

SAINIK SCHOOL - IX - 2018 - ANSWER KEY

Instructions

- This question paper contains 150 questions, which is divided into following four sections.
Section I Mathematics (50 Questions); **Section II** English (25 Question); **Section III** General Science (25 Questions & **Section IV** social Studies (25 Questions) **Section V** intelligence (25 Question)
- Section I** Mathematics each question carries 4 marks & **Section II** English, **Section III** General Science & **Section IV** Social Studies & **Section V** intelligence each question carries all question.
- The candidate is expected to attempt all questions.

SECTION 'I' – MATHEMATICS

1. If a number 573 xy is divisible by 90, then what is the value of $x + y$?

a) 6 b) 9 c) 3 d) 8

Solution:

Since, the number 573 xy is divisible by 90 (i.e. 9×10). Therefore, the sum of digits is divisible by 9. Also it is divisible by 10. Therefore, the sum of digits is divisible by 0.

$$\begin{aligned} \text{Now, sum of digits} &= 5 + 7 + 3 + x + y \\ &= 5 + 7 + 3 + x + 0 \\ &= 15 + x \end{aligned}$$

Here, we consider $x = 3$

\therefore Sum of digits = $15 + 3 = 18$, which is divisible by 9.

2. Which of the following numbers in standard form?

a) $\frac{-24}{52}$ b) $\frac{-49}{71}$ c) $\frac{-27}{48}$ d) $\frac{28}{-105}$

Solution:

Number $\frac{-49}{71}$ is in standard form.

3. What should be added to $-\frac{5}{7}$ to get $-\frac{2}{3}$?

a) $\frac{-29}{21}$ b) $\frac{29}{21}$ c) $\frac{1}{21}$ d) $\frac{-1}{21}$

Solution:

Let x should be added in $-\frac{5}{7}$

$$\begin{aligned} \text{Then, } -\frac{5}{7} + x &= \frac{2}{3} \\ \Rightarrow x &= -\frac{2}{3} + \frac{5}{7} = \frac{-14+15}{21} = \frac{-1}{21} \end{aligned}$$

4. The age of A & B are in the ratio 5 : 7. Four years from now the ratio of their ages will be 3 : 4 Then the present age of B is

a) 20 years b) 28 years c) 15 years d) 21 years

Solution:

Let present ages of A & B are x & y

$$\text{Then } \frac{x}{y} = \frac{5}{7}$$

$$\Rightarrow x = \frac{5}{7}y$$

$$\text{Also } \frac{x+4}{y+4} = \frac{3}{4}$$

$$\Rightarrow \frac{\frac{5}{7}y+4}{y+4} = \frac{3}{4}$$

$$\Rightarrow \frac{20}{7}y + 16 = 3y + 12$$

$$\Rightarrow 4 = \frac{1}{7}y$$

$$\Rightarrow y = 28 \text{ yr}$$

Hence, present age of B is 20 yr.

5. Two consecutive even numbers are such that half of the larger number exceeds one-fourth of the smaller number by 5. Then the larger number is:

a) 16

b) 18

c) 32

d) 34

Solution:

Let two consecutive even numbers be x and $x + 2$. Then, according to the given number

$$\frac{1}{2}(x + 2) = \frac{1}{4}(x) + 5$$

$$\Rightarrow 2x + 4 = x + 20$$

$$\Rightarrow x = 16$$

$$\therefore \text{Large number} = x + 2 = 16 + 2 = 18$$

6. If $0.25(4f - 3) = 0.05(10f - 9)$, then f is equal to:

a) 0.6

b) 0.5

c) 0.5

d) 0.4

Solution:

$$0.25(4f - 3) = 0.05(10f - 9)$$

$$\Rightarrow 25(4f - 3) = 5(10f - 9)$$

$$\Rightarrow 100f - 75 = 50f - 45$$

$$\Rightarrow 50f = 30$$

$$\Rightarrow f = \frac{30}{50} = 0.6$$

7. A number consists of two digits. The digit in the tens place exceeds the digit in the units place by 4. The sum of the digits is $\frac{1}{7}$ of the number. The number is

a) 27

b) 72

c) 48

d) 84

Solution:

Let unit's place digit be x and ten's place digit be y

Then, two digit number = $10y + x$

According to the given condition

$$y = x + 4 \quad \dots\dots\dots (i)$$

$$\text{Also } x + y = \frac{1}{7}(10y + x) \quad \dots\dots\dots (ii)$$

On solving Eq. (i) & (ii), we get

$$x = 4 \text{ \& } y = 8$$

$$\text{Hence, the required number} = 10 \times 8 + 4 = 84$$

8. How many sides does a regular polygon have, wherein, whose interior angle is eight times its exterior angle?

a) 16

b) 24

c) 18

d) 20

Solution:

$$\therefore \text{Interior angle} = 180^\circ - \text{exterior angle}$$

$$\therefore 8 \text{ exterior angle} = 180^\circ - \text{exterior angle}$$

$$\text{Exterior angle} = \frac{180^\circ}{9} = 20^\circ$$

$$\therefore \text{Exterior angle of a polygon} = \frac{360^\circ}{\text{Number of sides}}$$

$$\text{Number of sides} = \frac{360^\circ}{20^\circ} = 18^\circ$$

9. ABCD is a rectangle with $\angle BAC = 48^\circ$ then $\angle DBC$ is equal to
 a) 38° b) 42° c) 48° d) 132°

Solution:

In $\triangle AOB$,

$BO \approx OA$ (Diagonals of a rectangle are equal and bisect each other)

$$\Rightarrow \angle OAB = \angle OBA = 48^\circ$$

$$\Rightarrow \angle DBA = \angle OBA = 48^\circ$$

$$\Rightarrow \angle DBA = \angle CBA - \angle DBC$$

$$= 90^\circ - 48^\circ = 42^\circ$$

10. The angles A, B, C, D of a quadrilateral ABCD taken in order are in the ratio 3 : 7 : 6 : 4, then ABCD is a
 a) Rhombus b) Parallelogram c) Trapezium d) kite

Solution:

Let angles of a quadrilateral $3x, 7x, 6x$ & $4x$

\therefore The sum of a quadrilateral is 360°

$$\therefore 3x + 7x + 6x + 4x$$

$$\Rightarrow 20x = 360^\circ$$

$$\Rightarrow x = 18^\circ$$

$$\therefore \angle A = 3 \times 18^\circ = 54^\circ$$

$$\angle B = 7 \times 18^\circ = 126^\circ$$

$$\angle C = 6 \times 18^\circ = 108^\circ$$

$$\angle D = 4 \times 18^\circ = 72^\circ$$

Hence, we see that $\angle A + \angle B = 54^\circ + 126^\circ = 180^\circ$

And $\angle C + \angle D = 108^\circ + 72^\circ = 180^\circ$

Also, we see that, $\angle A \neq \angle C$ & $\angle B \neq \angle D$

Hence, A, B & D forms a trapezium.

11. A data set of n observations has mean $2\bar{x}$. While another data set of $2n$ observations has mean \bar{X} . Then the mean of the combined data set on $3n$ observations will be

- a) \bar{x} b) $\frac{3}{2}\bar{x}$ c) $\frac{2}{3}\bar{X}$ d) $\frac{4}{3}\bar{x}$

Solution:

Mean of combined data

$$= \frac{n(2\bar{x}) + 2n(\bar{x})}{n + 2n}$$

$$= \frac{2n\bar{x} + 2n\bar{x}}{3} = \frac{4}{3}\bar{x}$$

12. In a class of 17 students, six boys failed in a test. Those who passed scored 12, 15, 17, 15, 16, 15, 19, 17, 18, 18 & 19 marks. The median score of 17 students in the class is

- a) 15 b) 16 c) 17 d) 18

Solution:

The ascending order of given data is 12, 15, 17, 15, 16, 15, 19, 17, 18, 18, 19, 19

Since, six students are failed in test. Therefore, six students get score less than 12.

Here, $n = 17$ (odd)

$$\therefore \text{Median} = \frac{17+1}{2} = \frac{18}{2} = 9\text{th}$$

\therefore 9th term will be 15.

13. The mean age of a class is 16 years. If the class teacher aged 40 years old is also included, the mean age increases to 17 years. The number of students in the class are:

a) 23 b) 33 c) 44 d) 16

Solution:

Let number of students in a class be n

Then, total age of 16 students in the class

$$= 16 \times n = 16n$$

Another condition,

$$17 = \frac{16n+40}{n+1}$$

$$\Rightarrow 17(n + 1) = 16n + 40$$

$$\Rightarrow 17n + 17 = 16n + 40$$

$$\Rightarrow n = 23$$

14. From a well shuffled deck of 52 cards, one card is drawn at random. What is the probability that the drawn card is a queen?

a) $\frac{1}{4}$ b) $\frac{1}{52}$ c) $\frac{1}{13}$ d) $\frac{1}{26}$

Solution:

Total number of outcome in a deck of cards = 52

Favourable number of outcomes = Number of queens in a deck of cards = 4

\therefore Probability of getting a queen

$$= \frac{\text{Total number of outcomes}}{\text{Favourable number of outcomes}} = \frac{4}{52} = \frac{1}{13}$$

15. Which of the following numbers is not a perfect square?

a) 3600 b) 6400 c) 81000 d) 2500

Solution:

$$81000 = (90)^2 \times 10, \text{ Which is not a perfect square}$$

16. Which least number must be subtracted from 176 to make it a perfect square?

a) 16 b) 7 c) 10 d) 4

Solution:

$$176 = 169 + 7 = (13)^2 + 7$$

17. $\frac{\sqrt{288}}{\sqrt{128}}$ is equal to

a) $\frac{3}{2}$ b) 1.49 c) $\frac{\sqrt{3}}{2}$ d) $\frac{3}{\sqrt{2}}$

Solution:

$$\frac{\sqrt{288}}{\sqrt{128}} = \frac{\sqrt{144}}{\sqrt{64}} = \frac{12}{8} = \frac{3}{2}$$

18. The volume of a cubical box is 32.768 cubic metres. Then the length of a side of the box is

- a) 32 m b) 320 m c) 768 m d) 3.2 m

Solution:

$$\text{Volume of cubical box} = 32.768^3$$

$$\Rightarrow (l)^3 = 32.768,$$

Where l is the length of the cubical box

$$l = 3.2m$$

Hence, length of cubical box is 3.2m.

19. By what least number should 648 be multiplied to get a perfect cube?

- a) 3 b) 6 c) 9 d) 18

Solution:

$$648 = 81 \times 8 = (2)^3 \times (9)^2$$

To make perfect cube, k we have to multiply by 9.

20. Given that $3048625 = 3375 \times 729$. Then what is the cube root of 3048625?

- a) 155 b) 135 c) 45 d) None of these

Solution:

$$3048625 = 3375 \times 729 = (15)^3 \times (9)^3$$

$$\therefore \text{Cube root of } 3048625 = 15 \times 9 = 135$$

21. I borrowed Rs.12000/- from Jamshed at 6% per annum simple interest for 2 years. Had I borrowed this sum at 6% per annum compound interest, what extra amount would I have to pay?

- a) Rs.144/- b) Rs.1440/- c) Rs.72/- d) Rs.43.20/-

Solution:

Given $P = \text{Rs.}12000$, $P = 6\%$ & $T = 2$ yr.

$$\text{Now, } SI = \frac{PRT}{100} = \frac{1200 \times 6 \times 2}{100} = 1440$$

$$\text{And } CI = P \left(1 + \frac{R}{100} \right)^T - P$$

$$= 12000 \left(1 + \frac{6}{100} \right)^2 - 12000$$

$$= 12000 \left(\frac{106}{100} \right)^2 - 12000$$

$$= \frac{12000 \times 106 \times 106}{100 \times 100} - 12000$$

$$= 13483.2 - 12000 = 1483.2$$

The extra amount paid by Jamshed = $CI - SI$

$$= 1483.2 - 1440 = \text{Rs. } 43.20/-$$

22. During a sale, a shop offered a discount of 10% on the marked price of all the items. What would a customer have to pay for a pair of jeans marked at Rs.1450/- and two shirts marked at Rs.850/- each?

- a) Rs.2835/- b) Rs.3150/- c) Rs.2300/- d) None of these

Solution:

Rate of discount on all items = 10%

Marked Price of a pair jeans = Rs. 1450 and Marked Price of a shirt = Rs 850

$$\therefore \text{Total marked price} = \text{Rs. } (1450 + 2 \times 850) = \text{Rs.}(1450 + 1700) = \text{Rs. } 3150$$

given that, discount % = 10%

$$\text{Discount} = 10\% \text{ of Rs } 3150$$

$$\text{Discount} = 10/100 \times 3150 = \text{Rs. } 315$$

Also, Discount = Marked Price - Sale price
 $315 = 3150 - \text{Sale price}$
 $\therefore \text{Sale price} = \text{Rs } (3150 - 315) = \text{Rs. } 2835$
 Thus the customer will have to pay Rs. 2,835/-

23. If the cost price of 10 greeting cards is equal to the selling price of 8 greeting cards. Then the gain or loss% is

- a) loss of 25% b) loss of 20% c) loss of 25% d) gain of 20%

Solution:

We know that, if the cost price of 'a' articles is equal to the selling price of b articles, then gain percentage

$$= \frac{a-b}{b} \times 100\%$$

Here $a = 10, b = 8$

$$\therefore \text{Gain\%} = \frac{10-8}{8} \times 100\%$$

$$= \frac{2}{8} \times 100\% = 25$$

24. A can do a piece of work in 20 days which B alone can do in 12 days. B worked at if for 9 days then A can finish the remaining work in:

- a) 3 days b) 5 days c) 7 days d) 11 days

Solution:

$$\text{One day's work of B} = \frac{1}{12}$$

$$\text{For 9 day's B do the work} = \frac{9}{12} = \frac{3}{4}$$

$$\therefore \text{Remaining work} = 1 - \frac{3}{4} = \frac{1}{4}$$

$$\text{One day's work of A} = \frac{1}{20}$$

$$\therefore \text{A do } \frac{1}{4} \text{ th work} = \frac{1}{5}$$

Hence, A complete the remaining work in 5 days.

25. A car takes 2 hours to reach a destination by travelling at 60 km/hr. how long will it take while travelling at 80 km/h?

- a) 1 hrs 30 min b) 1 hrs 40 min c) 2 hrs 40 min d) None of these

Solution:

$$\text{Distance cover in 2 hr} = 2 \times 60 = 120 \text{ km}$$

$$\therefore \text{Distance cover in 1 hr} = \frac{120}{2} = 60 \text{ km}$$

$$\text{And Distance cover in } \frac{1}{2} \text{ hr} = \frac{60}{2} \text{ km} = 30 \text{ km}$$

$$\text{Hence, 120 km distance cover in time} = \left(1 + \frac{1}{2}\right)$$

$$\text{Hr} = \frac{1}{2} \text{ hr.}$$

26. If $x + \frac{1}{x} = 5$ then $x^2 + \frac{1}{x^2} = ?$

- a) 25 b) 27 c) 23 d) $25 \frac{1}{25}$

Solution:

$$x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2$$

$$= (5)^2 - 2 = 25 - 2 = 23$$

27. $(a + 1)(a - 1)(a^2 + 1)$ is equal to

- a) $(a^4 - 2a^2 - 1)$ b) $(a^4 - a^2 - 1)$ c) $(a^4 + 1)$ d) $(a^4 - 1)$

Solution:

$$(a + 1)(a - 1)(a^2 + 1)$$

$$(a^2 - 1)(a^2 + 1) = a^4 - 1$$

28. $(82)^2 - 18^2$ is equal to

- a) 8218 b) 6418 c) 6400 d) 7204

Solution:

$$(82)^2 - 18^2 = (82 - 18)(82 + 18)$$

$$= 64 \times 100 = 6400$$

29. How many edges does a square prism have

- a) 9 b) 12 c) 16 d) 8

Solution:

Square prism has 12 edges.

30. Three cubes of iron whose edges are 6 cm, 8 cm & 10 cm respectively are melted & formed into a single cube. The edge of the new cube formed is

- a) 12 cm b) 14 cm c) 16 cm d) 24 cm

Solution:

Volume of combined cube = Volume of cube having edge 6 + Volume of cube having edge 8 + volume of cube having edge 10

$$\text{volume of combined cube} = (6)^3 + (8)^3 + (10)^3$$

$$\Rightarrow (\text{edge})^3 = 216 + 512 + 1000 = 1728$$

$$\Rightarrow (\text{edge})^3 = (12)^3$$

Taking cubic roots sides, we get edge = 12 cm.

31. If the capacity of a cylindrical tank is & the diameter of its base is 14m, the depth of the tank is:

- a) 8 m b) 12 cm c) 16 cm d) 24 cm

Solution:

$$\text{Volume of cylinder} = \pi r^2 h$$

$$1848 = \frac{22}{7} \times \left(\frac{14}{2}\right)^2 \times h$$

$$\Rightarrow h = \frac{1848 \times 7 \times 4}{22 \times 14 \times 14} = \frac{12936 \times 4}{4312} = 12 \text{ m}$$

Hence, depth of the tank is 12 m

32. The edges of a cuboid are the ratio 1 : 2 : 3 & its surface area is 88. The volume of the cuboid is

- a) 64 b) 96 c) 120 d) 48

Solution:

Let edges of a cuboid be $l = x$, $b = 2x$ & $h = 3x$.

Then surface area of cuboid = $2(lb + bh + hl)$

$$\begin{aligned}
 &= 2(x \times 2 + 2x \times 3x + 3x \times x) \\
 &= 2(2x^2 + 6x^2 + 3x^2) \\
 &\Rightarrow 88 = 22x^2 \\
 &\Rightarrow x^2 = 4 \Rightarrow x = 2 \text{ cm} \\
 &\therefore \text{Edges of a cuboid are} \\
 &l = 2, b = 2 \times 2 = 4, h = 3 \times 2 = 6 \\
 &\therefore \text{Volume of cuboid} = lbh = 2 \times 4 \times 6 = 48
 \end{aligned}$$

33. The parallel sides of a trapezium are in the ratio 4 : 3 & the perpendicular distance between them is 12 cm. If the Area of the trapezium is 630^2 , then its shorter of the parallel side is:

a) 45 cm b) 42 cm c) 60 cm d) 36 cm

Solution:

Let parallel sides of a trapezium be $4x$ & $3x$

Area of trapezium = $\frac{1}{2}$ (sum of parallel sides) \times distance between two parallel sides

$$\Rightarrow 630 = \frac{1}{2}(7x) \times 12$$

$$\Rightarrow x = \frac{630 \times 2}{7 \times 12} = \frac{1260}{84} = 15$$

\therefore The shorter parallel side = $3x = 3 \times 15 = 45 \text{ cm}$

34. The bases if a triangle is four times its height & its area is 50^2 , then length of its base is

a) 10 m b) 15 m c) 20 m d) 25 m

Solution:

Let height of a triangle be h . Then base = $4h$

Area of triangle = $\frac{1}{2} \times 4h \times h$

$$\therefore 50 = 2h^2 \Rightarrow h^2 = 25$$

$$h = 5 \text{ m}$$

\therefore The length of = $4h = 4 \times 5 = 20 \text{ m}$

35. $\frac{3^n 3^{2n+1}}{9^n 3^{n-1}}$ is equal to

a) 1 b) 9 c) 3 d) 3^n

Solution:

$$\begin{aligned}
 \frac{3^n 3^{2n+1}}{9^n 3^{n-1}} &= \frac{3^{n+2n+1}}{3^{2n+n-1}} \\
 &= \frac{3^{3n+1}}{3^{3n-1}} = 3^{(3n+1)-(3n-1)} \\
 &= 3^{1+1} = 3^2 = 9
 \end{aligned}$$

36. $4^{3.5} : 2^5$ is the same as

a) 4 : 1 b) 2 : 1 c) 7 : 5 d) 7 : 10

Solution:

$$\frac{4^{3.5}}{2^5} = \frac{2^{2 \times 3.5}}{2^5} = 2^{7-5} = \frac{2^2}{1} = \frac{4}{1}$$

37. If $a = b^{2/3}$ & $b = c^{-2}$ then what is the value of a in terms of c?

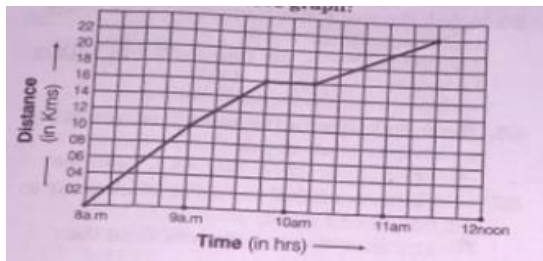
a) $\frac{4}{c^2}$ b) $\sqrt[3]{c^4}$ c) $\frac{1}{\sqrt[3]{c^4}}$ d) $\sqrt[4]{c^3}$

Solution:

$$a = b^{2/3} \& b = c^{-2}$$

$$a = (c^{-2})^{2/3} = c^{-4/3} = \frac{1}{3\sqrt{c^4}}$$

Directions (Q.No.38-42) Read the following information & refer to the graph to answer the question. A courier person cycles from a town to a neighboring suburban area to deliver a parcel to a merchant. His distance from the town at different times is shown by the above graph.



38. What is the scale taken for the time axis?

- a) 2 units = 1 hours b) 1 units = 2 hours c) 1 units = 4 hours d) 4 units = 1 hours

Solution:

It is clear from the graph 4 blocks (4 units) = 1 hour

39. How much time did the person take for the travel?

- a) 2 hours b) $2\frac{1}{2}$ hours c) $3\frac{1}{2}$ hours d) 4 hours

Solution:

The time taken by the person to travel a distance = $3\frac{1}{2}$ hour

Since, the person reach the destination at point E. The perpendicular line from E to the horizontal line meet at point F.

The time taken by the person to travel the distance = Time take from 8 am to 11 am + time taken form 11 am to 11 : 30 am.

[∵ at point F the time will be 11 : 30 am]

$$= 3 + \frac{1}{2} = 3\frac{1}{2} hr$$

40. How far is the place of the merchant from town?

- a) 11 km b) 22 km c) 13 km d) 26 m

Solution:

From the graph, it is clear that perpendicular line from E to the point a meets the vertical line at G.

The place of the merchant from town

∴ A to B is 22 km

41. When did the person stop on the way?

- a) 9 : 45 am to 10 :15 am b) between 9 am to 10 am
 c) between 10 : 00 am to 10 : 30 am d) between 10 : 30 am to 11 : 30 am

Solution:

The person stop on the way between
 9 : 45 am to 10 :15 am

42. During which period did he ride the fastest?

a) between 8 am to 9 am

c) between 10 : 00 am to 10 : 30 am

Solution:

He ride the fastest between 8 am to 9 am.

b) between 9 am to 10 am

d) between 10 : 30 am to 11 : 30 am

43. Find the values A, B, C in the following.

$$\begin{array}{r} 9 \overline{) 4AB \ (5C} \\ \underline{- 45} \\ 3B \\ \underline{- 36} \\ 0 \end{array}$$

Then what is the value of?

a) 10

b) 14

c) 16

d) 18

Solution:

In the given division method,

$$A - 5 = 3 \Rightarrow A = 8$$

$$B - 6 = 0 \Rightarrow B = 6$$

$$\text{And } 3b = 9c \Rightarrow c = 4$$

$$\therefore A + B + C = 8 + 6 + 4 = 18$$

44. If y denotes the digit at hundreds place of the numbers 67 y 19, such that the number is divisible by 11.

The value of y is

a) 3

b) 5

c) 4

d) 7

Solution:

Given number is 67y19.

$$\text{Sum of odd digits} = 6 + y + 9 = 15 + y$$

$$\text{Sum of even digits} = 15 + y - 8 = 7 + y$$

Since, above difference will be multiple of 11.

$$\therefore 7 + y = 11$$

$$y = 4$$

45. Find three whole numbers a, b & c such that $a + b + c = a \times b \times c$, then what is the value of $a^2 + b^2 + c^2$?

a) 14

b) 15

c) 16

d) 17

Solution:

$$\text{Since } a + b + c = a \times b \times c$$

Consider $a = 1, b = 2$ and $c = 3$

Which satisfy the given condition

$$\begin{aligned} \therefore a^2 + b^2 + c^2 &= (1)^2 + (2)^2 + (3)^2 \\ &= 1 + 4 + 9 = 14 \end{aligned}$$

46. $3 + 32y - 8y^2$ is equal to

a) $(1 - 8y)(3 + y)$

b) $(1 + 8y)(3 - y)$

c) $(1 - 8y)(y - 3)$

d) $(8y - 1)(y + 3)$

Solution:

$$3 + 32y - 8y^2$$

$$\begin{aligned}
 &= -8y^2 + 23y + 3 \\
 &= -(8y^2 - 23y - 3) \\
 &= -(8y^2 - (24 - 1)y - 3) \\
 &\quad \text{[by splitting middle term]} \\
 &= -(8y^2 - 24y + y - 3) \\
 &= -(8y(y - 3) + 1(y - 3)) \\
 &= -(8y + 1)(y - 3) \\
 &= (8y + 1)(3 - y)
 \end{aligned}$$

47. A motor can starts with a speed of 70 km/hr with its speed increasing every 2 hrs by 10 km/hr. In how many hours will it cover 345 kms?

- a) $2\frac{1}{4}$ hrs b) 4 hrs 5 min c) $4\frac{1}{4}$ hrs d) 3hrs

Solution:

A motor car has a speed of 70 km/h in first two km.

∴ It covers a distance in first two hours

$$= 70 \times 2 = 14 \text{ km}$$

[Distance = Speed × Time]

In next two hours, it speed will be 70 + 10 = 80 km/h

∴ Distancce cover in two hours = 80 × 2 = 160 km

Again in next two hours, it speed will be 80 + 10 = 90 km/h

∴ Distance cover in $\frac{1}{2}$ hours = $\frac{90}{2}$ km/h

Total time to cover 345 km = Time taken in first 140 km + Time taken in next 160 km + Time taken in next 45 km.

$$= 2 + 2 + \frac{1}{2} = 4\frac{1}{2} \text{ hr}$$

48. $\left(\frac{1}{4}X^2 - \frac{1}{2}X - 12\right) \div \left\{\frac{1}{2}X - 4\right\}$ is equal to

- a) $\left(X + \frac{3}{2}\right)$ b) $\frac{x}{2} + 3$ c) $(2x + 3)$ d) $\left(\frac{1}{2}X + 3\right)$

Solution:

$$\left(\frac{1}{4}X^2 - \frac{1}{2}X - 12\right) \div \left\{\frac{1}{2}X - 4\right\} = \frac{x^2 - 2x - 48}{\frac{x-8}{2}}$$

$$= \frac{x^2 - (8-6)x - 48}{(x-8) \times 2}$$

[by splitting middle term]

$$= \frac{x^2 - (8-6)x - 48}{2(x-8)}$$

$$= \frac{x(x-8) + 6(x-8)}{2(x-8)}$$

$$= \frac{(x-8) + (x+6)}{2} = \frac{x+6}{2}$$

$$= \frac{x}{2} + 3$$

49. 1200 soldiers in a fort had enough food for 28 days. After 4 days, some soldiers were transferred to another fort and thus the food lasted now for 32 more days. How many soldiers left the fort?

- a) 300 b) 400 c) 200 d) 100

Solution:

Let the number of soldiers left the fort be x

The according to the given condition,

$$1200 \times 24 = x \times 32$$

$$\Rightarrow x = \frac{1200 \times 24}{32} \Rightarrow x = 300$$

50. If the perimeter of an isosceles right triangle is $(6 + 3\sqrt{2})$ m, then the area of the triangle is
a) 54 m^2 b) 81 m^2 c) 9 m^2 d) 4.5 m^2

Solution:

Let equal sides of a right isosceles triangle be a unit & third be b unit

Perimeter of an isosceles triangle = $2a + \sqrt{2}a$

[\because Hypotenuse = $\sqrt{a^2 + a^2} = \sqrt{2}a$]

$$\Rightarrow 6 + 3\sqrt{2} = 2a + \sqrt{2}a$$

$$\Rightarrow 3(2 + \sqrt{2}) = a(2 + \sqrt{2})$$

$$\Rightarrow a = 3\text{m}$$

\therefore Area of right isosceles triangle

$$= \frac{1}{2}a^2 = \frac{1}{2} \times (3)^2 = \frac{9}{2} = 4.5\text{m}^2$$

SECTION 'II' – ENGLISH

51. The correctly punctuated sentence is:
a) He asked me, "whether I had done my work". b) He asked me, "whether I had done my work"?.
c) He asked me whether I had done my work? d) He asked me whether I had done my work.
52. Which of the following will be the correct indirect speech if the statement given below is changed into it?
He said, "I shall leave these papers here."
a) He said that he would leave those papers there. b) He said that he should leave those papers there.
c) He said that he would leave these papers there. d) He said that he would leave those papers here.
53. The correct passive form of the following sentence is:
They asked me my name.
a) My name was asked me by them. b) I was asked my name.
c) Me was asked my name by them. d) My name was asked from them.
54. The correct meaning of the word 'calamity' is:
a) disaster b) scourge c) harm d) injury
55. 'Red Letter Day' means:
a) a dangerous day b) a rosy day c) an important day d) a bloody day
56. The correct antonym of the word 'assets' is:
a) liabilities b) estate c) responsibilities d) hindrances
57. The plural form of 'alumnus' is:
a) alumnuses b) alumna c) alumnae d) alumni

58. 'Alma Mater' is the place where one:
a) studied b) married c) died d) was born
59. Identify the part which contains an error in the following sentence.
Ten miles are not a long distance.
a) ten miles b) are not c) a long distance d) no error
60. Choose the correct order to make the sentence below meaningful.
(1) History of India/(2) than/(3) was there a/ (4) Mahatma Gandhi/(5) never in the/(6) greater man.
a) 124356 b) 634521 c) 513126 d) 513624
61. Fill in the blank with a suitable Phrase Preposition.
He accepted the car his claim for Rs 3,25,000.
a) on account of b) by dint of c) in lieu of d) because of
62. The suitable prefix for the word "bitter" is:
a) im b) in c) un d) em
63. Fill in the blank with a suitable Conjunction.
He is slow, _____ he is sure.
a) and b) for c) but d) or
64. Complete the following maxim.
Genius without education is like silver in the
a) shop b) mine c) Well d) pit
65. Select the word that is opposite in meaning to the underlined word.
My first lecture in the classroom was a fiasco.
a) success b) joy c) fun d) disaster
66. The right suffix for the word 'just' to make it an abstract noun is:
a) -ly b) -ify c) -ice d) -ing
67. Select the word that is similar in meaning to the underlined word.
The requisite energy is derived from the battery.
a) insignificant b) necessary c) different d) special
68. Select the word that is similar in meaning to the underlined word.
His candid opinion has won him many friends.
a) kind b) courteous c) generous d) frank
69. Select the word that is opposite in meaning to the underlined word.
Everyone agreed that it was a piece of meticulous research.
a) careless b) careful c) cautious d) scrupulous
70. The word 'avert' means:
a) avoid b) fall c) hatred d) degenerate

71. The adjective form of 'boast' is:

- a) boastful b) beastly c) boasty d) boastile

Direction: Read the following passage and answer the questions that follow.

Vehicles do not move about the roads for mysterious reasons of their own. They move only because people want them to move in connection with the activities which the people are engaged in. Traffic is therefore a 'function of activities', and because, in towns, activities mainly take place in buildings, traffic in towns is a 'function of buildings'. The implications of this line of reasoning are inescapable.

72. Line 1 of the passage means that the vehicles move on the roads:

- a) for reasons difficult to explain. b) to serve specific purposes of people.
c) in a haphazard fashion. d) in ways beyond our control.

73. The author says that traffic is a 'function of activities'. He means that:

- a) human activities are taking place. b) human activities are dependent on traffic.
c) traffic is not dependent on human activities. d) traffic is connected with human activities.

74. The author suggests by his argument that:

- a) to regulate traffic, more policemen have to be employed.
b) to regulate activities, traffic has to be controlled.
c) to regulate traffic, buildings have to be taken into consideration.
d) to understand the traffic problem, we must examine the social context in which it is found.

75. By 'this line of reasoning', the author means:

- a) idea contained in this line. b) idea contained in any one line of his argument.
c) the manner of arguing. d) this row of printed characters.

SECTION 'III' – GENERAL SCIENCE

76. Tungsten (a transition element being a metal exhibits the following properties:

- (I) It is sonorous
(II) It possesses high tensile strength
(III) It possesses high melting point
(IV) It has high density

Which of the above property/properties of Tungsten made it a suitable material for the filament of an electric bulb?

- a) I, II and III b) II and III c) Only III d) II, III and IV

77. Hepatitis-B is caused due to:

- a) Virus b) Protozoa c) Bacteria d) Fungi

78. The production of an exact copy of an animal by asexual reproduction is known as:

- a) Cloning b) Mating c) Budding d) Hatching

79. The device which can be used to detect very small current following in an electric circuit is:
a) LEAD b) MCB c) LED d) None of these
80. Which of these unicellular organisms has no definite shape?
a) Amoeba b) Paramecium c) Euglena d) Bacteria
81. Which is a thermosetting plastic?
a) Polythene b) Melamine c) PVC d) Nylon
82. Solution of which of the following oxides in water will change the color of blue litmus to red?
a) Sulphur dioxide b) Magnesium oxide c) Iron oxide d) Copper oxide
83. In India, PCRA advises how to save petrol/diesel while driving. For this, PCRA gave several tips. Here, PCRA stands for:
a) Pollution Control Research Association b) Petroleum Conservation Research Association
c) Petroleum Collection and Reserve Association d) None of the above
84. An electrolyte is:
a) a metal b) a solution c) a liquid that conducts current d) All of the above
85. As the angle between two plane mirrors is decreasing gradually, the number of images of an object placed between them:
a) first increases then decreases b) first decreases then increases
c) increases d) decreases
86. Purest form of carbon is:
a) Coal b) Charcoal c) Coke d) All of these
87. Value of one light year in S.I unit is:
a) 1.5×10^{11} m b) 9.46×10^{51} m c) 1.5×10^{15} m d) 9.46×10^{12} m
88. Which of the following liquids does not conduct electricity?
(I) Lemon juice
(II) Sugar solution
(III) Distilled water
(IV) Dilute Hydrochloric acid
a) I, II and IV b) Only III c) Only IV d) III & IV
89. I-Fungi, II-Bacteria
Consider the following statements and find the correct one:
a) II are small prokaryotes while I are large celled eukaryotes with defined mitochondria and other organelles.
b) I have a sexual reproduction through conjugation and transformation but II through genetic recombination.
c) II have a sexual reproduction through conjugation and transformation but I through genetic recombination.
d) All of the above

90. When the applied force is doubled and the object is still at rest, friction becomes:
a) **doubled** b) halved c) quadrupled d) zero
91. Oxides of which statement(s) is/are present in acid rain?
(I) Carbon
(II) Nitrogen
(III) Sulphur
a) I and II b) II and III c) I and III **d) I, II and III**
92. Which of the following tools would a farmer use to remove weeds from the field?
a) **Hoe** b) Plough c) Axe d) Cultivator
93. _____ are the smallest micro-organisms which can develop only inside the cell of the _____ Organism. They do not respire, feed, grow, excrete or move on their own but they cannot _____ When they are outside the _____ cell, they behave as _____.
Choose the correct order to fill in the blanks:
a) Bacteria, Host, Multiply, Animal, Living b) Virus, Bacteria, Reproduce, Living, Non-living
c) Virus, Host, Exchange gases, Living, Non-living **d) Virus, Host, Reproduce, Living, Non-living**
94. In the process of vulcanization, Natural rubber is treated with an element X to improve its properties. The element X can be:
a) Carbon b) Nitrogen **c) Sulphur** d) Phosphorus
95. The standard value of atmospheric pressure is:
a) 78 cm of Hg **b) 76 mm of Hg** c) 45 cm of Hg d) 0.76 cm of Hg
96. The sound from a mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. What is the time period of vibration?
a) 2 s **b) 0.002 s** c) 0.02 s d) 0.2 s
97. The change in focal length of an eye lens to focus the image of objects at varying distances is done by the action of:
a) Pupil b) Iris c) Retina **d) Ciliary muscles**
98. Which cell organelle is called the Power House of a cell?
a) Lysosomes b) Golgi bodies **c) Mitochondria** d) Ribosomes
99. The dramatic changes in body features associated with puberty are mainly because of the secretions of:
(I) Thyroxine
(II) Estrogen
(III) Adrenalin
(IV) Testosterone
a) I and II b) II and III c) I and III **d) II and IV**
100. The earth rotates around its axis. The sun appears to rise in the east. Venus rotates in the opposite direction of Earth. We can therefore assume that on Venus, the sun sets in the:
a) East b) West c) North d) South

SECTION 'IV' – SOCIAL SCIENCE

101. Who became the Nawab of Bengal after the death of Alivardi Khan?
a) Murshid Quli Khan b) Mir Jafar c) Sirajuddaulah d) Mir Qasim
102. FIR means:
a) Final Information Report b) First Information Report
c) Full Information Report d) First Investigation Report
103. How many MPs are elected to the Rajya Sabha?
a) 272 b) 250 c) 245 d) 233
104. What is the meaning of 'media sets the agenda'?
a) Media supports the government
b) Media directs the people to agitate
c) Media shapes our thoughts by giving more importance to some issues
d) Media criticizes the government
105. The process in which different crops are grown in alternate rows is known as:
a) Crop rotation b) Intercropping c) Terrace farming d) Contour cropping
106. Which of the following statements is/are correct?
(1) 'Diwani' is the right to collect revenue
(2) 'Faujdar adalat' refers to a civil court
(3) Richard Wellesley implemented the Subsidiary Alliance
Select the correct answer using the codes given below:
a) 1 only b) 1, 2 and 3 c) 1 and 3 only d) 2 and 3 only
107. Which type of farming is practiced to meet the needs of a farmer's family?
a) Subsistence Farming b) Organic Farming c) Commercial Farming d) Mixed Farming
108. Biotic resources are:
a) made by human beings b) derived from living things
c) derived from non-living things d) None of the above
109. Separation of religion from the state means:
a) Communalism b) Democracy c) Secularism d) All of the above
110. Arrange the following events of the Indian Freedom Movement in correct sequence beginning from the earliest:
(1) The Non-Cooperation Movement (2) Quit India Movement
(3) The Rowlatt Satyagraha (4) The March to Dandi
Select the correct answer using the code given below:
a) 3-1-4-2 b) 1-2-3-4 c) 3-1-2-4 d) 1-3-2-4

111. The Young Bengal Movement was led by:
a) Swami Vivekananda
b) Keshab Chandra Sen
c) William Jones
d) Henry Louis Vivian Derozio
112. _____ refers to the court declaring that a person is not guilty of the crime which he/she was tried for by the court.
a) Appeal
b) Acquit
c) Accuse
d) None of these
113. Which of the following pairs is NOT correctly matched?
(1) Nana Saheb – Kanpur
(2) Rani Lakshmbai – Jhansi
(3) Kunwar Singh – Lucknow
(4) Bakht Khan -Delhi
Select the correct answer using the codes given below:
a) 1 and 3
b) 3 only
c) 4 only
d) 2 and 3
114. Which one of the following is a leading producer of copper in the world?
a) Bolivia
b) Ghana
c) Peru
d) Zimbabwe
115. AMUL stands for:
a) Anand Milk Union Limited
b) Anand Milk United Limited
c) Anand Mazdoor Union Limited
d) Ahmedabad Milk Union Limited
116. How many permanent members are there in the UN Security Council?
a) Three
b) Four
c) Five
d) Six
117. Cultivation on planter's won land was referred to as:
a) Ryoti
b) Mahalwari
c) Batai
d) Nij
118. Which of the following is a secondary activity?
a) Transport
b) Farming
c) Obtaining sugar from sugarcane
d) Bee keeping
119. Which one of the following is not a factor of soil formation?
a) Topography
b) Soil texture
c) Climate
d) Time
120. Viceroy partitioned Bengal in
a) Curzon
b) Minto
c) Irwin
d) Mountbatten
121. The leaders of the Khilfat agitation were:
a) Sayyid brothers
b) Ali brothers
c) Both A and B
d) None of these
122. Which of the following is not a fundamental right of citizens of India?
a) Right to equality
b) Right to education
c) Right to properly
d) Right to freedom
123. The complain about the problem of hygiene & sanitation, a person living in a big city should go to:
a) Municipal Corporation
b) Municipal Committee
c) Nagar Panchayat
d) Zila Parishad

124. The Supreme Court was established on:

- a) 26 January, 1950
- b) 15 August, 1947
- c) 26 November, 1949
- d) 15 August, 1950

125. Which one of the following refers to the tomb of a Sufi Saint?

- a) Idgah
- b) Khanqah
- c) Dargah
- d) None of these

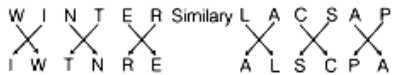
SECTION 'V' – INTELLIGENCE

Directions: Choose the letters group that best represents a relationship similar to the one expressed in the original pair of letters groups.

126. WINTER: IWTNRE : LACSAP : ?

- a) PASCAL
- b) SPLACA
- c) ALSCPA
- d) LACSPA

Solution:



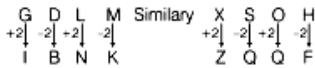
∴ ? = ALSCPA

127. GDLM : IBNK : XSOH : ?

- a) ZQQF
- b) WTMO
- c) APQF
- d) ZQLF

Solution:

As,



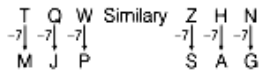
∴ ? = ZQQF

128. TQW is to MJP as ZHN is to:

- a) SAG
- b) GSA
- c) YGM
- d) TEG

Solution:

As,



∴ ? = SAG

129. WEIGHT is related to KILOGRAM in the same way as DISTANCE is related to:

- a) GRAM
- b) POUND
- c) LENGTH
- d) KILOMETER

Solution:

As, kilogram is the measurement unit of weight, similarly kilometre is the measurement unit of distance.

Directions: Which number completes the second pair in the same way as the first pair?

130. 26 : 5 :: 65 : ?

- a) 6
- b) 7
- c) 8
- d) 9

Solution:

Ad, $26 - 1 = 25$

and $\sqrt{25} = 5$

Similarly, $65 - 1 = 64$

and $\sqrt{64} = 8$

131. 16 : 56 :: 36 : ?

a) 96

b) 112

c) 118

d) 128

Solution:

As, $16^2 = 256$

Now, 2 56 \rightarrow 56 (last two digits)

Similarly, $36^2 = 1296$

Now, 12 96 \rightarrow 96 (last two digits)

Directions: In the given series, find the next/missing term.

132. AT, BS, CR, DQ, ?

a) EP

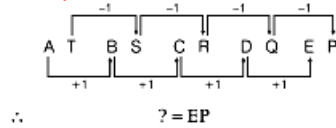
b) FP

c) ED

d) EN

Solution:

The pattern is as follows.



133. 4, 9, 16, 25, ?, 49

a) 50

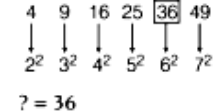
b) 36

c) 64

d) 39

Solution:

The pattern is as follows



134. 0, 1, ?, 27, 64

a) 16

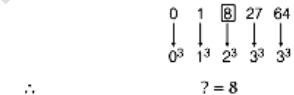
b) 32

c) 4

d) 8

Solution:

The pattern is as follows

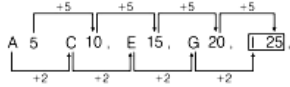


135. A 5, C 10, E 15, G 20, ?

- a) H 30 b) I 30 c) I 25 d) H 25

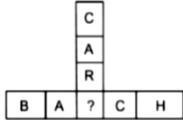
Solution:

The pattern is as follows.



∴ ? = I 25

136. Insert a letter which completes both the words given below:

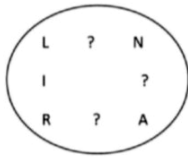


- a) T b) K c) V d) L

Solution:

Letter T will complete both the words as BA **T** CH and CA R**T**

137. Insert the missing terms in the figure, so that the word formed is the name of a country when read clockwise direction.



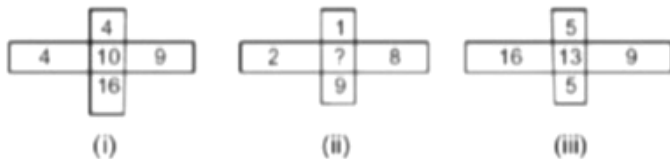
- a) SAA b) SAK c) APR d) PLC

Solution:

SR I L **A** N **K** A

So, the missing letters are S, A and K

138. Find the number that replaces the question mark.



- a) 12 b) 6 c) 5 d) 7

Solution:

In first figure

$$(4 \times 16) + (4 \times 9) = 64 + 36 = 100$$

$$\text{Now, } \sqrt{100} = 10$$

In third figure,

$$(16 \times 9) + (5 \times 5) = 144 + 25 = 169$$

$$\text{Now, } \sqrt{169} = 13$$

Similarly, In second figure

$$(2 \times 8) + (1 \times 9) = 16 + 9 = 25$$

$$\text{Now, } \sqrt{25} = 5$$

139. In a class of 30 students, Swati's rank is 11th from the top, what is her rank from the bottom?

- a) 19th b) 20th c) 22nd d) 21st

Solution:

Swati's rank from top = 11th

∴ Number of students after Swati

$$= 30 - 11 = 19$$

∴ Swati's rank from the bottom

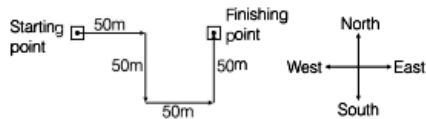
$$= 19 + 1 = 20$$

140. Ritu walks 50 m towards East, then turns to her right and walks 50 m, now she turns left and walks another 50 m, now again she turns left and walks another 50 m. In which direction is she from the starting point?

- a) East b) North c) North-East d) South-West

Solution:

According to the question, the direction



It is clear from the above diagram that Ritu is in East direction from the starting point in the end.

141. Find the fourth proportional to 3, 7 and 9.

- a) 23 b) 27 c) 21 d) None of these

Solution:

Let the fourth proportional = x

$$3 : 7 :: 9 : x$$

$$\Rightarrow \frac{3}{7} = \frac{9}{x}$$

$$\therefore \text{Fourth proportional } x = \frac{9 \times 7}{3} = 21$$

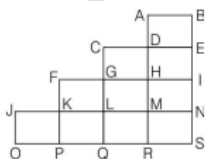
142. Count the number of squares in the given figure:



- a) 14 b) 13 c) 10 d) None of these

Solution:

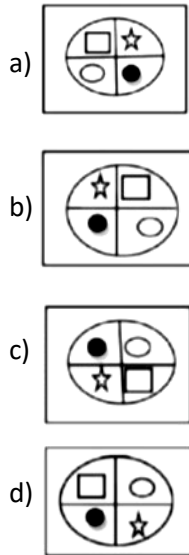
The figure can be represented as



The above figure has following 13 squares.

ABED, CDHG, DEIH, FGLK, GHML, HINM, JKPO, KLQP, LMRQ, MNSR, CENL, FHRP & GISQ

143. Choose the figure, which is different from others.



Solution:

Except figure (d) in all other figures the square and black dot are diagonally opposite to each other but they are adjacent in figure (d). Hence, figure (d) is different from others.

144. What is the sequence of the following when arranged in a dictionary?

- 1) Telegraph 2) Telephone 3) Teleprinter 4) Telemetry 5) Telepathy
 a) 14532 b) 14253 c) 14523 d) 14325

Solution:

The arrangement of given words according to dictionary is as follows

Telegraph → Telemetry → Telepathy → Telephone → Teleprinter ie, 1, 4, 5, 2, 3

145. CLOCK is 42145, LEAN is 2068, CARE is 4690, then NECKLACE is

- a) 80546240 b) 6054842 c) 80452640 d) 50842604

Solution:

As,

C	L	O	C	K	L	E	A	N
↓	↓	↓	↓	↓	↓	↓	↓	↓
4	2	1	4	5	2	0	6	8

and,

C	A	R	E
↓	↓	↓	↓
4	6	9	0

Similarly,

N	E	C	K	L	A	C	E
↓	↓	↓	↓	↓	↓	↓	↓
8	0	4	5	2	6	4	0

146. Which among the following year is a leap year?

- a) 2500 b) 2800 c) 2600 d) 2700

Solution:

As we know that Leap year in the form of a century are exactly divisible by 400. So, among the given alternatives only 2800 is a Leap year.

Directions: In each of the following questions, find the word which cannot be made from the letters of the given word.

147. CARPENTER

- a) NECTAR b) CARPET c) PAINTER d) REPENT

Solution:

The word PAINTER can not be made from the letters of the given word because the letter I is not present in the given word CARPENTER.

148. REASONABLE

- a) BRAIN b) BONES c) NOBLE d) ARSON

Solution:

The word BRAIN can not be made from the letters of the given word because the letter I is not present in the given word REASONABLE

149. If '÷' stands for '×', '×' stands for '+'. '+' stands for '-', then what is the value of $7 \div 21 \times 81 + 9 - 3 \times 14$?

- a) 210 b) 240 c) 230 d) 280

150. Determine the term that would replace the question mark.



- a) 36 b) 41 c) 35 d) 45

Solution:

In first figure, $25 + 24 = 49$

And $\sqrt{49} = 7$

In second figure $5 + 4 = 9$ and $\sqrt{9} = 3$

Similarly in second figure

$$? + 40 = 9^2$$

$$\Rightarrow ? = 81 - 40$$

$$\therefore ? = 41$$