

148. Difference of percentages of maximum marks obtained by two candidates = 32% - 20% = 12%  
 Difference of scores between two candidates = 30 = 42 = 72  
 12% of maximum marks = 72

$$\text{Maximum marks} = \frac{72 \times 100}{12} = 600$$

$$\text{Pass marks} = 20\% \text{ of } 600 = 30 = 120 + 30 = 150$$

$$\text{Required percentage} = \frac{150}{600} \times 100 = 25\%$$

141. Water content in 40 L of mixture

$$= 40 \times \frac{10}{100} = 4 \text{ L}$$

$$\text{Milk content} = 40 - 4 = 36 \text{ L}$$

Let  $x$  L of water is mixed.

$$\frac{4+x}{40+x} = \frac{20}{100}$$

$$\frac{4+x}{40+x} = \frac{1}{5}$$

$$\Rightarrow \frac{4+x}{40+x} = \frac{1}{5}$$

$$\Rightarrow 20 + 5x = 40 + x$$

$$\Rightarrow 4x = 20$$

$$\Rightarrow x = 5 \text{ L}$$

142.  $(a+b+c)^2 - (a-b-c)^2$

$$= (a+b+c+a-b-c)(a+b+c-a+b+c)$$

$$= 2a(2b+2c) = 4a(b+c)$$

143. The given expression

$$= 999 \frac{995}{999} - \frac{995}{999}$$

$$= \left( 999 + \frac{995}{999} \right) - \frac{995}{999}$$

$$= 999 + 999 - \frac{995}{999} = 999$$

$$= (1000 - 1) - 999 + 995$$

$$= 999000 - 999 + 995 = 999000 - 4 = 998996$$

144.  $OB = 5$  cm and  $AB = 7$  cm



$$OA = \sqrt{AB^2 - OB^2}$$

$$= \sqrt{49 - 25}$$

$$= 2\sqrt{6}$$

$$AC = 2OA = 2 \times 2\sqrt{6} = 4\sqrt{6}$$

$$\text{Hence, area of rhombus} = \frac{1}{2} \times 10 \times 4\sqrt{6}$$

$$= 20\sqrt{6} \text{ cm}^2$$

145.  $d_1 = 32$  cm and  $d_2 = 24$  cm

$$\therefore AO = 16 \text{ cm and } OB = 12 \text{ cm}$$



$$AB = \sqrt{OA^2 + OB^2} = \sqrt{256 + 144}$$

$$= \sqrt{400} = 20$$

$$\therefore \text{Perimeter of rhombus} = 4 \times AB$$

$$= 4 \times 20 = 80 \text{ cm}$$

146. Distance covered by A to cross a field diagonally

$$= 52 \times \frac{15}{60} = 13 \text{ m}$$

And distance covered by B to cross a field along its side

$$= 68 \times \frac{15}{60} = 17 \text{ m}$$

Let  $l$  and  $b$  be the length and breadth of field.

$$\therefore l^2 + b^2 = 169 \quad \dots(1)$$

$$\text{and } l + b = 17 \quad \dots(2)$$

$$\Rightarrow (l+b)^2 = 289$$

$$\Rightarrow l^2 + b^2 + 2lb = 289$$

$$\Rightarrow 169 + 2b = 289$$

$$\Rightarrow 2b = 120$$

$$\therefore \text{Area of field} = 60 \text{ m}^2$$

147. Total number of students playing cricket

$$= 38 + 40 + 12 + 17 + 25 + 18 + 20 = 170$$

$$\text{Required percentage} = \frac{25}{170} \times 100 = 14.706 \approx 15$$

148. Required ratio = 27 : 18 = 3 : 2

149. Looking at the table, we find Cricket is the most popular game.

150. Total number of student of class X playing different games

$$= 5 + 12 + 7 + 21 + 18 + 8 + 11 + 33 = 115$$

Required percentage

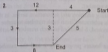
$$= \frac{21}{115} \times 100 = 18.26 \approx 18\%$$

# Hints and Solutions

1. House



So, the answer is East.



3. The movements of Sanjeev from A to F are as shown in figure given below



Clearly, Sanjeev's distance from starting point A

$$\begin{aligned} &= AF = (AB + BF) \\ &= AB + (BE - EF) = AB + (CD - EF) \\ &= [10 + (20 - 10)] \text{ m} = (10 + 10) \text{ m} = 20 \text{ m} \end{aligned}$$

Also, F lies to the South of A.

So, Sanjeev is 20 m to the South of his starting point.

4. The first, third and sixth letters of the word are each moved two steps forward; the second, fifth and seventh letters are each moved two steps backward, while the fourth letter is moved one step forward to obtain the corresponding letters of the code.

8. Due to letter 'M', the word TERMITE cannot be formed from the original word.

7. In the given coding system, we have

Letter	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Code	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31

So, the code for BOIL is 5, 31, 19, 25.

8. Let the number of questions attempted correctly be  $x$ .

Then, number of incorrect ones =  $(60 - x)$

$$\therefore 4x - 3(60 - x) = 130 \Rightarrow 5x = 190 \Rightarrow x = 38$$

8. Here, the pattern is  $x^2 - x$ .

$$\text{Or, } 3^2 - 3 = 27 - 3 = 24$$

$$\text{Similarly, } 5^2 - 5 = 25 - 5 = 20$$

10. As 'Sorrow' is antonym of 'Joy', similarly 'Pleasure' is antonym of 'Pain'.

11. 'Quais' is an area with water and trees etc in 'desert', similarly 'Island' is a piece of land surrounded by sea-water.

12. If we rotate direction indicator through  $135^\circ$  in clockwise direction the pointer indicating West would show North-East direction.



Similarly, if we rotate the direction indicator through  $135^\circ$  in clockwise direction, South will become North-West.



Similarly,



Similarly,



Similarly,



16.  $R = 18 \rightarrow Z = 20$



Similarly,



17.  $7 \ 5 \ 0 \ 4 \rightarrow 5 \ 3 \ 6 \ 2$



Similarly,



18. Except grass, all others can be obtained from animals.

19. Sport are organized in ground cinema is shown on screen. Drama is played on stage. But rubber is used to erase writings on paper. So, it is different pair.

20. Except pair 33-56, in all others the sum of digits of one number is equal to the sum of digits of all the second numbers.

21.  $E - 1 = D, H - 1 = G, L - 1 = K, O - 1 = N$

$$Q - 1 = P, T - 1 = S$$

$$\text{but } U + 1 = V, T - 1 = S$$

22.  $Q + 3 = T + 3 = W + 3 = Z$

$$Z + 3 = C + 3 = F + 3 = I$$

$$G + 3 = J + 3 = M + 3 = P$$

$$\text{But } 1 + 1 = J + 4 = N + 4 = R$$

23.  $2 + 3 = 5, 5 + 1 = 6, 1 + 7 = 8$

$$6 - 1 = 1, 8 - 6 = 2$$

$$2 + 9 = 11 \rightarrow 1 + 1 = 2$$

$$5 + 7 = 12 \rightarrow 1 + 2 = 3$$

$$1 + 4 = 5$$

$$3 - 2 = 1, 5 - 3 = 2$$

24. Except 161, the sum of the digits of each of the numbers is an odd number.

25. Only option (a) follows a certain rule as the gap between each of the letter in this group is (+1).

26. Anguish, Asmate, Animosity, Ankle, Arrozance

27. Praise, Preach, Proceeds, Precept, Precinct

28. This is a series formed by the group of letter a, b and c in cyclic order starting with 'a'. We have the group of letters abc, bac and cab coming one after the other continuously.

29. This is a simple subtraction series. Each number is 35 less than the previous number.

30. This is an alternating addition and subtraction series. In the first pattern, 10 is subtracted from each number to arrive at the next. In the second, 5 is added to each number to arrive at the next.

31. In this series, the letters progress by 2 and the numbers increase by 2.

32. 1st letter  $A \xrightarrow{-2} C \xrightarrow{-2} E \xrightarrow{-2} G \xrightarrow{-2} I$

2nd letter  $Z \xrightarrow{-2} X \xrightarrow{-2} V \xrightarrow{-2} T \xrightarrow{-2} R$

33. The correct pattern is + 6, + 12, + 24, + 48, + 96 and + 192.

So, 96 is wrong and it must be replaced by  $(46 + 48)$  i.e., 94.

34. When Ravi's brother was born, let Ravi's father's age =  $x$  yr and mother's age =  $y$  yr

Then, sister's age =  $(x - 28)$  yr

$$\text{So, } x - 28 = 4 \text{ or } x = 32$$

Ravi's age =  $(y - 26)$  yr.

Age of Ravi's brother =  $(y - 26 + 3)$  yr =  $(y - 23)$  yr

Now, when Ravi's brother was born, his age = 0, i.e.,  $y - 23 = 0$  or  $y = 23$

35. Clearly, number of students in the class =  $(8 + 1 + 37) = 46$ .

37. Clearly, from 1 to 100, there are ten numbers with 3 as the unit's digit—3, 13, 23, 33, 43, 53, 63, 73, 83 and 93 and ten numbers with 3 as the ten's digit—30, 31, 32, 33, 34, 35, 36, 37, 38 and 39.

So, required number =  $10 + 10 = 20$

38. Clearly, the black cards are either clubs or spades while the red cards are either diamonds or hearts.

Let the number of spades be  $x$ . Then, number of clubs =  $(7 - x)$

Number of diamonds =  $2 \times$  number of spades =  $2x$

Number of hearts =  $2 \times$  number of diamonds =  $4x$

Total number of cards =  $x + 2x + 4x + 7 - x = 6x + 7$

$$6x + 7 = 13 \Rightarrow 6x = 6 \Rightarrow x = 1$$

Hence, number of clubs =  $(7 - x) = 6$

39.  $48 + 4 + 7 - 8 \times 2 = x$

$$12 + 7 - 8 \times 2 = x$$

$$12 + 7 - 16 = x$$

$$19 - 16 = x$$

$$\therefore x = 3$$

42. 2004 is a leap year and so February has 29 days.  
Now, 1st, 8th, 15th, 22nd and 29th February are  
Wednesday.

So, 1st march is Thursday and therefore, 3rd March is  
Saturday.

43. In the first row,  $(85 + 5) + 3 = 20$

In the second row,  $(126 + 6) + 3 = 24$

In the third row, missing number =  $(175 + 7) + 3$   
=  $(25 + 3) = 28$

44. In the first row,  $\frac{12}{4} = \frac{21}{7}$

In the second row,  $\frac{10}{5} = \frac{4}{2}$

Clearly, in the third row, we have  $\frac{64}{8} = \frac{24}{3}$

∴ Missing number = 83

45. At 5 o'clock, the minute hand is 25 min spaces apart. The  
two hands will be 5 min apart between 5 and 5 : 30, if the  
minute hands is  $(25 - 5) \times c$ , 20 min spaces behind the hour  
hand.

Now, 55 min are gained in 60 min.

20 min are gained in  $\left(\frac{60}{55} \times 20\right)$  min  
=  $\left(\frac{240}{11}\right)$  min  
=  $21 \frac{9}{11}$  min

∴ The hands will be 5 min apart at  $21 \frac{9}{11}$  min past 5.

46. The movements of Radhika are as shown in figure given  
below (A to B, B to C, C to D and D to A.)



Clearly, she is finally moving in the direction DA i. e.,  
North-West.



Some flowers are white. Some clothes are white.  
But flowers and clothes are entirely different things.



$$191. \sqrt{0.01} + \sqrt{0.81} + \sqrt{1.21} + \sqrt{0.0009}$$

$$= \sqrt{\frac{1}{100}} + \sqrt{\frac{81}{100}} + \sqrt{\frac{121}{100}} + \sqrt{\frac{9}{10000}}$$

$$= \frac{1}{10} + \frac{9}{10} + \frac{11}{10} + \frac{3}{100}$$

$$= 0.1 + 0.9 + 1.1 + 0.03$$

$$= 2.13$$

$$192. \sqrt{(272)^2 - (128)^2}$$

$$= \sqrt{12 \times 12 \times 20 \times 20}$$

$$= 12 \times 20 = 240$$

193. we know that  $x^2 + a^2$  has a factor as  $x + a$  when  $a$  is an odd  
number.

Therefore,  $17^2 + 11^2$  and  $13^2 + 11^2$  has a common factor as  
 $(13 + 11) = 24$ .

194. Let the number =  $x$

According to question,

$$\frac{3}{2}x - \frac{x}{3/2} = 10$$

$$\Rightarrow \frac{3x}{2} - \frac{2x}{3} = 10$$

$$\Rightarrow \frac{9x - 4x}{6} = 10$$

$$\Rightarrow x = \frac{10 \times 6}{5} = 12$$

$$195. \therefore \sqrt{3} = 1.732$$

$$\sqrt[3]{2} = 1.259$$

$$\sqrt{2} = 1.414$$

$$\text{and } \sqrt[3]{4} = 1.587$$

∴ It is clear that from the given number  $\sqrt[3]{2}$  is least.

$$196. (\sqrt{3.5} + \sqrt{2.5})(\sqrt{3.5})^2 - \sqrt{8.75} + (\sqrt{2.5})^2$$

$$= 3.5 + 2.5$$

$$= 6$$

197. Let the CP of one article = ₹  $x$   
and CP of another article = ₹  $y$

According to question,

$$15\% \text{ of } x = 20\% \text{ of } y$$

$$\Rightarrow \frac{15x}{100} = \frac{20y}{100}$$

$$\Rightarrow 3x = 4y$$

This shows that the price of articles can be ₹ 80 and ₹ 60.

198. Let the agent sells the cloth worth ₹  $x$ , then 2.5% of  $x = 12.50$

$$\Rightarrow x = \frac{12.50 \times 100}{2.5} = ₹ 500$$

$$199. \text{Cost price of one balloon} = ₹ \frac{10}{12}$$

$$\text{and selling price of one balloon} = ₹ \frac{12}{10}$$

$$\text{Profit} = ₹ \left( \frac{12}{10} \cdot \frac{10}{12} \right)$$

$$= ₹ \left( \frac{144 - 100}{120} \right) = ₹ \frac{44}{120}$$

$$\therefore \text{Profit per cent} = \frac{44/120}{10/12} \times 100\% = 44\%$$

118. There is always a loss which is

$$\frac{10 \times 10}{100} = 1\%$$

111. Given that,

$$1 + \frac{1}{1 + \frac{1}{\left( \frac{1}{x+1} \right)}} = \frac{11}{7}$$

$$\text{Or } 1 + \frac{1}{\left\{ 1 + \frac{x}{1+x} \right\}} = \frac{11}{7}$$

$$\text{Or } \frac{1 + \frac{1+x}{1+2x}}{1+2x} = \frac{11}{7}$$

$$\text{Or } \frac{1+2x+1+x}{1+2x} = \frac{11}{7}$$

$$\text{Or } \frac{2+3x}{1+2x} = \frac{11}{7}$$

$$\text{Or } 14 + 21x = 11 + 22x$$

$$\text{Or } x = 14 - 11 = 3$$

112. Let the cost price of item = ₹  $x$

$$\therefore 80\% \text{ of } x = 84$$

$$\text{Or } \frac{x \times 80}{100} = 84$$

$$\text{Or } x = \frac{100 \times 84}{80} = ₹ 105$$

$\therefore$  Profit on selling item for ₹ 126

$$= 126 - 105 = ₹ 21$$

$$\therefore \text{Profit Per cent} = \frac{21 \times 100}{105} = 20\%$$

$$113. 1 + \frac{2}{1 + \frac{2}{3}} = 1 + \frac{2}{1 + \frac{2}{9}}$$

$$= 1 + \frac{18}{24} = \frac{24+18}{24}$$

$$= \frac{42}{24} = \frac{7}{4}$$

$$114. (256)^{0.16} \times (256)^{0.09}$$

$$= (256)^{0.16} \times (256)^{0.09}$$

$$= (256)^{0.16+0.09} = (256)^{0.25}$$

$$= (4)^{\frac{1}{4}} = 4$$

115. Suppose,

$$P = 100$$

$$CI = 225$$

$$A = P \left( 1 + \frac{r}{100} \right)^T$$

$$\text{Or } 225 = 100 \left( 1 + \frac{r}{100} \right)^2$$

$$\text{Or } \frac{225}{100} = \left[ 1 + \frac{r}{100} \right]^2$$

$$\text{Or } \left( \frac{1+r}{100} \right) = \frac{\sqrt{225}}{\sqrt{100}}$$

$$\text{Or } 1 + \frac{r}{100} = \frac{15}{10}$$

$$\text{Or } \frac{100+r}{100} = \frac{15}{10}$$

$$\text{Or } 100+r = 150$$

$$\text{Or } r = 50\%$$

$$116. ? = 1 - [5 - (2 + (-1)2)]$$

$$= 1 \times [5 - (2 - 2)]$$

$$= 1 - [5 - 0] = 1 - 5$$

$$= -4$$

117. Let the width of rectangle =  $x$  cm

$\therefore$  Length of rectangle =  $3x$  cm

$$\therefore 8\sqrt{10} = \sqrt{(9+1)x^2}$$

$$\Rightarrow x = 8 \text{ cm}$$

$\therefore$  Length of rectangle = 24 cm

and breadth of rectangle = 8 cm

$\therefore$  Perimeter of rectangle =  $2(24 + 8) = 64$  cm

$$118. \text{Per cent change} = 25 - 20 = \frac{25 \times 20}{100}$$

$$= 25 - 20 = 0\%$$

119. Let the length of rectangle =  $3x$  cm

and the breadth of rectangle =  $2x$  cm

$$\therefore 2(3x + 2x) = 20$$

$$\Rightarrow x = 2$$

$\therefore$  Length of rectangle = 6 cm

and breadth of rectangle = 4 cm

$$\therefore \text{Area of rectangle} = 6 \times 4 = 24 \text{ cm}^2$$

$$120. \text{Per cent change} = -10 + 10 = \frac{10 \times 10}{100} = -1\%$$

$$121. \therefore \frac{A_1}{A_2} = \frac{225}{256}$$

$$\Rightarrow \left( \frac{a_1}{a_2} \right)^2 = \frac{225}{256} = \left( \frac{15}{16} \right)^2$$

$$\Rightarrow \frac{a_1}{a_2} = \frac{15}{16}$$

$$\therefore \text{Ratio of their perimeter} = \frac{4a_1}{4a_2} = \frac{a_1}{a_2} = \frac{15}{16}$$