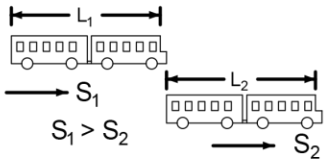
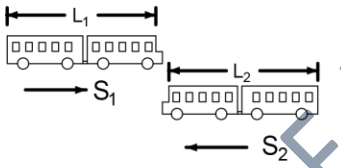
Given: t=$\frac{L}{V_1+V_2}$ (when running/moving in opposite directions, the relative speed is addition of the 2 speeds)

$\therefore 6 = \frac{120}{V_1+\frac{10}{3}} \rightarrow 6V_1 + 20 = 120$

$\therefore V_1 = \frac{100}{6} m/s$

$= \frac{100}{6} \times \frac{18}{5} kmp = 20 \times 3 = 60 kmp$h. The cocept and formulas used are shown below Table

Table: Train speed

A train crossing a pole or Man or a point		$t = \frac{L}{S}$
A train crossing a bridge or platform		$t = \frac{L + L_p}{S}$ or $t = \frac{L + L_b}{S}$
Two trains crossing each other in the same direction		$t = \frac{L_1 + L_2}{S_1 - S_2}$
Two trains crossing each other in the opposite direction		$t = \frac{L_1 + L_2}{S_1 + S_2}$

Note:

L_p = Platform length in m.

L_b = Bridge length in m.

L, L_1, L_2 = Train length in m.

S, S_1, S_2 = Train speed in m/s.

t = Time in seconds.

i. To convert kmph to m/s.

$\frac{5}{18}$ x __kmph ⟶ __m/s

ii. To convert m/s to kmph.

$\frac{18}{5}$ x __m/s ⟶ __kmph

Figure : Sums on train - Time taken by a train of finite length, traveling at a constant speed to cross a point or a man or a pole or lengthy objects like bridge or railway platform or to cross another train.

37. A glass half full of milk weighs 600 gram. When empty its weight is 200 gram. What will it weigh four fifth of it is full of milk?

1. 1 litre 2. 840 gram 3. 690 gram 4. 750 gram

Ans:2

Explanation

Glass tumbler weight, x = 200gm

Let full glass milk weight be = y,

$\therefore x + \frac{y}{2} = 600$

∴ Glass with ½ glass of milk =400,

∴Full milk weight= 800 gm

∴ 4/5th glass milk weight is $\frac{4}{5}\times$ 800 + 200, =640+200 =840 gram

38. Two numbers are in ratio 2:3 if 5 added to each number, the ratio becomes 5:7. Find the bigger number?

1) 20 2) 40 3. 30 4. 60

Ans:3

Explanation:

The 2 numbers are in the ratio 2:3.

Let the common ratio be x.

Therefore the numbers are 2x and 3x.

If 5 is added to both the numbers the ratio become 5:7

. Therefore, (2x + 5):(3x + 5)= 5 :7

Therefore, 14x + 35 = 15x + 25

Therefore, x = 10

Thus, the numbers are 2x = 2 × 10 = 20 and 3x = 3 × 10 = 30.

39. Surface area of a sphere is 5544 sq.cm. Find its volume.

1. 30808 2. 38808 3. 380808 4. 380800

Ans:2

Explanation

$S = 4\pi r^2$,i.e.,$4\pi r^2 = 5544cm^2$, i.e.,$4\times \frac{22}{7} \times r^2 = 5544 \rightarrow r^2=441 \rightarrow r = 21$

$V = \frac{4}{3}\pi r^3 = 4/3 \times \frac{22}{7} \times 21\times 21\times 21 = = 38808cm^3$

40. What is 30% of 40% of 260?

1. 26.2 2. 31.2 3. 28.2 4. 43.2

Ans:2

Explanation

$= \frac{30}{100} x \frac{40}{100} x260 = \frac{312}{10} = 31.2$

41. In an examination 40% students fail in Maths and 30% fail in English and 20% in both. Find the pass percentage.

1. 10% 2. 50% 3. 60% 4. 70%

Ans: 2

Explanation

Total students be 100

Condition for failed students: $A \cup B = \in A + \in B - A \cap B$

∴Total failed students = 40+30 -20 =50

∴ Total pass 100 -50 = 50

42. $[(-3)^2]^3$ is equal to

1) $(-3)^8$ 2)$(-3)^6$ 3)$(-3)^5$ 4) $(-3)^{23}$

Ans:2. (The given sum is $(-3)^2 \cdot (-3)^2 \cdot (-3)^2 = (-3)^6$ = 9x9x9)

43. Each internal angle of a regular hexagon measures

1. 108° 2. 120° 3. 136° 4.100°

Ans:2

44. Each internal angle of a regular octagon measures

1. 108° 2. 120° 3. 135° 4. 100°

Ans: 3 (Formulas for interior and exterior angles for a polygon are shown below)

Box1.

1. Sum of all interior angles = (n-2) x180°

1.1 Each interior angle = $\frac{\text{Sum of interior angles}}{\text{No. of sides, n}}$

$= \left(180° - \frac{360°}{n}\right) = \frac{(n-2) \times 180°}{n}$

2. Sum of all exterior angles = 360°

2.1 Each exterior angle = $\frac{360°}{n}$

where, n = Number of sides.

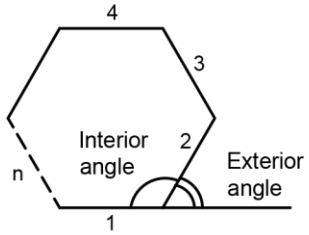
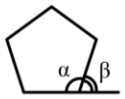


Figure : Relation for no.of sides and sum of all interior / exterior angles of a polygon.

Box 2

Name	Shape, Internal angle marked	No. of sides	Interior angle, α
1. Equilateral triangle		3	60°
2. Square		4	90°
3. Pentagon		5	108° α = Internal angle β = External angle
4. Hexagon		6	120°
5. Heptagon		7	128.57°
6. Octagon		8	135°
7. Nonagon		9	140°
8. Decagon		10	144°

1. Interior angles = $\left(180° - \frac{360°}{n}\right) = \frac{(n-2) \times 180°}{n}$
2. Sum of all exterior angles = 360°

Figure : Interior angles of polygons.

45. The LCM of 4,8,12 and 16 is

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

Ans:4

Explanation

The given numbers are 4×1, 4×2, 4×3 , 4×4

∴ LCM = 4×3×4 = 48

46. A train passes a platform 60 metre long in 20 seconds and a man in 12 seconds. The speed of the train is:

1. 18 km/hr 2. 27 km/hr 3. 36 km/hr 4. 40 km/hr

Ans: 2

Explanation

Passing a platform, $t_1 = \frac{L+60}{V} = 20$ ……(1)

Passing a man, $t_2 = \frac{L}{V} = 12$ ……(2)

Eqn.(1) / Eqn.(2) → $\frac{L+60}{L} = \frac{20}{12}$ → L=90, ∴V=7.5m/s →18/5 x 7.5 Km/hr =27 Km/hr

47. 20% of 30% of 40% of Rs 1,000 is :

1.Rs 30 2.Rs 24 3.Rs 48 4.Rs 100

Ans: 2

Explanation

$= \frac{20}{100} \text{x } \frac{30}{100} \text{x} \frac{40}{100} \text{x} 1000 = 24$

48. The sum of $3x^2+y^2$, $-x^2+2y^2$ and $4x^2-5y^2$ is

1.$6x^2-2y^2$ 2.$8x^2-2y^2$ 3.$6x^2-8y^2$ 4.$8x^2-8y^2$

Ans:1

49. On simplification -3x-[2x-(4x+y)] is

1. y-x 2.x-y 3.5x+y 4.5x-y

Ans: 1

Explanation

-3x -(2x -4x –y) = -3x + 2x +y = -x +y

50. A certain triangle has sides that are, respectively, 6 cm, 8 cm, and 10 cm long. A rectangle equal in area to that of the rectangle has a width of 3 cm. The perimeter of the rectangle, expressed in cm, is

1. 11 2. 16 3. 22 4. 24

Ans: 3

Explanation

The sides of the triangle, 6, 8 and 10 are Pythagorean triples and hence it is a right angle triangle. Area of $\Delta = \frac{1}{2}$ x 6 x 8 = Area of rectangle = 3 ×ℓ

∴ℓ= 8,

∴Perimeter, P = 2(ℓ+b), =2(8+3) =22

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