

**1. Directions :** Find out the missing numbers in each one of the following series.

5, 15, 45, ?, 405, 1215, 3645

- a. 60
- b. 90
- c. None of these
- d. 135
- e. 160

**Answer d**

**Explanation:**



Hence, missing number = 135

**2. Directions :** Find out the missing numbers in each one of the following series.

7, 26, ?, 124, 215, 342, 511

- a. 63
- b. 80
- c. 65
- d. 84
- e. 92

**Answer a**

**Explanation:**

7, 26, ....., 124, 215, 342, 511

$$(2)^3 - 1 = 7$$

$$(3)^3 - 1 = 26$$

$$(4)^3 - 1 = 63$$

$$(5)^3 - 1 = 124$$

$$(6)^3 - 1 = 215$$

$$(7)^3 - 1 = 342$$

$$(8)^3 - 1 = 511$$

Hence, missing number =  $(4)^3 - 1 = 63$

3. **Directions :** Find out the missing numbers in each one of the following series.

2, 5, 10, ?, 26, 37, 50, 65, 82

- a. 26
- b. 65
- c. 17
- d. 10
- e. 37

**Answer c**

**Explanation:**

2, 5, 10, ?, 26, 37, 50, 65, 82

$$(1)^2 + 1 = 2, (2)^2 + 1 = 5, (3)^2 + 1 = 10$$

$$(4)^2 + 1 = 17, (5)^2 + 1 = 26, (6)^2 + 1 = 37$$

$$(7)^2 + 1 = 50, (8)^2 + 1 = 65, (9)^2 + 1 = 82$$

Hence, missing no. 17.

4. **Directions:** Find out the missing numbers in each one of the following series.

2, 12, 30, 56, 90, ?

- a. 100
- b. 112
- c. 132
- d. 140
- e. 108

**Answer c**

**Explanation:**

The given terms of the series are in the order of  $1 \times 2, 3 \times 4, 5 \times 6, 7 \times 8, 9 \times 10$  and  $11 \times 12$ .

Therefore, (D) is to be put.

5. **Directions :** Find out the missing numbers in each one of the following series.

0, 2, 6, 12, 20, 30, ?, 56

- a. 40
- b. 49
- c. 50
- d. 55
- e. 42

**Answer e**

**Explanation:**

0, 2, 6, 12, 20, 30, ?, 56

$$(1)^2 - 1 = 0, (6)^2 - 6 = 30$$

$$(2)^2 - 2 = 2, (7)^2 - 7 = 42$$

$$(3)^2 - 3 = 6, (8)^2 - 8 = 56$$

$$(4)^2 - 4 = 12$$

$$(5)^2 - 5 = 20$$

Hence, missing number = 42

**6. Determine the HCF of 6,**

$$3\frac{9}{17} \text{ and } \frac{36}{51}.$$

- a. 6
- b.  $1/17$
- c.  $6/17$
- d. None of these
- e.  $12/17$

**Answer c**

**Explanation:**

$$3\frac{9}{17} = \frac{60}{17} \text{ and } \frac{36}{51} = \frac{12}{17}$$

Now, H.C.F. of  $\frac{6}{1}$ ,  $\frac{60}{17}$  and  $\frac{12}{17}$

$$= \frac{\text{H.C.F. of 6, 60 and 12}}{\text{L.C.M. of 1, 17 and 17}}$$

$\therefore$  H.C.F. of 6, 60 and 12 = 6 and L.C.M. of 1, 17 and 17 = 17

$\therefore$  Required H.C.F. =  $\frac{6}{17}$

7. The average of marks obtained by 120 students in an examination is 35. If the average of marks of pass candidates is 39 and that of failed candidates is 15, then what is the number of candidates who passed the examination?

- a. 60
- b. 80
- c. 100
- d. 90
- e. 110

**Answer c**

**Explanation:**

Let the number of passed candidates be  $x$ .

Then, the number of candidates who failed in the examination =  $120 - x$

∴ Average of marks obtained by 120 candidates = 35

∴ Sum of the marks obtained by candidates =  $35 \times 120 = 4200$

∴ According to the statement of the problem average of the marks obtained by  $x$  candidates to the statement, the average of marks = 39

∴ Sum of the marks obtained by  $x$

Candidates =  $x \times 39 = 39x$

And the average of marks obtained by  $(120 - x)$  candidates = 15

∴ Sum of marks obtained by

$(120 - x)$  candidates =  $(120 - x) \times 15$

∴  $39x + (120 - x) \times 15 = 4200$

Or,  $24x + 1800 = 4200$

$24x = 4200 - 1800$

$24x = 2400$

$x = \frac{2400}{24} = 100$

∴ Number of passed candidates = 100.

8. The average age of 8 men is increased by 2 years when two of them, whose ages are 20 years and 24 years, respectively, are replaced by two women. What is the average age of these women?

- a. 30 years
- b. None of these
- c. 32 years
- d. 36 years
- e. 34 years

**Answer a**

**Explanation:**

Let the average age of 8 men be  $x$  years.

$\therefore$  Sum of the ages of 8 men =  $8x$  years

Now, according to the statement, average age of 6 men + 2 women =  $(x + 2)$  years

$\therefore$  Sum of the ages (6 men + 2 women) =  $8(x + 2) = 8x + 16$  years

Hence, it is clear that on replacing 2 men by 2 women, the sum of their ages increases by 16 years.

Therefore, the sum of the ages of two women =  $(20 + 24) + 16 = 60$  years

$\therefore$  Average age of the women

$$= \frac{60}{2} = 30 \text{ years}$$

9. A man undertakes a journey of 36 kms. He covers  $\frac{1}{3}$ rd part of the journey at the speed of 4 km/hr, next  $\frac{1}{3}$ rd part of the journey at the speed of 6 km/hr and the rest of the journey at the speed of 3 km/hr. His average speed for the entire journey will be

- a. 4 km/hr
- b. 8 km/hr
- c. 6 km/hr
- d. 15 km/hr
- e. 12 km/hr

**Answer a**

**Explanation:**

In the first case,  $\frac{1}{3}$ rd of the total distance =  $\frac{1}{3} \times 36 = 12$  km

In the second case,  $\frac{1}{3}$ rd of the total distance = 12 km

Remaining distance = 12 km

As the man covers three equal distances at the speed of 4 km/hr, 6 km/hr and 3 km/hr, respectively, we have:

$$x = 4 \text{ km/hr } y = 6 \text{ km/hr } z = 3 \text{ km/hr}$$

Hence, the average speed of the man for the entire journey

$$\begin{aligned} &= \frac{3xyz}{xy+yz+zx} \\ &= (3 \times 4 \times 6 \times 3) / (4 \times 6 + 6 \times 3 + 3 \times 4) \\ &= \frac{12 \times 18}{54} \\ &= 4 \text{ km/hr} \end{aligned}$$

**10.** A mixture contains alcohol and water in the ratio of 4 : 1. By adding 20 litres of water to the mixture, the ratio of alcohol to water becomes 4 : 3. What is the ratio of the primary mixture to the final mixture?

- a. 3 : 4
- b. 7 : 9
- c. 6 : 7
- d. 5 : 7
- e. 4 : 5

**Answer d**

**Explanation:**

Let the primary mixture be  $x$  liters.

$$\therefore \text{Quantity of alcohol in the } x \text{ – liter mixture} = \frac{4x}{5} \text{ liters}$$

$$\text{And the quantity of water in the } x \text{ – liter mixture} = \frac{x}{5} \text{ liters}$$

Now, according to the question, quantity of water in the new mixture after adding 20 liters water =  $\left(\frac{x}{5} + 20\right)$  liters

In the new mixture, the ratio of alcohol to water is 4 : 3

$$\therefore \frac{4x}{\frac{x}{5} + 20} = \frac{4}{3}$$

$$\text{Or, } \frac{4x}{x+100} = \frac{4}{3}$$

$$\text{Or, } 12x = 4x + 400$$

$$\text{Or, } 12x - 4x = 400$$

$$\text{Or, } 8x = 400$$

$$\text{Or, } x = 50$$

∴ The primary mixture is 50 liters and final mixture is  $50 + 20 = 70$  liters.

Hence, the ratio of the primary mixture to the final mixture =  $50 : 70$  or  $5 : 7$

**11. Direction :** Four of the five parts numbered (A), (B), (C), (D) and (E) are exactly equal. Which one of the parts is not equal to the other four? The number of that part is your answer.

$$(A) \frac{\left(\sqrt{5} + \frac{1}{\sqrt{5}}\right)^2 - 2}{\frac{2}{5} \text{ of } 13}$$

$$(B) = \frac{(0.33)^3 + (0.67)^3}{(0.33)^2 - 0.33 \cdot 0.67 + (0.67)^2}$$

$$(C) = \frac{12 \cdot 12 \cdot 12 - 1 \cdot 1 \cdot 1}{12 \cdot 12 + 12 \cdot 1 + 1 \cdot 1}$$

$$(D) = \frac{24 + 24 \cdot 12 - 8}{160 + 18 \cdot 12 - 72}$$

$$(E) = 51 / (17 \text{ of } 3)$$

- a. A
- b. B
- c. C
- d. D
- e. E

**Answer c**

**Explanation:**

From (A) we get

$$\frac{\left(\sqrt{5} + \frac{1}{\sqrt{5}}\right)^2 - 2}{\frac{2}{5} \text{ of } 13}$$

$$= \frac{(\sqrt{5})^2 + 2 \cdot \sqrt{5} \cdot \frac{1}{\sqrt{5}} + \left(\frac{1}{\sqrt{5}}\right)^2 - 2}{\frac{2}{5} \text{ of } 13}$$

$$= \frac{5+2+\frac{1}{5}-2}{\frac{26}{5}} = \frac{\frac{26}{5}}{\frac{26}{5}} = 1$$

From (B), we get:

$$\frac{(0.33)^3 + (0.67)^3}{(0.33)^2 - 0.33 \times 0.67 + (0.67)^2}$$

$$\frac{(0.33 + 0.67)[(0.33)^2 - 0.33 \times 0.67 + (0.67)^2]}{(0.33)^2 - 0.33 \times 0.67 + (0.67)^2}$$

$$= 0.33 + 0.67 = 1.00$$

From (C), we get:

$$\frac{12 \times 12 \times 12 - 1 \times 1 \times 1}{12 \times 12 + 12 \times 1 + 1 \times 1}$$

$$= \frac{12^3 - 1^3}{12^2 + 1^2 \times 1 + 1^2}$$

$$= \frac{(12-1)(12^2 + 12 \times 1 + 1^2)}{12^2 + 12 \times 1 + 1^2}$$

$$= 12 - 1 = 11$$

From (D), we get:  $\frac{24+24 \times 12-8}{160+18 \times 12-72}$

$$= \frac{8(3+3 \times 12-1)}{8(20+9 \times 3-9)}$$

$$= \frac{3+36-1}{20+27-9}$$

$$= \frac{38}{38} = 1$$

From (E), we get:  $51 / (17 \text{ of } 3)$

$$= 51 \times \frac{1}{17} \times \frac{1}{3} = 1$$

**12. Direction :** Four of the five parts numbered (A), (B), (C), (D) and (E) are exactly equal. Which one of the parts is not equal to the other four? The number of that part is your answer.

$$(A) \sqrt{32\sqrt{1012} + \sqrt{144}}$$

$$(B) = 20\% \text{ of } 10 + 10\% \text{ of } 20$$

$$(C) = \frac{9}{11} \div \frac{45}{11} + \frac{19}{5}$$



$$(D) = 3 + \frac{40}{49} \div \frac{10}{7} + \frac{3}{7}$$

$$(E) = \sqrt{13 + \sqrt{7 + \sqrt{4}}}$$

- a. A
- b. C
- c. B
- d. D
- e. E

**Answer a**

From (A), we get:

$$\begin{aligned}\sqrt{32\sqrt{1012 + \sqrt{144}}} &= \sqrt{32 + \sqrt{1012 + 12}} \\ &= \sqrt{32 + 32} \\ &= \sqrt{64} = 8\end{aligned}$$

From (B), we get:

$$20\% \text{ of } 10 + 10\% \text{ of } 20 = 2 + 2 = 4$$

$$\text{From (C), we get: } \frac{9}{11} \div \frac{45}{11} + \frac{19}{5}$$

$$= \frac{9}{11} \times \frac{11}{45} + \frac{19}{5}$$

$$= \frac{1}{5} + \frac{19}{5} = \frac{20}{5} = 4$$

$$\text{From (D), we get: } 3 + \frac{40}{49} \div \frac{10}{7} + \frac{3}{7}$$

$$= 3 + \frac{4}{7} + \frac{3}{7} = \frac{21+4+3}{7} = \frac{28}{7} = 4$$

From (E), we get:

$$\begin{aligned}\sqrt{13 + \sqrt{7 + \sqrt{4}}} &= \sqrt{13 + \sqrt{7 + 2}} \\ &= \sqrt{13 + \sqrt{9}} = \sqrt{13 + 3} \\ &= \sqrt{16} = 4\end{aligned}$$

**13. Direction :** Four of the five parts numbered (A), (B), (C), (D) and (E) are exactly equal. Which one of the parts is not equal to the other four? The number of that part is your answer.

(A)  $400\%$  of  $1200 + 11 * 40$

(B)  $= 3\frac{2}{3}$  of  $2100 - 2450$

(C)  $= 4350 + 2120 - 1330$

(D)  $= 2690 + 1250 + 1300$

(E)  $= 1725 + 1615 + 1475 - 1425 + 1850$

- a. A
- b. E
- c. D
- d. B
- e. C

**Answer d**

**Explanation:**

From (A), we get:

$$4800 + 440 = 5240$$

From (B), we get:  $7700 - 2450 = 5250$

From (C), we get:  $6470 - 1230 = 5240$

From (D), we get:  $3940 + 1300 = 5240$

From (E), we get:  $1725 + 1615 + 1475 - 1425 + 1850 = 5240$

**14.** A square is converted into a rectangle by increasing its length by 10% and decreasing its width by 10%. Which one of the following statements is true?

- a. Area of rectangle = Area of the square
- b. Area of rectangle = 2% of area of the square
- c. Area of the rectangle = 99% of area of the square
- d. None of these
- e. Area of square = 99% of area of the rectangle

**Answer c**

**Explanation:**

Let the length and breadth of a rectangle be  $l$  and  $b$ , respectively.

Area of the square =  $lb$

Area of the rectangle =  $1.1 l \times 0.9 = 0.99 lb$

$\therefore$  Area of the rectangle = 99% area of the square

**15.** In a particular laboratory experiment, a type of bacteria was found to grow four times in two minutes.  
What is the approximate percentage increase per minute of the bacteria?

- a. 100 per cent
- b. 20 per cent
- c. 30 per cent
- d. 70 per cent
- e. None of these

**Answer a**

**Explanation:**

Let  $P$  be the original number of the bacteria

Then, after 2 minutes, this number increases to

$$4P, \text{ i.e. } \left(1 + \frac{r}{100}\right)^2 = 4P$$

$$\text{Or, } \left(1 + \frac{r}{100}\right)^2 = 2^2$$

(where  $r$  is the rate of growth in per cent per minute)

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

$$\text{Or, } 1 + \frac{r}{100} = 2$$

$$\frac{r}{100} = 2 - 1 = 1$$

$$r = 100\%$$