

# Hints and Solutions

1. The female members in the family are mother, wives of 3 married sons, unmarried daughter and two daughters of each of the two sons.

- No. of female members in the family  
 $= (1 + 3 + 1 + 2 \times 2) = 9$

2. The given words when arranged in order of various events as they occur in a man's life, form the sequence; Birth, Education, Marriage, Death, Funeral. Thus, the correct order is 1, 5, 4, 2, 3.

3. The number of players who play Football and Hockey = 15

4.  $\text{C H I J K L M N O P Q R S T U V W X Y Z A B C D E F}$   
 $\text{R} \qquad \qquad \text{6} \qquad \qquad \text{-2} \qquad \qquad \text{4} \qquad \qquad \text{2}$   
 $\qquad \qquad \qquad \text{-2} \qquad \qquad \qquad \text{-2}$

5. War, Wasp, Waste, Wrinkle, Wreat  
 6. Clearly, refugees are people forced out of their homeland by some misery and need shelter desperately. So, argument II holds. Argument I against the statement, is vague.

7. Only the word 'ROME' can be formed from the original word.

8. Due to absence of letter 'U' the word 'MUNDANE' can not be formed from the original word.

9. Let  $A = 1, B = 2, C = 3, \dots, X = 24, Y = 25, Z = 26$ .

Then,  $M = 13 = 1 + 3 = 4$ ;  
 $O = 15 = 1 + 5 = 6$ ;  $H = 2$ ;  $I = 9$ ;  $L = 12 = 1 + 2 = 3$ ;  
 $T = 20 = 2 + 0 = 2$ ;  $Y = 25 = 2 + 5 = 7$ .  
 So, MOBILITY = 46293927.

Similarly,  $X = 24 = 2 + 4 = 6$ ;  $N = 14 = 1 + 4 = 5$

So, EXAMINATION = 56149512965.

11. The first letter of the word is moved one step forward to obtain the first letter of the code, while the other letters remain unaltered.

LUTE  $\rightarrow$  MUTE, FATE  $\rightarrow$  GATE,  
 $\downarrow +1 \qquad \qquad \downarrow +1$

BLUE  $\rightarrow$  CLUE  
 $\downarrow +1 \qquad \qquad \downarrow +1$

12. Room is a part of the house. Similarly, nation is a part of the world.

13.  $A \xrightarrow{-3} D \xrightarrow{+4} H \xrightarrow{-5} M$   
 $\xrightarrow{-3} W \xrightarrow{-4} S \xrightarrow{-5} N$

Similarly,  
 $C \xrightarrow{+3} F \xrightarrow{-4} J \xrightarrow{-5} O$   
 $\xrightarrow{-3} V \xrightarrow{-4} R \xrightarrow{-5} T$

14. Atoms combine to form molecule; Similarly, Cells combine to form tissue.

15.  $R \quad D \quad K \quad U \quad \rightarrow \quad U \quad M \quad F \quad T$   
 $\downarrow +2 \qquad \downarrow +2 \qquad \downarrow +2$   
 $\downarrow +2 \qquad \downarrow +2 \qquad \downarrow +2$

Similarly,

$V \quad H \quad B \quad P \quad \rightarrow \quad P \quad D \quad J \quad X$   
 $\downarrow +2 \qquad \downarrow +2 \qquad \downarrow +2$   
 $\downarrow +2 \qquad \downarrow +2 \qquad \downarrow +2$

16. Here, the relationship is

$$x^3 : (x+1)^3 + 1$$

or,  $2^3 : (2+1)^3 + 1$

$\Rightarrow 8 : 27 + 1 = 8 : 28$

Similarly,  $3^3 : (3+1)^3 + 1$

Or,  $27 : 64 + 1 = 27 : 65$

17. Here, the relationship is  $x : x^5$  or,  $3 = 3^5$

or,  $3 \times 3 \times 3 \times 3 \times 3 = 243$

Similarly,  $5 : 5^5 \Rightarrow 5 \times 5 \times 5 \times 5 \times 5 = 3125$

18. All the other pairs of words indicate similar kind of things.

19.  $\begin{matrix} \downarrow & \downarrow & \downarrow & \downarrow \\ \text{A Y B Z} & \text{B X C Y} & \text{D V E W} & \text{M P O N} \end{matrix}$  But

All the group of letters are complementary to each other except the last one.

20. In all the other pairs one is kept on/in other.

21.  $R \xrightarrow{-3} U \xrightarrow{-5} Z \xrightarrow{+7} G$

$G \xrightarrow{-3} J \xrightarrow{+5} O \xrightarrow{+7} V$

$I \xrightarrow{-3} L \xrightarrow{+5} Q \xrightarrow{+7} X$

But,

$B \xrightarrow{+4} F \xrightarrow{+4} J \xrightarrow{-7} Q$

22. Except in number pair 164-41, in all the others, the second number is one third of the first number.

$\frac{117}{3} = 39, \frac{198}{2} = 99, \frac{213}{3} = 71$

But,  $\frac{164}{4} = 41$

23. Except the number 210, all other numbers are perfect squares.

$12 \times 12 = 144, 13 \times 13 = 169, 14 \times 14 = 196$

24. All the three numbers in this given set are prime numbers.

25.  $\begin{matrix} \text{U} & \text{C} & \text{D} & \text{E} & \text{F} & \text{G} & \text{H} & \text{J} & \text{K} & \text{L} & \text{M} & \text{N} & \text{O} & \text{P} & \text{Q} & \text{R} \\ \downarrow 3 & & \downarrow 3 & & & & & \downarrow 3 & & & & & \downarrow 5 & & & \downarrow 5 \end{matrix}$

1, 3, 5 are all odd numbers.

26. The sum of numbers of each column is 15.

$4 + 3 + 8 = 15$ ;

$9 + 5 + 1 = 15$  and  $2 + 7 + 7 = 15$

$\therefore ? = 15 - 9 = 6$



28. The series is a**bb**/a**bb**/a**bb**/a**bb**. Thus, the pattern 'abb' is repeated.

29. The series is t**st**/t**st**/t**st**/t**st**. Thus, the pattern 'ts' is repeated.

123. 1 man = 2 women = 3 boys

∴ 1 man + 1 woman + 1 boy = 3 boys +  $\frac{3}{2}$  boys + 1 boy

Boys	Days
$\frac{3}{11}$	55
$\frac{1}{2}$	$x$
↑	↓

⇒  $\frac{x}{55} = \frac{3}{11 \times 2}$

⇒  $x = \frac{3 \times 2}{11} \times 55 = 30$  days

124. Given number is 222222.

Here, sum of digits = 2 + 2 + 2 + 2 + 2 + 2 = 12 which is divisible by 3.

∴ So, given number is divisible by 3.

Now, sum of odd terms of digits = 5 and sum of even terms of digits = 6 - 5 = 1. It is divisible by 11.

∴ Since, in a number a digit repeated six times, then this number is divisible by 7, 11 and 13.

∴ The given number is divisible by 3, 7 and 11.

125. Required numbers are of the form of  $12q - 2$

i.e., 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

∴ Total sum = 10 + 22 + 34 + 46 + 58 + 70 + 82 + 94 = 416

126. Dividend =  $D = Q \times R$

Given,  $D = 5Q$  and  $D = 2R$

When  $R = 15$ ,  $D = 2 \times 15 = 30$

∴  $Q = \frac{D}{5} = \frac{30}{5} = 6$

∴ Dividend =  $30 \times 6 = 180$

127. Present populations after 1 yr      Next year

$x$        $x + 20\%$  of  $x$        $x \left( x + \frac{x}{5} \right) - 20\%$  of  $\left( x + \frac{x}{5} \right)$

$x$        $\left( x + \frac{x}{5} \right)$        $\frac{4}{5} \left( x + \frac{x}{5} \right)$

By given condition,  $\frac{4}{5} \left( x + \frac{x}{5} \right) = 5184$

⇒  $\frac{4}{5} \times \frac{6x}{5} = 5184$

⇒  $x = \frac{5184 \times 25}{24} = 5400$

128. Let number be  $x$ , then its reciprocal be  $\frac{1}{y}$

By given condition,

$x^2 + \frac{1}{x^2} = 3 \left( x^2 - \frac{1}{x^2} \right)$

∴  $x^2 + \frac{1}{x^2} = 3x^2 - \frac{3}{x^2}$

⇒  $2x^2 = \frac{4}{x^2}$

⇒  $x^4 = 2 \Rightarrow x = \sqrt[4]{2}$

129. Given  $P^x = r^y$

⇒  $r = P^{x/y}$       (i)

and  $Q^y = r^x$

⇒  $r = Q^{y/x}$       (ii)

From Eqs. (i) and (ii)

$P^{x/y} = Q^{y/x} \Rightarrow \frac{x}{y} = \frac{y}{x} \Rightarrow xy = y^2$

130. ∴  $1.34 = \frac{134 - 1}{99} = \frac{133}{99}$

and  $4.12 = \frac{412 - 41}{90}$

$= \frac{371}{90}$

∴  $1.34 + 4.12 = \frac{133}{99} + \frac{371}{90}$

$= \frac{1130 + 4081}{990}$

$= \frac{5411}{990} = 5 \frac{461}{990}$

131. Let the person invest amount  $x$  and  $y$  into two different rates of interest.

∴  $\frac{x \times 12 \times 1}{100} + \frac{y \times 10 \times 1}{100} = 130$       (∵ SI =  $\frac{PRT}{100}$ )

⇒  $12x + 10y = 13000$       (i)

and  $\frac{y \times 12 \times 1}{100} + \frac{x \times 10 \times 1}{100} = 134$

⇒  $12y + 10x = 13400$       (ii)

On solving Eqs. (i) and (ii), we get

$x = ₹ 500$  and  $y = ₹ 700$

132. By given condition,

P% of  $x = z$  (or of  $y$ )

∴  $\frac{xP}{100} = \frac{yQ}{100}$

⇒  $\frac{x}{y} = \frac{Q}{P}$

∴  $x : y = Q : P$

133. Let initial salary = ₹ 22x

Final salary = ₹ 25x

Let initial number of employees = 3y

Final number of employees = 2y

∴ Present bill = Final salary × Final number of employees

⇒  $5000 = 2x \times 2y$

⇒  $\frac{5000}{50} = xy$

⇒  $xy = 100$

Original bill = Initial salary × Initial number of employees

$= 22x \times 3y$

$= 66xy = 66 \times 100 = ₹ 6600$

$$134. \text{ Here, } 52 - 33 = 78 - 59$$

$$= 117 - 98 = 19$$

$$\text{Now, } 52 = 13 \times 2 \times 2$$

$$78 = 13 \times 2 \times 3$$

$$117 = 13 \times 3 \times 3$$

$$\therefore \text{ LCM} = 13 \times 2 \times 2 \times 3 \times 3 = 468$$

$$\therefore \text{ Required number} = 468 - 19 = 449$$

Hence, sum of digits is 17

135. Let distance between A and B =  $x$  km

By given condition,

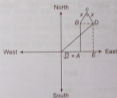
$$\frac{x}{12} - \frac{x}{18} = 2$$

$$\Rightarrow 6x = 2 \times 18 \times 12$$

$$\Rightarrow x = \frac{2 \times 18 \times 12}{6} = 72 \text{ km}$$

Hence, required distance = 72 km

136. In  $\Delta BCD$ ,



$$BD^2 = BC^2 + CD^2 = x^2 + x^2$$

$$\Rightarrow BD = \sqrt{2} x$$

$$\Rightarrow BD = AE = \sqrt{2} x$$

$$\therefore OE = OA + AE \\ = \sqrt{2} \cdot x + \sqrt{2} \cdot x \\ = 2\sqrt{2} x$$

$$\therefore BA = DE = x$$

$\therefore$  In  $\Delta ODE$ ,

$$OD^2 = OE^2 + DE^2$$

$\therefore$  Minimum distance

$$OD = \sqrt{(2\sqrt{2} \cdot x)^2 + x^2} \\ = \sqrt{8x^2 + x^2} = 3x \text{ km}$$

137. Time taken =  $\frac{\text{Distance}}{\text{Speed}}$

Let distance travel by person from A to B be  $x$  km

$$\therefore \frac{x}{4} + \frac{x}{3} = \frac{x(3+4)}{12} = \frac{7x}{12} \Rightarrow x = 12 \text{ km}$$

138. Two successive discounts

$$= 36\% + \frac{36 \times 4}{100} = 38.56\%$$

$$\therefore \text{ Difference between discounts} = 40\% - 38.56\% = 1.44\%$$

$$\therefore \text{ Required difference} = 10000 \times 1.44\%$$

$$= \frac{10000 \times 1.44}{100} = \text{₹}144$$

139. Let cost price = ₹  $x$

$$\text{Marked price} = \frac{x \times 110}{100} = \text{₹} \frac{11x}{10}$$

$$\therefore \text{ SP} = \frac{11x}{10} \times \frac{90}{100} = \frac{99x}{100}$$

$\therefore$  Required gain/Loss per cent

$$= \frac{100}{x} \cdot x - 100 = -1\% \text{ (loss)}$$

140. Given,  $x^4 + \frac{1}{x^4} = 322$

$$\Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 - 2 = 322$$

$$\Rightarrow \left(x^2 + \frac{1}{x^2}\right)^2 = 324 = 18^2$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 18$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 + 2 = 18 \Rightarrow x - \frac{1}{x} = 4$$

141. Let  $a$  and  $b$  be the length and breadth of rectangle.

$$\therefore \text{ Area of rectangle, } A_1 = a \times b$$

$$\text{New length} = \frac{a}{2} \text{ and new breadth} = 3b$$

$$\therefore \text{ Area of rectangle, } A_2 = \frac{3}{2} ab$$

$$\text{change} = \frac{3}{2} ab$$

$$\text{change} = \frac{1}{2} ab$$

$$\text{change} = \frac{1}{2} ab \times 100\% = 50\%$$

142.  $\therefore P_1 = 24 \text{ cm}$

$$\therefore a_1 = 6 \text{ cm}$$

$$\text{and } P_2 = 32 \text{ cm}$$

$$\therefore a_2 = 8 \text{ cm}$$

$$\therefore \text{ Area of first square } 6^2 = 36 \text{ cm}^2$$

$$\text{and area of second square } 8^2 = 64 \text{ cm}^2$$

$$\therefore \text{ Area of third square} = 36 + 64 = 100 \text{ cm}^2$$

$$\therefore \text{ Length of third square} = 10 \text{ cm}$$

$$\Rightarrow \text{ Perimeter of third square} = 40 \text{ cm}$$

143. Length of garden = 12 m

and breadth of garden = 5 m

$$\therefore \text{ Area of square garden } 12 \times 5 = 60 \text{ m}^2$$

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

$$\therefore \text{ Side of this square garden} = \sqrt{60} = 2\sqrt{15}$$

$$\begin{aligned} \therefore \text{Length of diagonal of square garden} \\ = 2\sqrt{15} \times \sqrt{2} = 2\sqrt{30} \text{ m} \end{aligned}$$

144. Length of diagonal of square = 452 cm

$$\therefore \text{Side of square} = 4 \text{ cm}$$

$$\therefore \text{Area of square} = 16 \text{ cm}^2$$

$$\therefore \text{Area of another square} = 32 \text{ cm}^2$$

$$\therefore \text{Side of this square} = \sqrt{32} = 4\sqrt{2}$$

$$\therefore \text{Diagonal of this square} = 4\sqrt{2} \times \sqrt{2} = 8 \text{ cm.}$$

145.  $(0.01024)^{\frac{1}{5}} = \left(\frac{1024}{100000}\right)^{\frac{1}{5}}$

$$= \left[\left(\frac{2}{10}\right)^5\right]^{\frac{1}{5}} = \frac{2}{10} = 0.2$$

146. Required difference

$$\begin{aligned} &= (\sqrt{12} + \sqrt{18}) - (\sqrt{3} + \sqrt{2}) \\ &= 2\sqrt{3} + 3\sqrt{2} - \sqrt{3} - \sqrt{2} \\ &= \sqrt{3} + 2\sqrt{2} \end{aligned}$$

147. Total cost = ₹ 60000

$$\text{Amount spent on cement}$$

$$= ₹ \frac{72}{360} \times 60000 = ₹ 12000$$

148. Amount spent on labour

$$= \frac{90}{360} \times 60000$$

$$= ₹ 15000$$

$$\text{Amount spent on steel}$$

$$= \frac{54}{360} \times 60000$$

$$= ₹ 9000$$

$$\text{Difference} = 15000 - 9000$$

$$= ₹ 6000$$

(i.e., 10% of the total cost.)

149. Amount spent on cement, steel and supervision

$$= \frac{(72 + 54 + 54)}{360} \times 100\%$$

$$\therefore \text{Required percentage}$$

$$= \frac{180}{360} \times 100\% = 50\%$$

150. Difference in angle of labour and supervisor

$$= 90^\circ - 54^\circ = 36^\circ$$

$$\therefore \text{Amount} \frac{36^\circ}{360^\circ} \times 60000 = 6000$$