

### Numerical skills

(1)  $x+y = 12$  /  $x^2 + y^2 = 126$ ,  $xy = ?$

$$(x+y)^2 = 12^2$$

$$x^2 + 2xy + y^2 = 144.$$

$$(x^2 + y^2) + 2xy = 144$$

$$\downarrow \\ 126 + 2xy = 144$$

$$2xy = 144 - 126$$

$$2xy = 18$$

$$\therefore xy = \frac{18}{2} = 9 \leftarrow \text{Ans;}$$

(2) 79% of total capacity = 118 million gallons

$\frac{100}{?}$

= ?

$$= \frac{100}{79} \times 118$$

= 149.36 gallons. (Total capacity)

= 149 - 96 gallons (സൂര്യാസ്ത്രം നിന്ന് പാതയാണ്)

Ans;  $\Rightarrow = 53$  gallons.

(3) Walk  $\Rightarrow 1 \text{ min} / \text{block}$

Bicycle  $\Rightarrow 20 \text{ s} / \text{block}$ .

( $\frac{1}{3} \text{ min} / \text{block}$ )

Walk =  $x$  block (1min)

Bicycle =  $\frac{x}{3}$  block. (20s)

$x$  block നും സാധിച്ച് 10 min ദേഹപരിശീലനം

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

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

$$2x = 30$$

$$\Rightarrow x = \frac{30}{2} = 15 \text{ blocks}$$

④ Total charge = ₹ 867.50

each member pair = ₹ 92

members = ?

$$= \frac{867.50}{92}$$

$$= 20 \leftarrow \text{Ans}$$

⑤ 5 series = R, B, Black, white, yellow

5 क्रम अनुक्रम यहाँ

Black यही यहाँ तक है ताकि वहाँ से एक उत्तराधिकारी नियम है -

(5 क्रमांकी अंकी + 5 क्रमांकी अंकी)

$$\begin{aligned} & \left[ \begin{array}{l} 5 \times 1, 5 \times 2, 5 \times 3, 5 \times 4, \\ 5 \times 5, 5 \times 6, 5 \times 7, \\ 5 \times 8, 5 \times 9, \\ 5 \times 10, \\ 5 \times 11, 5 \times 12, \\ 5 \times 13, 5 \times 14, \\ 5 \times 15 \end{array} \right] + 3 \Rightarrow - 7.8 \leftarrow \end{aligned}$$

⑥  $4x+y=8$ ,  $y-3x=7$ ,  $\underline{\underline{x+2y=?}}$

$$y-3x=7$$

$$(y=7+3x) \quad \text{--- ①}$$

$$= x+2y -$$

$$4x+y=8$$

$$= \frac{1}{7} + 2(7+3x)$$

$$4x+7+3x=8$$

$$= \frac{1}{7} + 14 + 6x$$

$$7x+7=8$$

$$= \frac{1}{7} + 14 + \frac{6}{7}$$

$$7x=8-7$$

$$= \frac{1+98+6}{7}$$

$$7x=1$$

$$= \frac{15}{7} \leftarrow \text{Ans}$$

$$x=\frac{1}{7}, \quad \text{--- ②}$$

⑦ Total no. of games =  $G$

09. 283076724.

$$50\% \text{ of } \frac{st}{160} \text{ games won} = 30 \text{ games}$$

$$\text{remaining games} = (G - 60)$$

$$80\% \text{ of remaining game won} = 0.8(G - 60)$$

$$60\% \text{ of Total game won} = 0.6G$$

$$\frac{st}{160} \text{ games (won)} + 0.8(G - 60) = \text{Total no. of game won}$$

$$30 + 0.8G - 48 = 0.6G$$

$$0.8G - 0.6G = 48 - 30$$

$$0.2G = 18$$

$$G = \frac{18}{0.2} = \frac{180}{20} = 90$$

⑧ Revenues =  $R$

$$\text{Marketing} = \frac{1}{4} \times R = \frac{R}{4}$$

$$\text{Remainder} = R - \frac{R}{4} = \frac{4R - R}{4} = \frac{3R}{4}$$

$$\text{For maintenance} = \frac{1}{7} \text{ of remainder}$$

$$\Rightarrow \frac{1}{7} \times \frac{3R}{4} = \frac{3R}{28}$$

Fraction of original revenues =  $\frac{1}{4} \text{ of } R - \text{For maintenance}$

$$= \frac{3R}{4} - \frac{3R}{28}$$

$$= \frac{21R}{28} - \frac{3R}{28}$$

$$= \frac{18}{28} R$$

$$= \frac{9}{14} R$$

$$\textcircled{1} \quad \text{Revenue} = R, \% \text{ profit of } 1999 = ?$$

In 1998

$$\text{Revenue} = 100\%$$

$$\text{Profit} = 10$$

In 1999

$$\text{Revenue} = 100 - 20 = 80\%$$

$$\text{Profit} = 12$$

$$\frac{\text{Profit \% (1999)}}{\text{Profit \% (1998)}} = \frac{\text{Profit } 10}{\text{Profit } 12} = \frac{\text{Revenue } 100\%}{?}$$

$$\frac{\text{Profit \% (1998)}}{\text{Profit \% (1998)}} = \frac{\text{Profit } 12}{?}$$

$$= \frac{12}{10} \times 100\%$$

$$= 12 \times 10 = 120\% \leftarrow$$

$$\textcircled{10} \quad \text{Original speed} = 100\%$$

$$\text{Increased speed} = 20\% \text{ of } \cancel{\text{original}} \text{ increased speed}$$

$$\text{Total speed} = \cancel{\text{original speed}} + \text{increased speed.}$$

$$= 90 +$$

$$\textcircled{10} \quad \text{Original speed} = 100\%$$

$$1^{\text{st}} \text{ increased speed} = 30\% \rightarrow 130 \text{ increased!}$$

$$2^{\text{nd}} \text{ increased speed} = \frac{10\%}{1^{\text{st}} \text{ increased speed}} \times \text{TIS} = \frac{143 - 100}{130} = \underline{\underline{43\%}}$$

$$= 13$$

$$\text{Total final speed} = 130 + 13 = 143$$

$$\frac{\text{Total speed}}{\text{original speed}} = \underline{\underline{143\%}}$$

(1) works 10% fewer hours each week.

1 hr  $\Rightarrow$  10 bears  $\approx$  10%.

with Assistant  $\Rightarrow$  80% more bears

$\Rightarrow$  100% + 80%.

$= 180$  bears.  $\approx$  ~~10%~~

working hours

$= 10\%$  ~~any 2 ps~~

$= 9$  hrs.

(12) loan 150 \$  $\Rightarrow$  12% <sup>interest</sup> (Rate) (For 1 month)

~~For 12 months~~  $\Rightarrow$  ?

Interest  $\Rightarrow$  ~~150~~  $\times \frac{12}{100}$   $150 \times \frac{12}{100}$   
per month  
 $\Rightarrow 18$  \$

Interest + loan  $\Rightarrow 18$  \$ + 150 \$

$\Rightarrow 168$  \$. (1 year).

12 months  $\rightarrow$  ~~18~~ 18 (Interest).

10 months — ?

$\rightarrow \frac{10}{12} \times 18$

$= 15$

$\therefore$  Total amount  $\Rightarrow$  loan + interest for 10 months

$\Rightarrow 150 + 15$

$= 165$  \$  $\Leftarrow$

$$SL : P \Rightarrow 4 : 11$$

$$x : (x+84) = 4 : 11$$

$$\frac{x}{x+84} = \frac{4}{11}$$

$$11x = 4x + 336$$

$$11x - 4x = 336$$

$$7x = 336$$

$$\therefore x = \frac{336}{7} = 48 \leftarrow$$

$$\text{no of CR} = x \quad (?)$$

$$\text{no of incr} = 100 - x$$

$$x - 2(100 - x) = 73$$

$$x - 200 + 2x = 73$$

$$3x = 73 + 200$$

$$3x = 273$$

$$\therefore x = \frac{273}{3} = 91 \leftarrow$$

$$(16) \text{ Sale price} = x.$$

$$S.P.(1) = 200 + 0.04(x-1000) \quad \text{--- ①}$$

$$S.P.(2) = 0.06x \quad \text{--- ②}$$

$$200 + 0.04(x-1000) = 0.06x$$

$$200 + 0.04x - 40 = 0.06x$$

$$240 = 0.06x - 0.04x$$

$$240 = 0.02x$$

$$\frac{240}{0.02} = x, x = \frac{24000}{2} \leftarrow$$

$$160 = 0.02x$$

$$x = \frac{160}{0.02}$$

$$= 8000 \leftarrow$$

$$\begin{aligned}
 (17) \quad x &= 800,000 - 50y, \quad y = 15000 \\
 &= 800000 - 50(15000) \\
 &= 800000 - 750000 \\
 &= 50000
 \end{aligned}$$

$$\begin{aligned}
 \text{Revenue} &= \text{Sale price} \times \text{no. of cars} \\
 &= 15000 \times 50000 \\
 &= 750,000,000 \leftarrow E
 \end{aligned}$$

$$(18) \quad \sqrt{x+1} = 3, \quad (x-3)^2 = ?$$

$$(\sqrt{x+1})^2 = 3^2$$

$$x+1 = 9$$

$$x = 9-1 = 8$$

$$\therefore (x-3)^2 = (8-3)^2 = 5^2 = 25 \leftarrow S$$

$$\begin{aligned}
 (19) \quad x^2 - 2x - 15 &= (x+r)(x+s), \quad r-s=? \\
 x^2 - 2x - 15 &= (x-5)(x+3)
 \end{aligned}$$

$$r = -5, \quad s = 3$$

$$r-s = -5 - 3 = -8$$

$$= -8 + 8 = 0$$

$$= (0.02)(2 + 0.01)$$

$$0.02 \times 2.01 = 0.0402$$

$$0.02 \times 0.01$$

$$0.02 \times 0.01$$

$$\textcircled{19} \quad x^2 - 2x - 15 = (x+3)(x-5)$$

$$x+3 \\ x-5 \quad (x+3)(x-5) = (x+3)(x-5)$$

$$r = 3, s = -5$$

$$r-s = 3 - (-5)$$

$$\Rightarrow 3+5 = 8 \Leftarrow \textcircled{A}$$

$$\textcircled{20} \quad 2.0314 \times 10^x < 210000$$

$$10^x < \frac{210000}{2.0314}$$

$$10^x < 98406.79$$

$$\textcircled{10} \quad < 9.8 \times 10^4$$

$$x = 4.$$

$$\textcircled{20} \quad \begin{array}{l} \text{Or. seat} = a \\ \text{balcony} = b \end{array}$$

$$12a + 8b = 3320$$

$$a + b = 350$$

$$b = 350 - a$$

$$12a + 8(350 - a) = 3320$$

$$= 90 \Leftarrow \textcircled{A}$$

	$12a + 2800$	$-8a + 3320$	
	$\cancel{4a} = 3320 - 2800$		
	$4a = 520$		

$$\Rightarrow a = 130,$$

$$1 < 3x + 5 < 17$$

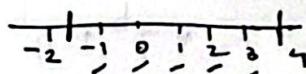
$$1 < 3x + 5 = -4 < 3x$$

$$3x + 5 < 12 = 3x < 12$$

$$-4 < 3x < 12$$

$$-\frac{4}{3} < \frac{3x}{3} < \frac{12}{3}$$

$$-1.3 < x < 4$$



Answer  $\Rightarrow 5$

(23) Profit =  $x$

$$\begin{matrix} 5x & 7x & 8x \\ A & B & C \end{matrix}$$

$$5x = 3500$$

$$x = 700 \Leftarrow$$

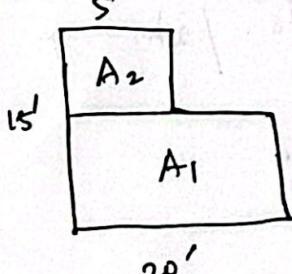
$$7x + 8x = 7(700) + 8(700)$$

(B)  $\text{C.C}$

$$= 4900 + 5600$$

$$= 10500 \Leftarrow \text{(E)}$$

(24)



$$A_1 = 20' \times 8' = 160'$$

$$A_2 = 7 \times 5 = 35$$

$$A_1 + A_2 = 160 + 35 = 195 \Leftarrow$$

(25)

$$6^2 = 3^2 + x^2$$

$$x^2 = 6^2 - 3^2 = 36 - 9$$

$$x^2 = 27$$

$$x = 3\sqrt{3}$$

$$A_1 = \frac{1}{2} b \times h$$

$$\Rightarrow \frac{1}{2} \times 6 \times 3\sqrt{3}$$

$$\Rightarrow 9\sqrt{3}$$

$$A_2 = 9 \times 3$$

$$\Rightarrow 54$$

$$A_{\text{total}} \Rightarrow A_1 + A_2 = [9\sqrt{3} + 54] \Leftarrow \textcircled{B}$$

(26)  $7^b + 7^b + 7^b + 7^b + 7^b + 7^b + 7^b = 7 \times 7^b$

$$\Rightarrow 7^{(1+b)} = 7^{b+1} \Leftarrow \textcircled{B}$$

(27) Room Ar =  $13 \times 26 = 338 \text{ inch}^2$

Ar Rug Ar =  $12 \times 18 = 216 \text{ inch}^2$

Area of uncovered =  $338 - 216$   
 $\Rightarrow 122 \text{ sq. inch} \Leftarrow \textcircled{D}$

(28)

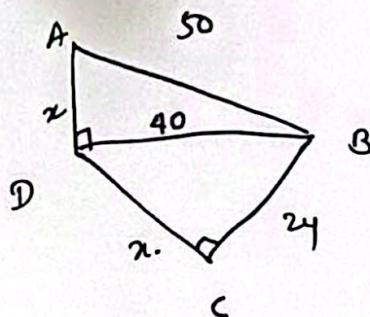
Machine A       $5 \text{ hrs} = 1000 \text{ widgets} / 1 \text{ hr} = 200 \text{ widgets}$

B       $3 \text{ hrs} = 900 \text{ widgets} / 1 \text{ hr} = 300 \text{ widgets}$

$350 \text{ widgets} \rightarrow 1 \text{ hr.}$

$2000 \text{ widgets} \rightarrow ?$

$$\cdot \frac{2000}{350} \times 1 = 5.71 = 5 \frac{7}{7} \text{ hr} \Leftarrow \textcircled{D}$$



$$\Delta ADB = ? \quad \frac{1}{2} \times b \times h$$

=

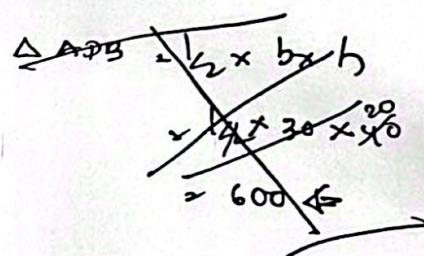
$$50^2 = x^2 + 40^2$$

$$2500 = x^2 + 1600$$

$$x^2 = 2500 - 1600$$

$$x^2 = 900$$

$$x = 30$$



$$\Delta CDB = ?$$

$$= \frac{1}{2} \times b \times h$$

$$40^2 = 24^2 + x^2$$

$$x^2 = 40^2 - 24^2 = 1600 - 576$$

$$x^2 = 1024$$

$$x = \sqrt{1024} = \sqrt{32 \times 32} = 32$$

$$ABCD = 50 + 24 + 30 + 32$$

$$= 136 \Leftarrow \textcircled{E}$$