

## Simplification Questions.

1.  $784 \div 14 + 598 \div 13 + ? = 99\% \text{ of } 2500$ .

$$\frac{784}{14} + \frac{598}{13} + ? = 99 \times \frac{2500}{100}$$

$$56 + 46 + ? = 2475$$

$$x = 2475 - 102 = 2373$$

Hence, option B is correct.

A) 2475

B) 2373

C) 2285

D) 2565

E) None of these.

2.  $221 \div 13 \times \sqrt{576} + 10^2 = ?$

$$221 \div 13 \times \sqrt{576} + 100$$

$$x = 17 \times 24 + 100$$

$$x = 408 + 100 = 508$$

Hence, option D is correct.

A) 628

B) 428

C) 408

D) 508

E) None of these.

$$3) \quad 15^2 + 12^2 = 11^2 + ?$$

$$225 + 144 - 121 = x$$

$$x = 248$$

Hence, option B is correct.

- A) 258      B) 248      C) 262
- D) 282      E) None of these

$$4) \quad 6 \times 6 = 81 \times 3.5 \times ?$$

$$6^4 (6+1) = 81 \times 3.5 \times ?$$

$$2^4 \times 3^4 \times 7 = 3^4 \times 7 \frac{1}{2} \times ?$$

$$? = 2^5 = 32.$$

Hence, option C is correct.

$$5) \quad \frac{\sqrt{1024} + (16 \times 13)}{\sqrt{576}} - 4 + \frac{3}{7} \times 1092 = ?$$

$$\frac{32 + 208}{24} - 4 + 3 + 156 = ?$$

$$\Rightarrow 10 - 4 + 468 = ?$$

$$x = 478 - 4$$

$$\boxed{x = 474}$$

$$6) \quad 15^2 + 17^2 - ? = 21^2$$

$$225 + 289 - x = 441$$

$$x = 225 + 289 - 441$$

$$x = 514 - 441$$

$$\boxed{x = 73}$$

$$7) \quad 0.5 \times 8.4 + 3.5 \times 12.2 + 0.25 \times 10^2 = ?$$

$$x = \frac{1}{2} \times 8.4 + \frac{7}{2} \times 12.2 + \frac{1}{4}, \quad \times 100$$

$$= 4.2 + 42.7 + 25.$$

$$\boxed{x = 71.9}$$

42.7  
4.2  
25.0  
71.9

$$8) \quad 5\frac{1}{5}\% \text{ of } 3000 + 6\frac{1}{3}\% \text{ of } 3000 = ?$$

$$\frac{26}{5} \times \frac{1}{100} \times 3000 + \frac{19}{3} \times \frac{1}{100} \times 3000 = ?$$

$$\Rightarrow \frac{26}{5\phi\phi} \times 30\phi\phi + \frac{19}{3\phi\phi} \times 30\phi\phi = ?$$

$$x = 26 \times 6 + 19 \times 10$$

$$= 156 + 190$$

$$x = 346$$

$$9. \quad 16^{4.5} \times 4^{6.3} \times 8^{2.1} \div 2^{9.2} \times 32^{0.64} = 8^{2.3+?}$$

$$2^{4 \times 4.5} \times 2^{2 \times 6.3} \times 2^{3 \times 2.1} \div 2^{9.2} \times 2^{5 \times 0.64} = 2^{[3 \times 2.3 + 3?]} \\ = 2$$

$$2^{18} \times 2^{12.6} \times 2^{6.3} \div 2^{9.2} \times 2^{3.2} = 2^{(6.9 + 3?)} \\ 2^{(18 + 12.6 + 6.3 - 9.2 + 3.2)} = 2^{(6.9 + 3?)}$$

$$18 + 12.6 + 6.3 - 9.2 + 3.2 = 6.9 + 3?$$

$$30.9 = 6.9 + 3?$$

$$94 = 3?$$

$$x = 8.$$

$$10. ? = \frac{1884}{44} \times \frac{880}{83} \div \frac{340}{414}$$

$$x = \frac{\frac{1884}{44} \times \frac{880}{83}}{\frac{340}{414}}$$

$$= \frac{1884}{44} \times \frac{880}{83} \times \frac{414}{340}$$

$$x = \frac{36}{2} \times 18^9$$

$$\therefore x = 384$$

$$11. \left[ \left( 2811 \div 67 \right)^2 - 21 \times \sqrt{256} \right] \div (549 - 213) = ? \div 1344.$$

$$\left[ (33)^2 - 21 \times 16 \right] \div 336 = \frac{x}{1344}$$

$$(1089 - 336) \div 336 = \frac{x}{1344}$$

$$753 \div 336 = \frac{x}{1344}$$

$$\frac{753}{336} \times 1344 = x$$

$$x = 3012$$

$$12) ?^2 \% \text{ of } 11.11? \text{ of } 256 \times 1872 \div 2704 = 81.$$

$$x^2 \times 1 \div 900 \times 16 \times 1872 \div 52 = 81$$

$$x^2 = 81 \times 900 \times 52 \div 16 \div 1872$$

$$x^2 = \frac{2025}{16}$$

$$x^2 = \frac{45}{4} = 11.25$$

$$x = 11.25.$$

$$13. (37.5 \times 22 \times 48) \div 2^4 - ? = (11)^3$$

$$(37.5 \times 22 \times 48) \div 16 - x = 1331$$

$$\frac{(37.5 \times 22 \times 48)^3}{16} - 1331 = x.$$

$$x = 37.5 \times 22 \times 3 - 1331$$

$$x = 2475 - 1331 = 1144$$

$$x = 1144$$

$$14) 2\sqrt{3} \times 3\sqrt{8} \times 2\sqrt{27} \times 2\sqrt{2} = 2^4 x ?$$

$$2^4 x x = 2\sqrt{3} \times 6\sqrt{2} \times 6\sqrt{3} \times 2\sqrt{2}$$

$$x \times x = 2 \times 6 \times 6 \times 2 \times 3 \times 2$$

$$x = 3 \times 3 \times 3 \times 2 = 54$$

$$x = 54$$

$$15) \frac{1}{1 \times 6} + \frac{1}{6 \times 11} + \frac{1}{11 \times 16} + \frac{1}{16 \times 21} = ?$$

$$x = \frac{1}{5} \left( 1 - \frac{1}{6} + \frac{1}{6} - \frac{1}{11} + \frac{1}{11} - \frac{1}{16} + \frac{1}{16} - \frac{1}{21} \right)$$

$$x = \frac{1}{5} \left( 1 - \frac{1}{21} \right)$$

$$x = \frac{1}{5} \left( \frac{20}{21} \right) = \frac{20}{105}$$

$$x = \frac{4}{21} = \frac{8}{42}$$

$$x = \frac{8}{42}$$

$$16. \left(5175 \div 23\right)^{1/2} + (72 \times 2)^{1/2} = (?)^{1/2}$$

$$\left(\frac{5175}{23}\right)^{1/2} + (144)^{1/2} = (?)^{1/2}$$

$$(985)^{1/2} + 12 = (?)^{1/2}$$

$$15 + 12 = 27 = (?)^{1/2}$$

$$? = 729$$

$$x = 729$$

$$17) \sqrt{15 + ?} = 3^{3/2}$$

$$15 + ?^{1/2} = 3^3$$

$$15 + ?^{1/2} = 27$$

$$?^{1/2} = 27 - 15$$

$$?^{1/2} = 12 \Rightarrow x = (12)^2$$

$$x = 144$$

$$18) \quad 5 \times ? = 735 \div 3.$$

$$5 \times x = \frac{735}{3}$$

$$5 \times x = 245$$

$$x = \frac{245}{5} = 49.$$

$$\boxed{x = 49.}$$

$$19\% \text{ of } 250 + ? = 2^7.$$

$$\cancel{\frac{19}{100}} \times \cancel{250}^5 + x = 2^7$$

$$\frac{19}{100} \times 250 + x = 2^7$$

$$19 \times 2.5 + x = 128.$$

$$x = 128 - (19 \times 2.5)$$

$$= 128 - 47.5$$

$$\boxed{x = 80.5}$$

20.  $50\% \text{ of } \left( 13\frac{1}{10} + 11\frac{1}{10} \right) = ?$

$$\frac{50}{100} \times \left( \frac{131}{10} + \frac{111}{10} \right) = x$$

$$\frac{1}{2} \times \left( \frac{131}{10} + \frac{111}{10} \right) = x$$

$$x = \frac{1}{2} \times (13.1 + 11.1)$$

$$= \frac{1}{2} (24.2)$$

$$= \frac{24.2}{2}$$

$$x = 12.1$$

21.  $600\% \text{ of } \sqrt{\frac{180+81}{5}} \times 12 \div 13^{-1} = ?^2$

$$\frac{600}{100} \times \sqrt{\frac{291}{5}} \times \frac{12}{1/3} = x^2$$

$$6 \times 6 \times 9 \times 12 \times 3 = x^2$$

$$x = 3 \times 6 \times 6$$

$$x = 108$$

$$22. (360 - 15^2) \times 6 - 810 = ? \times 12$$

$$(360 - 225) \times 6 - 810 = x \times 12$$

$$(135) \times 6 - 810 = x \times 12$$

$$810 - 210 = x \times 12$$

$$600 = x \times 12$$

$$x = \frac{600}{12}$$

$$\boxed{x = 50}$$

$$\begin{array}{r} 23 \\ 135 \\ \times 6 \\ \hline 810 \\ 210 \end{array}$$

$$23. 24\% \text{ of } 500 + 30^2 = ? \times 51$$

$$\frac{24}{100} \times 500 + 900 = x \times 51$$

$$\begin{array}{r} 80 \\ 30 \\ \hline 100 \\ 90 \\ \hline 900 \end{array}$$

$$120 + 900 = x \times 51$$

$$1020 = x \times 51$$

$$x = \frac{1020}{51}$$

$$\begin{array}{r} 51 \\ 80 \\ \hline 102 \\ 1020 \end{array}$$

$$\boxed{x = 20}$$

$$24. \quad x = 102 \times \left( \frac{29}{6} \right) - \sqrt{484}$$

$$= \frac{17 \times 102 \times 29}{6} - 22$$

$$= 17 \times 29 - 22$$

$$= 493 - 22$$

$$\boxed{x = 471}$$

$$\begin{array}{r} 88 \\ 88 \\ \hline 44 \\ 44 \\ \hline 484 \end{array}$$

$$\begin{array}{r} 16 \\ 17 \\ 29 \\ \hline 153 \\ 34 \\ \hline 493 \\ 22 \\ \hline 471 \end{array}$$

$$25. \quad ? = 19^2 - 30^2 + 21^2$$

$$x = 19^2 - 30^2 + 21^2$$

$$= 361 - 900 + 441$$

$$= 361 + 441 - 900$$

$$= 802 - 900$$

$$= -98$$

$$\boxed{x = -98}$$

$$\begin{array}{r} 8 \\ 19 \\ 119 \\ \hline 171 \\ 19 \\ \hline 361 \end{array}$$

$$\begin{array}{r} 21 \\ 21 \\ \hline 21 \\ 42 \\ \hline 441 \end{array}$$

26)

$$x = (80 \times 370/100) + (10 \times 510/100)$$

$$= \left( 80 \times \frac{370}{100} \right) + \left( 10 \times \frac{510}{100} \right)$$

$$= (8 \times 37) + 51$$

$$= 296 + 51$$

$$\boxed{x = 347}$$

$$\begin{array}{r}
 37 \\
 8 \\
 \hline
 296 \\
 51 \\
 \hline
 347
 \end{array}$$

27)

$$(26^2 + 12^2) \div 4 + 42\% \text{ of } 1200 = ?$$

$$(676 + 144) \div 4 + \frac{42}{100} \times 1200 = x$$

$$\frac{(676 + 144)}{4} + \frac{42 \times 1200}{100} = x$$

$$\frac{200}{4} + 42 \times 12 = x$$

$$205 + 504 = x$$

$$709 = x$$

$$\boxed{x = 709}$$

$$\begin{array}{r}
 26 \\
 12 \\
 \hline
 156 \\
 52 \\
 \hline
 676 \\
 144 \\
 \hline
 820
 \end{array}$$

$$\begin{array}{r}
 42 \\
 12 \\
 \hline
 184 \\
 42 \\
 \hline
 504
 \end{array}$$

$$28. \quad 1500 + 2000 \div 40 \times 20 = ?$$

$$1500 + \frac{500}{2000} \times 20 = ?$$

$$1500 + 500 \times 2 = x$$

$$1500 + 1000 = x$$

$$x = 2500$$

$$29) \quad 7500 \div 3 + 270 - ? = 10^2$$

$$\frac{7500}{3} + 270 - x = 100$$

$$2500 + 270 - x = 100$$

$$2770 - 100 = x$$

$$x = 2670$$

$$30) \quad ? = 272 \times 33 \div 51 + 32$$

$$= 272 \times \frac{33}{51} + 32$$

$$= 16 \times 11 + 32$$

$$= 176 + 32$$

$$x = 208$$



$$15^2 - ?^2 + 195 + 21^2 = 132$$

$$?^2 = 15^2 + 195 + 21^2 - 132$$

$$= 225 + 195 + 441 - 132$$

$$= 420 + 441 - 132$$

$$= 861 - 132$$

$$\boxed{x = 729}$$



67.5% of 600 + 22.5% of 200 = ?

$$\frac{67.5}{100} \times 600 + \frac{22.5}{100} \times 200 = ?$$

$$\frac{675}{10} \times 60 + \frac{225}{10} \times 20 = x$$

$$\begin{array}{r} 3 \\ 675 \\ \hline 4150 \end{array}$$

$$675 \times 60 + 225 \times 20 = x$$

$$40500 + 4500 = x$$

$$\begin{array}{r} 1 \\ 825 \\ \hline 450 \end{array}$$

$$\boxed{x = 450}$$

$$\begin{array}{r} 4150 \\ 4500 \\ \hline 4500 \end{array}$$

$$\sqrt{676} * \sqrt{289} - ? = 202$$

$$x = \sqrt{676} * \sqrt{289} - 202$$

$$= 26 * 17 - 202$$

$$= 442 - 202$$

$$x = 240$$

$$\sqrt{1156} + \sqrt{676} + 30) * 80\% = ?$$

$$(34 + 26 + 30) * \frac{80}{100} = ?$$

$$90 * \frac{8}{10} = x$$

$$x = 9 * 8$$

$$x = 72$$

$$50/6 \text{ of } 186 + 820 = 4200 - ?$$

$$\frac{50}{6} * 186 + 820 = 4200 - x$$

$$50 * 31 + 8200 = 4200 - x$$

$$1550 + 820 = 4200 - x$$

$$x = 1830$$

⇒ 15% of 300 + 25% = ? × 67

$$\frac{15}{100} \text{ of } 300 + 625 = x \times 67$$

$$\frac{15}{100} \times 300 + 625 = x \times 67$$

$$450 + 625 = x \times 67$$

$$1075 = x \times 67$$

$$x = \frac{670}{67}$$

$$x = 10$$

⇒ 250% of 3650 + 155% of 8600 = ?

$$\frac{250}{100} \times 3650 + \frac{155}{100} \times 8600 = x$$

$$9125 + 13330 = x$$

$$x = 22455$$

$$?^2 = 7168 \div 16 \times 11 + 256$$

$$\begin{aligned} ?^2 &= \frac{7168}{16} \times 11 + 256 \\ &= 448 \times 11 + 256 \\ &= 4928 + 256 \end{aligned}$$

$$?^2 = 5184$$

$$x = \sqrt{5184}$$

$$\boxed{x = 72}$$

$$78\% \text{ of } 500 - 18\% \text{ of } 1950 = 0.5 \times ?$$

$$\frac{78}{100} \times 500 - \frac{18}{100} \times 1950 = 0.5 \times x$$

$$390 - 351 = 0.5 \times x$$

$$39 = 0.5 \times x$$

$$x = \frac{39}{0.5}$$

$$\boxed{x = 78}$$

$$2\frac{5}{11} \times 4\frac{8}{9} + ? = 25\% \text{ of } 232.$$

$$\frac{27}{11} \times \frac{44}{9} + x = \frac{25}{100} \times 232$$

$$12 + x = \frac{232}{4}$$

$$12 + x = 58$$

$$x = 58 - 12$$

$$x = 46$$

$$178\% \text{ of } 450 + 72\% \text{ of } 250 = 39.05\% \text{ of } 2000 + ?$$

$$\frac{178}{100} \times 450 + \frac{72}{100} \times 250 = \frac{39.05}{100} \times 2000 + x.$$

$$810 + 180 = 781 + x.$$

$$x = 981 - 781$$

$$x = 200$$



$$34343 - 3432 - 12644 + 14135 - 18373 = ?$$

$$34343 + 14135 - 3432 - 12644 - 18373 = ?$$

$$x = 14029$$



$$? \times 41 \times 15 = 4900 + 20 = 4920.$$

$$? \times 41 \times 15 = 4920$$

$$x = 4920$$

$$\overline{(41 \times 15)}$$

$$x = 8$$



$$67 \times 4071 \div 69 = ?^2 - 16$$

$$?^2 - 16$$

## Quadratic Equation.

$$1. \text{ I. } 6x^2 - 23\sqrt{3}x + 60 = 0$$

$$\text{II. } 2y^2 + 3\sqrt{3}y - 15 = 0.$$

$$6x^2 - 23\sqrt{3}x + 60 = 0.$$

$$6x^2 - 8\sqrt{3}x - 15\sqrt{3}x + 60 = 0$$

$$2x(3x - 4\sqrt{3}) - 5\sqrt{3}(3x - 4\sqrt{3}) = 0$$

$$(2x - 5\sqrt{3})(3x - 4\sqrt{3}) = 0$$

$$x = 2.5\sqrt{3}, 1.33\sqrt{3}$$

$$2y^2 + 3\sqrt{3}y - 15 = 0$$

$$2y^2 + 5\sqrt{3}y - 2\sqrt{3}y - 15 = 0$$

$$y(2y + 5\sqrt{3}) - \sqrt{3}(2y + 5\sqrt{3}) = 0$$

$$(2y + 5\sqrt{3})(y - \sqrt{3}) = 0$$

Therefore, for any value of  $x$  and any value of  $y$ .

$$x > y$$

Answer

$$\boxed{x > y}$$

Q2)

$$\text{I. } x^2 - 14 - 1714 = 0$$

$$\text{II. } 3y^2 - 63 - 300 = 0.$$

$$x^2 - 14 - 1714 = 0$$

$$x^3 = 1728$$

$$\boxed{x = 12}$$

$$3y^2 - 63 - 300 = 0$$

$$3y^2 = 363$$

$$y^2 = 121$$

$$\boxed{y = \pm 11}$$

Therefore,  $x > y$ .

$$3. \text{ I) } 2x^2 + 3x - 35 = 0$$

$$\text{II) } 4y^2 + 10y - 104 = 0$$

$$2x^2 + 3x - 35 = 0$$

$$2x^2 + 10x - 7x - 35 = 0$$

$$2x(x+5) - 7(x+5) = 0$$

$$(2x-7)(x+5) = 0$$

$$x = 3.5, -5$$

$$4y^2 + 10y - 104 = 0$$

$$4y^2 + 26y - 16y - 104 = 0$$

$$2y(2y+13) - 8(2y+13) = 0$$

$$(2y-8)(2y+13) = 0$$

$$y = 4, -6.5$$

For  $x = 3.5$  and  $y = 4$

$$x < y$$

For  $x = 3.5$  and  $y = -6.5$

$$x > y$$

This relationship cannot be established.

$$4) \text{ I. } x^2 - 0.5x - 39 = 0$$

$$\text{II. } y^2 - 15.5y + 60 = 0.$$

$$x^2 - 0.5x - 39 = 0$$

$$x^2 + 6x - 6.5x - 39 = 0$$

$$x(x+6) - 6.5(x+6) = 0$$

$$(x-6.5)(x+6) = 0$$

$$\boxed{x = 6.5, -6.}$$

$$y^2 - 15.5y + 60 = 0$$

$$y^2 - 8y - 7.5y + 60 = 0$$

$$y(y-8) - 7.5(y-8) = 0$$

$$(y-8)(y-7.5) = 0$$

$$\boxed{y = 7.5, 8.}$$

Therefore, for any value of  $x$  and any value of  $y$

$$\boxed{x < y.}$$

$$5. \quad \text{I) } 35x^2 + 13x - 90 = 0$$

$$\text{II, } 7y^2 + 24y + 20 = 0$$

$$35x^2 + 13x - 90 = 0$$

$$35x^2 + 63x - 50x - 90 = 0$$

$$7x(5x+9) - 10(5x+9) = 0$$

$$(7x-10)(5x+9) = 0$$

$$x = \frac{10}{7}, -\frac{9}{5}$$

$$7y^2 + 24y + 20 = 0$$

$$7y^2 + 14y + 10y + 20 = 0$$

$$7y(y+2) + 10(y+2) = 0$$

$$(y+2)(7y+10) = 0$$

$$y = -2, -\frac{10}{7}$$

$$\text{For } x = -\frac{9}{5} \text{ & } y = -\frac{10}{7} \quad \boxed{x < y}$$

$$\text{For } x = -\frac{9}{5} \text{ & } y = -2 \quad \boxed{x > y}$$

This relationship cannot be determined

$$6. \quad \text{I) } x^2 + 8\sqrt{3}x + 45 = 0$$

$$\text{II) } 3y^2 + 27y + 60 = 0.$$

$$x^2 + 8\sqrt{3}x + 45 = 0$$

$$x^2 + 5\sqrt{3}x + 3\sqrt{3}x + 45 = 0$$

$$x(x + 5\sqrt{3}) + 3\sqrt{3}(x + 5\sqrt{3}) = 0$$

$$(x + 3\sqrt{3})(x + 5\sqrt{3}) = 0$$

$$x = -3\sqrt{3}, -5\sqrt{3}$$

$$3y^2 + 27y + 60 = 0$$

$$3y^2 + 12y + 15y + 60 = 0$$

$$3y(y+4) + 15(y+4) = 0$$

$$(y+4)(3y+15) = 0$$

$$y = -4, -5$$

For  $x = -3\sqrt{3}$  or  $-5\sqrt{3}$

$$y = -4 \text{ or } -5$$

$$\boxed{x < y}$$

7)

$$\text{I) } x^2 - 16x + 63 = 0$$

$$\text{II) } y^2 - 20y + 100 - 1 = 0$$

$$x^2 - 16x + 63 = 0$$

$$x^2 - 9x - 7x + 63 = 0$$

$$x(x-9) - 7(x-9) = 0$$

$$(x-9)(x-7) \geq 0$$

$$x = 7, 9$$

$$y^2 - 20y + 100 - 1 = 0$$

$$y^2 - 11y - 9y + 99 = 0$$

$$y(y-11) - 9(y-11) = 0$$

$$(y-11)(y-9) = 0$$

$$y = 11, 9.$$

For  $x = 11$  or 9 and  $y = 11$ .

$$\boxed{x < y}$$

For  $x = 9$  and  $y = 9$

$$\boxed{x = y}$$

$$\boxed{x \leq y}$$

Answer :  
=

8) I)  $15x^2 + 133x + 220 = 0$

II)  $3y^2 + 19y + 26 = 0$

$$15x^2 + 33x + 20 = 0$$

$$(3x+5)(5x+11) = 0$$

$$(3x+20)(5x+11) = 0$$

$$3x = -20$$

$$x = -\frac{20}{3}$$

$$5x + 11 = 0$$

$$5x = -11$$

$$x = -\frac{11}{5}$$

$$x = -\frac{20}{3}, -\frac{11}{5}$$

$$\boxed{x = -6.67, -2.2}$$

$$3y^2 + 19y + 26 = 0$$

$$3y^2 + 13y + 6y + 26 = 0$$

$$y(3y+13) + 2(3y+13) = 0$$

$$(3y+13)(y+2) = 0$$

$$y = -\frac{13}{3}, -2$$

$$\boxed{y = -4.33, -2}$$

For  $x = -6.67$  and  $y = -4.33$

$$x < y$$

For  $x = -2.2$  and  $y = -4.33$ .

$$x > y$$

This relationship cannot be determined.

9) I)  $x^2 + 12x + 35 = 0$

II)  $y^2 + 15y + 56 = 0$

$$x^2 + 12x + 35 = 0$$

$$x^2 + 7x + 5x + 35 = 0$$

$$x(x+7) + 5(x+7) = 0$$

$$(x+7)(x+5) = 0$$

$$x = -5, -7$$

$$y^2 + 15y + 56 = 0$$

$$y^2 + 7y + 8y + 56 = 0$$

$$y(y+7) + 8(y+7) = 0$$

$$(y+7)(y+8) = 0$$

$$\boxed{y = -7, -8}$$

For  $x = -5$  or  $-7$

$$y = -8$$

$$\boxed{x > y}$$

For  $x = -7$  and  $y = -7$

$$\boxed{x = y}$$

$$\boxed{x \geq y}$$

Answer

10)

$$\text{I) } x^3 - 216 = 0$$

$$\text{II) } y^4 - 625 = 0$$

$$x^3 - 216 = 0$$

$$x^3 = 216$$

$$x = 6$$

$$y^4 - 625 = 0$$

$$y^4 = 625$$

$$y = \pm 5$$

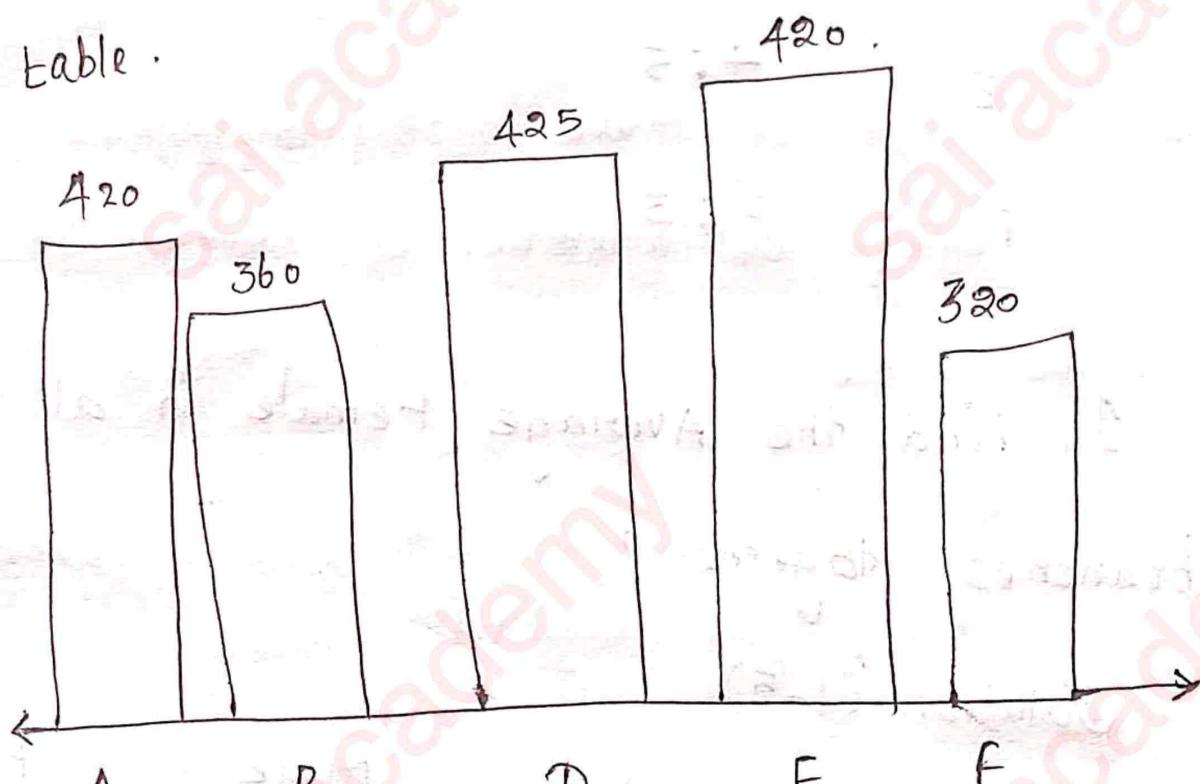
$$x = 6, y = \pm 5$$

Therefore,

$$x \times y$$

## DI Questions.

I) A company has five branches. Number of Employee in five branches is given in the bar Graphs and ratio of Male and female in respective branch is Given in the table.



Total Number of Employee.

Office

Ratio of Male and  
Female Employee

A

4 : 3

B

1 : 2

D

3 : 2

E

4 : 5

F

5 : 3.

1. Find the Average Female in all the branches together?

Solution (1-5)

Branch	Total Employee	Male	Female
A	420	$\frac{420 \times 4}{7} = 240$	180
B	360	$\frac{360 \times 1}{3} = 120$	240
C	425	$\frac{425 \times 3}{5} = 255$	170
E	450	200	250
F	320	200	120

Office

Ratio of Male and  
Female Employee

A

4 : 3

B

1 : 2

D

3 : 2

E

4 : 5

F

5 : 3.

1. Find the Average Female in all the branches together?

Solution (1-5)

Branch	Total Employee	Male	Female
A	420	$\frac{420 \times 4}{7} = 240$	180
B	360	$\frac{360 \times 1}{3} = 120$	240
D	425	$\frac{425 \times 3}{5} = 255$	170
E	450	200	250
F	320	200	120

1. Average Female =  $\frac{(180 + 170 + 240 + 250 + 120)}{5}$   
= 192.

ANSWER = 192

2. Total Male in A and B is what percent  
of total Female in E and F office?

$$\begin{aligned}\text{Required percentage} &= \frac{(840 + 120)}{(850 + 120)} \times 100 \\ &= \frac{360}{370} \times 100 \\ &= 97.29\%\end{aligned}$$

3. Find the difference of average Employee  
in A and E office average Employee in  
B and F office?

$$\text{Required difference is} = \left[ \frac{(420+450)}{2} - \frac{(360+320)}{2} \right]$$

$$= \frac{870}{2} - \frac{680}{2}$$

$$= 95$$

Answer = 95.

4. Number of Male in P is what Percentage of Number of Female of Same office?

Required Percentage is  $\left( \frac{1200}{120} \right) \times 100 = 166.66\%$

5. Find the ratio of Number of Male in B and Number of Female in D?

Required ratio is = 120 : 170

= 12 : 17.

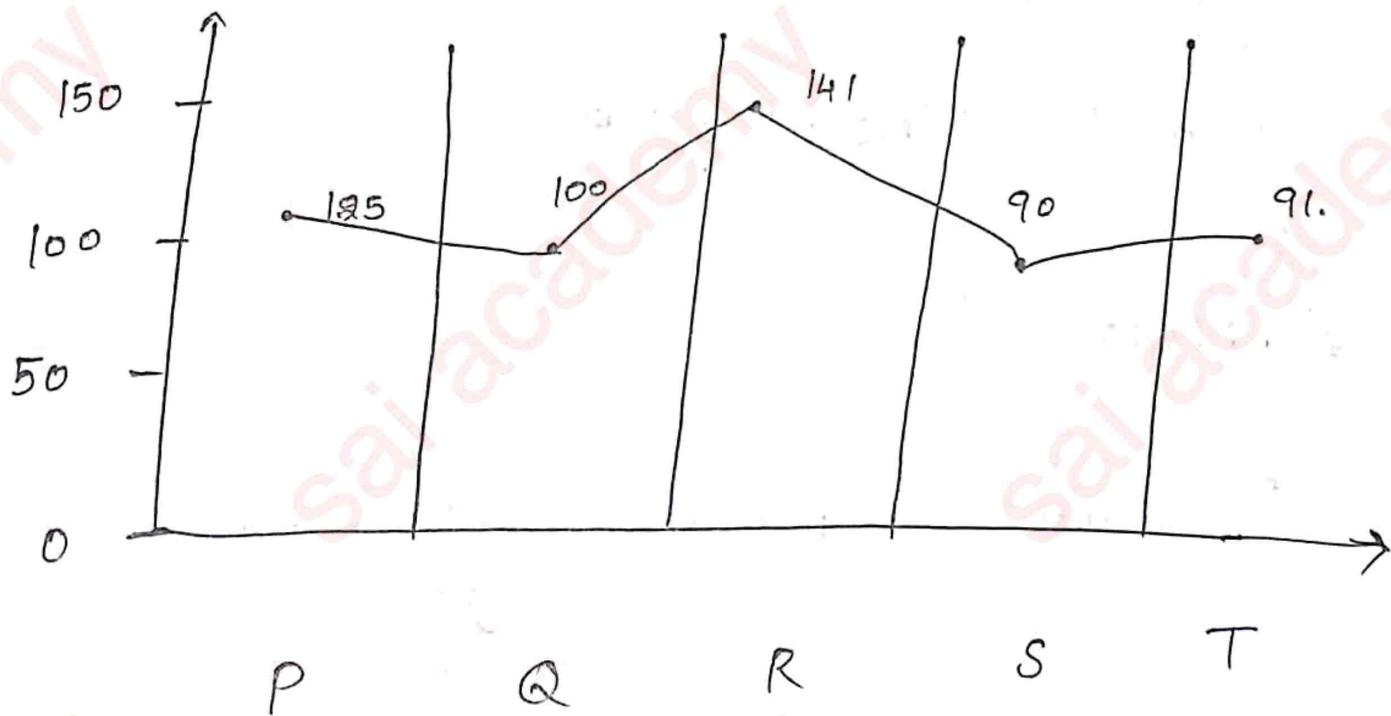
II) (b-10)

Study the Graphs and Answer the Following Questions.

There are Five cricket stadium.

Number of Match played in five stadium is given in line graph and ratio of ODI Match and T20 Match out of the total Match played is given in the table.

Total No. of Match played.



Stadium	Ratio of ODI and T20 Match Played
P	1:4
Q	2:3
R	2:1
S	5:4
T	4:3

6) Total T20 Match Played in T is what Percent of total ODI Match Played in P?

Solution (6-10) (Next Page) \*

8.

(6) Answer.

$$\text{Required Percentage} = \left( \frac{29}{25} \right) \times 100$$

$$= 155\%$$

Stadium	Total Match Played	ODI	T20
P	125	$\frac{125 * 1}{5} = 25$	100
Q	100	$\frac{100 * 2}{5} = 40$	60
R	141	$\frac{141 * 2}{3} = 94$	47
S	90	$\frac{90 * 5}{9} = 50$	40
T	91	$\frac{91 * 4}{7} = 52$	39

f) Find the differences of total ODI Match Played in P and Q together and total ODI Match Played in R and S together ?

$$\text{Total ODI Match in P and Q} = 25 + 40 = 65$$

$$\text{Total ODI Match in R and S} = 94 + 50 = 144$$

$$\text{So difference} = 144 - 65 \\ = 79$$

8. Find the average (approx) T20 Match played in all the stadiums together?

$$\text{Average T20 Match} = \frac{(100+60+47+40+39)}{5} \\ = 57$$

9) Find the ratio of Number ODI Match Played in R and T20 Match Played in Q?

$$\text{Required ratio} = 94 : 60$$

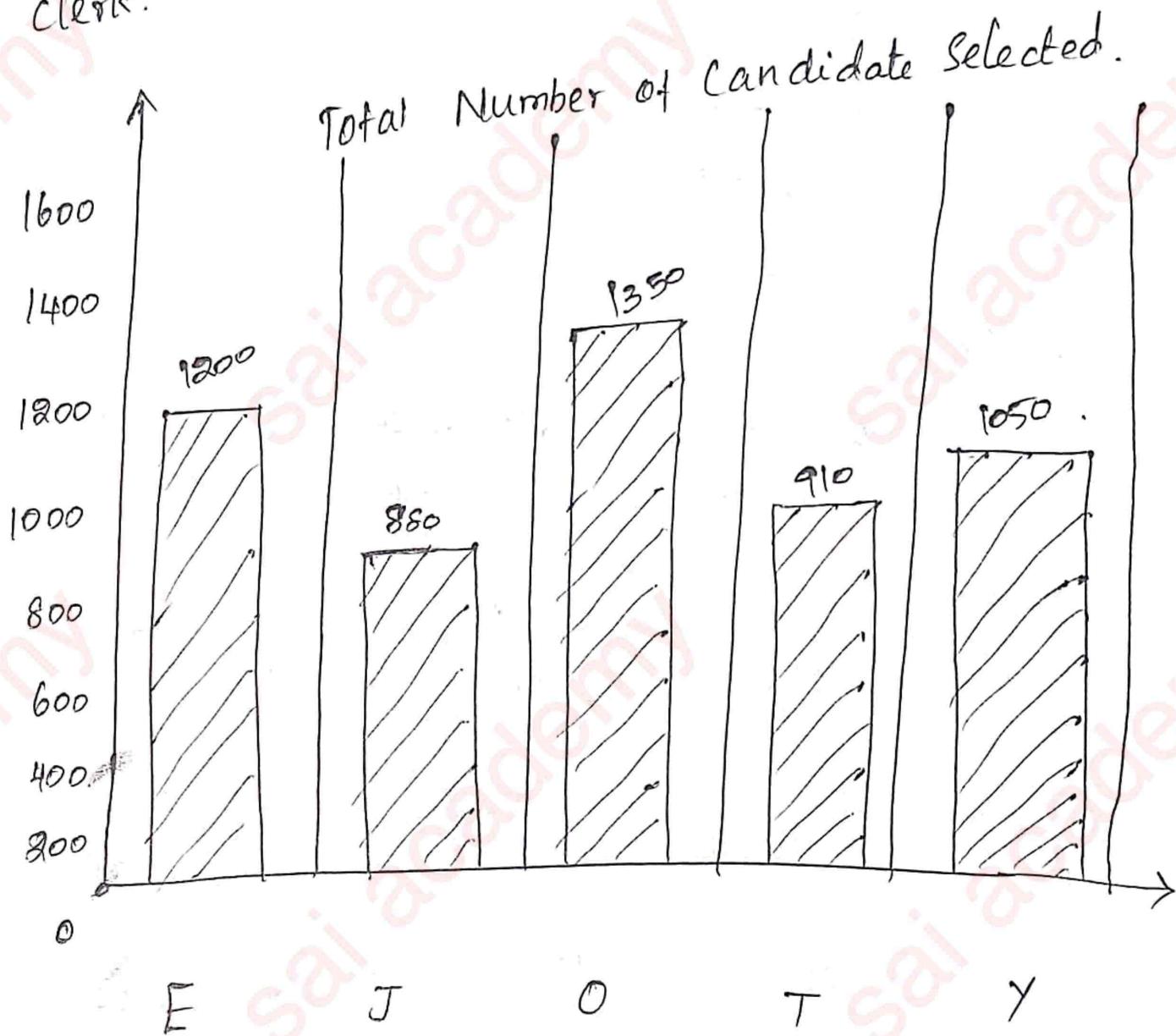
$$= 47 : 30$$

10) Find the total Number of ODI Match Played in P, Q, R and R together?

$$\text{Total No. of ODI Match} = 25 + 40 + 94 \\ \text{played in P, Q and R} \\ = 156,$$

### iii) Direction (11-15)

Bar Graph show total Number of Students  
in two post Po and clerk and table Graph  
shows percentage of students Selected as a  
clerk.



Total Number of Candidate  
Selected.

City	percentage of candidate Selected as a clerk
E	40%
J	68.5%
O	55.55%
T	57.14%
Y	66.67%

Solution :

City	Total No. of Candidate	selected as clerk	selected as Po
E	1200	$\frac{1200 \times 40}{100} = 480$	720
J	880	$\frac{880 \times 68.5}{100} = 550$	330
O	1350	$\frac{1350 \times 55.55}{100} = 750$	600
T	910	$\frac{910 \times 57.14}{100} = 520$	390
Y	1050	$\frac{1050 \times 66.67}{100} = 700$	350

11. Total Number of Candidate selected as Po in E is what Percent of total Number of candidate selected as clerk in T?

$$\text{Required percentage} = \frac{720}{550} \times 100$$

$$= 130.90$$

$$\text{Answer} = 130.90$$

12. Find the difference of total Number of candidate selected as Po and total Number of candidate selected as clerk?

$$\begin{aligned}\text{Required differences} &= (480 + 550 + 750) - (720 + 330 + \\&\quad 600 + 390 + 350) \\&= 610\end{aligned}$$

13) Find the ratio of Number of Candidate selected in T and Number of Candidate selected in O?

$$\begin{aligned} \text{So required ratio is } &= 910 : 1350 \\ &= 91 : 135 // \end{aligned}$$

14. Total Number of candidate Selected as Po in T and o together is what Percentage of total Number of candidate Selected as clerk in T and Y together?

$$\begin{aligned} \text{Total candidate Selected as Po in T and o} &= 330 + 600 = 930. \end{aligned}$$

$$\begin{aligned} \text{Total candidate Selected as clerk in T and Y} &= 520 + 700 = 1220. \end{aligned}$$

clerk T and Y

$$\text{Required \%} = \frac{930}{1220} \times 100 = 76.32\%$$

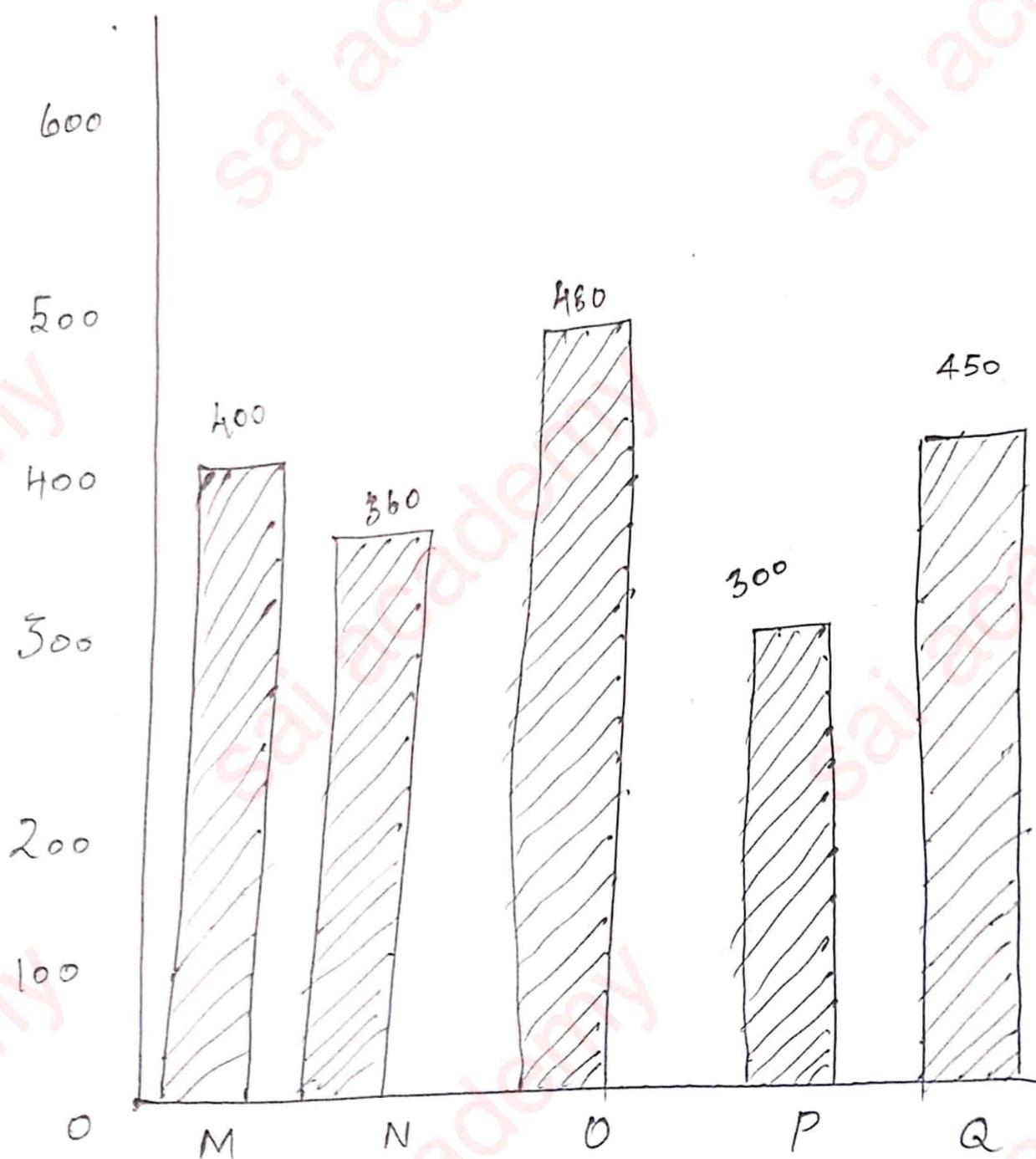
15) Find the average of number of candidate Selected as clerk in all the cities together?

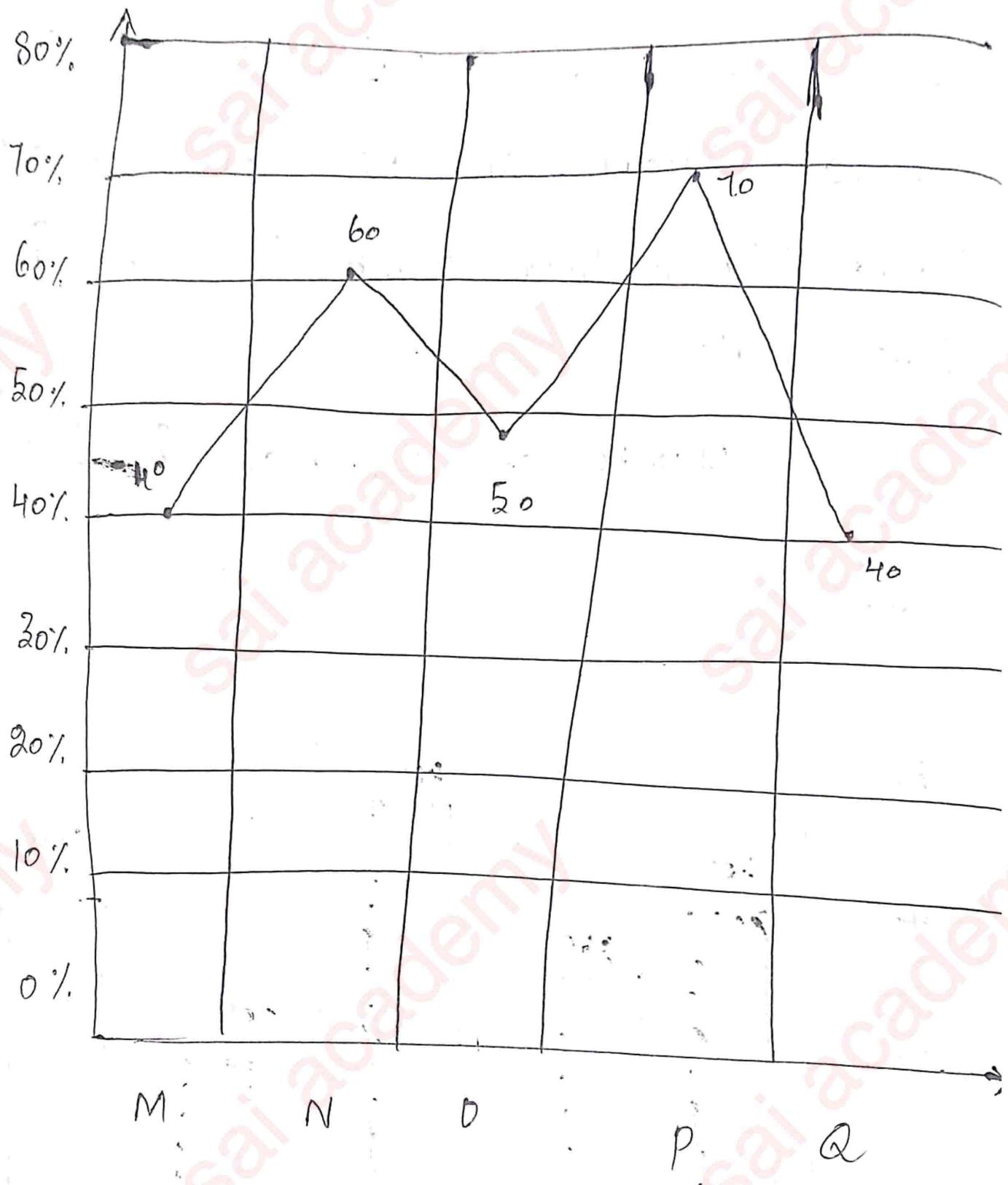
$$\begin{aligned} \text{Average candidate Selected as clerk} &= \frac{(480 + 550 + 750)}{5} \\ &= 600. \end{aligned}$$

iv) Total Number of Laptop (HP + DEL)

at Five shops in a Month is Given in  
the bar Graphs and percentage of HP  
Laptop sold in that Month is Given in  
Line Graphs

Number of Laptop sold in a Month.





Hp Laptops sold in May.

Shop	Total Laptop Sold	HP Laptop Sold	Dell Laptop Sold
M	400	$\frac{410 \times 40}{100} = 160$	840
N	360	$\frac{316 \times 60}{100} = 216$	144
O	480	$\frac{480 \times 50}{100} = 240$	240
P	300	$\frac{300 \times 70}{100} = 210$	90
Q	450	$\frac{450 \times 40}{100} = 180$	270

16. Number Hp Laptop sold in M and N together is what percent of total

Number of Laptop sold in O?

$$\text{Required percentage} = \frac{(160 + 216)}{480} \times 100$$

$$= 78.33\%$$

17) Find the difference of Number of Dell laptop Sold in P and Number of Hp Laptop Sold in Q?

Required

Differences

$$\{ \begin{array}{l} \text{No. of Dell laptop sold in P} \\ \text{No. of Hp laptop sold in Q} \end{array} \} = 180 - 90 = 90,$$

18) Find the average Number of Laptop Sold in all the shop together?

$$\text{Average Laptop sold by } J = \frac{(400 + 360 + 480 + 300 + 450)}{5}$$

$$= 398$$

19) Find the ratio of total Hp Laptop Sold in M and Q together and total Dell Laptop Sold in N and O together?

$$\begin{aligned}\text{Required ratio} &= (160+180) : (140+240) \\ &= 340 : 380 \\ &= 17 : 19\% \end{aligned}$$

20) Find the average (approx) Number of Hp Laptop sold in all the shop together?

$$\begin{aligned}\text{Average Laptop sold} &= \frac{(160+216+240+210+180)}{5} \\ &= 201.2 \\ &= 201\% \end{aligned}$$

## Reasoning Inequalities.

1. Statements :  $B > A \geq T > F = Y \leq S < D$

Conclusions :  $F < D, A > S$ .

For conclusion I :  $F < D$

Here, the common sign between F and D is ' $<$ '.

Hence  $F < D$ .

Thus conclusion I follows.

For conclusion II :  $A > S$

We can see the opposite sign between A and S, thus no relationship can be established between them.

Thus conclusion II does not follow

Answer :-

Therefore only conclusion I follows

2. Statements :  $y < o \leq g \leq k = u > l > p$

Conclusion :  $o = u, u > o$ .

Here, the common sign between  $o$  and  $u$  is ' $\leq$ '.

Hence  $o \leq u$ .

Thus, either  $o < u$  or  $o = u$ .

Answer:

Therefore either conclusion I or II follows

3. Statement :  $y < o \leq g \leq k = u > l > p$

Conclusion:  $o = u, u > o$

Here, the common sign between  $o$  and  $u$  is ' $\leq$ '. Hence  $o \leq u$

Thus, either  $o < u$  or  $o = u$ .

Therefore either conclusion I or II follows

4. Statement :  $3 \geq 9 < 7 \leq 10 = 2 \leq 6$

Conclusion: I)  $6 > 9$

II)  $9 \leq 2$

Checking Conclusion I:  $6 > 9$

From the given statement, we get:

while moving from 6 towards 9, the common sign of inequalities is ' $>$ ' and the given conclusion is also ' $6 > 9$ ', clearly C<sub>1</sub> follows.  
Conclusion I follows.

Checking Conclusion II:  $9 \leq 2$ .

In the statement  $9 < 7 \leq 10 = 2$ , the common sign of inequalities between 9 and 2 is ' $<$ '. Whereas the given conclusion is ' $9 \leq 2$ '.

Therefore, C<sub>2</sub> doesn't follow.

Conclusion II doesn't follow.

Option A is Hence the correct answer.

Q. Statement:  $P \leq R \leq C = S > Q > T$

Conclusion: I)  $P < Q$

II)  $S \geq P$ .

Checking conclusion I:  $P < Q$

From the given statement, we get:

$$P \leq R \leq C = S > Q$$

The common sign of inequalities between P and Q are reversed and therefore no definite conclusion can be withdrawn between these two elements. Hence C<sub>1</sub> doesn't follow.

Conclusion I doesn't follow.

As we can see that in the given statement while moving from S towards P, the common sign between these two elements is ' $\geq$ ' and the given conclusion is also  $S \geq P$ . Therefore C<sub>2</sub> follows here.

Conclusion II follows.

Option B is Hence the correct answer.

6. Statement:  $L \geq Y \geq A < R$ ,  
 $S > Q = A \geq I$ .

Conclusions:  $S > Y$ ,  
 $R > Q$ .

For conclusion I:  $S > Y$

Combining statements I and II, we get

$$S > Q > A \leq Y.$$

Here, we get opposite signs between S and Y  
and given conclusion is  $S > Y$ , thus we cannot  
define any relation between S and Y. Hence  
 $S > Y$  does not follows.

$S > Y$  does not follows

For conclusion II:  $R > Q$

Combining statement I and II. we get.

$$Q = A < R$$

Here, the common sign between R and Q is ' $>$ '  
and the given conclusion is  $R > Q$ , hence  $R > Q$  follows.

$R > Q$  follows.

Hence, the correct answer is option B.

$$\text{I. Statement: } M < A \leq P > X,$$

$$P \geq B = C < Y,$$

$$C \geq D > F = L.$$

Conclusion :  $P \geq D, M < C.$

For conclusion I:  $P \geq D$ .

Combining statement I and II, we get:

$$P \geq B = C \geq D.$$

Here the common sign between P and D is ' $\geq$ ' and given conclusion is  $P \geq D$ . Hence  $P \geq D$  follows.

For conclusion II:  $M < C$

Combining statement I and II, we get,

$$M < A \leq P \geq B = C.$$

Here, we get opposite signs between M and C and given conclusion is  $M < C$ , thus we cannot define any relation between M and C. Hence  $M < C$  does not follow.

Hence, the correct answer would be only Conclusion I follows.

Hence, the correct answer is option A.

10) Statement:

Conclusion:

For conclusion I:  $o = x$

Combining statement I and II, we get:

$$o = c < r = x$$

Here, the common sign between o and k is ' $<$ ' and the given conclusion  $I < R$ , Hence, the  $I < R$  follows.

Hence the correct answer would be

Only conclusion II follows.

Hence, the correct answer is option D.

11. Statement:  $y \geq p = o, p < r \leq j$

Conclusion:  $r > y, j > o$

For conclusion I:  $r > i$

Combining statement I and II: we get

$$y \geq p < r$$

Here, we get opposite signs between Y and R and the given conclusion is  $R > Y$ , thus we cannot define any relation between R and Y. Hence, conclusion I does not follows.

For conclusion II :  $J > 0$

Combining statement I and II. We get :

$$0 = P < P \leq J.$$

Here, the common sign between 0 and J is  $<$  and the given conclusion is  $J > 0$ .

Therefore, conclusion II follows.

Hence option B is correct

12. Statement :  $T > D \geq P, F \geq P = R$

Conclusions :  $T > R, D > F$

For conclusion I :  $T > R$

Combining statements I and II. We get,

$$T > D \geq P = R$$

Here, we can see the common sign between P and R is  $>$ .

Hence, conclusion I follows.

For conclusion II :  $D \geq F$

combining statements I and II. We get

$$D \geq P \leq F.$$

Here, we can see the opposite sign between D and F, thus no relationship can be established between them.

Therefore, conclusion II does not follow.

Hence, option A is correct.

(3) Statement :

Conclusion :

Checking C<sub>1</sub>

$$B > D > C$$

Thus C<sub>1</sub> follows.

Checking C<sub>2</sub>

$$A = E \geq B > D$$

Thus C<sub>2</sub> does not follow.

Hence, option B is correct.

1H) Statement:  $M = X < Z \geq W = N \leq Q < T \leq V = U$

Conclusion: 1.  $V \geq W$

2.  $T \neq U$

Checking C<sub>1</sub>:

Here if we move from V to W, we can observe the common sign of inequalities is ' $>$ ', whereas the given conclusion I is  $V \geq W$ .

- Hence, conclusion I doesn't follows.

Checking C<sub>2</sub>:

Here, Moving From T to U, the common sign of inequalities of ' $\leq$ ' which confirms that T is either less than or equal to U and the same can be interpreted as.

T is not greater than U. Conclusion II which

is  $T \neq U$ , Hence follows.

Option A is Hence the correct answer.

15) Statement:  $P \leq Q < S = T \geq U \geq W < Z$

Conclusion:  $S > W, W = T$

For conclusion I and II:  $S > W$  and  $W = T$

From the given statement, We get.

$$S = T \geq U \geq W.$$

Here, the common sign between  $S$  and  $W$  is ' $\geq$ ' and the given conclusion are  $S > W$  and  $W = T$ .

Moreover, we are aware that  $S = T$  which means we can replace  $T$  with  $S$  in Conclusion 2.

Hence, either conclusion I or Conclusion II follows.

option D is Hence the Correct Answer.

16) Statements:  $P \geq I, N \not\sim J, R > A = P, I = J$

Conclusions:  $R \geq I, A > N$

For conclusion I :  $R \geq I$ .

Combining statement I and III we get:

$$R > A = P \geq I.$$

Here, the common sign between  $R$  and  $I$  is ' $>$ ' and the given conclusion is  $R \geq I$ .  
Hence, conclusion I does not follows.

For conclusion II :  $A > N$ .

Combining all the statement, we get

$$A = P \geq I = J * N.$$

Here, the common sign between  $A$  and  $N$  is ' $>$ ' and the given conclusion is ' $A > N$ ', hence conclusion II follows.

Hence, the correct answer would be 'only conclusion II' follows.

(17) Statement :  $N > O \geq M = B$ ,  $D \geq R \leq E \geq B$ .

Conclusion :  $E > M$ ,  $N < D$ .

For conclusion I:  $E \geq M$ .

Combining statement I and II we get:

$$E > B = M.$$

Here, the common sign between E and M is ' $\geq$ ' and the given conclusion is  $E > M$ . Hence, conclusion I follows.

For conclusion II:  $N < D$

$$N > U \geq M = B < E \geq R \leq D$$

Here, we get opposite signs between N and D. and the given conclusion is ' $N < D$ ', thus, we cannot define any relation between N and D. Hence, conclusion II does not follows.

Hence, the correct answer would be only conclusion I follows?

18) Statements:  $U < I$ ,  $V = E$ ,  $R \geq V$ ,  $I < N < R$

Conclusion:  $R > U$ ,  $I \geq E$ .

For conclusion I:  $R > U$

Combining statement I and IV. we get

$$U < I < N < R.$$

Here, the common sign between U and R is ' $<$ ' and the given conclusion is ' $R > U$ '. Hence conclusion I follows.

Combining statement II, III and IV. we get

$$I < N < R \geq V = E$$

Here, we get opposite signs between  $\text{II}$  and  $I$  and the given conclusion is ' $I \geq E$ ', thus, we cannot define any relation between I and E. Hence, conclusion II does not follows.

Hence, the correct answer would be

'only conclusion I follows.'

19) Statement:  $S > M = Z > T < Q > V$ .

Conclusion:  $V = S$ ,  $Q > M$ .

For conclusion I:  $V = S$

From the given statements, we have:

$$S > M = Z > T < Q > V$$

Here, we get opposite signs between  $S$  and  $V$  and the given conclusion is ' $V = S$ ', thus, we cannot define any relation between  $V$  and  $S$ . Hence, conclusion I does not follow.

For conclusion II:  $Q > M$

From the given statement we have:

$$M = Z > T < Q$$

Here, we get opposite signs between  $M$  and  $Q$  and the given conclusion is ' $Q > M$ ', thus, we cannot define any relation between  $Q$  and  $M$ . Hence, conclusion II does not follow. Thus, Neither conclusion I nor conclusion II follows. Hence the correct answer would be option D.

(a) Statement:  $T < U \geq V \geq S \geq P \geq Q$

Conclusions:  $S > T, V > Q$

For conclusion I:  $S > T$

From the given statement, we have:

$$T < U = V \geq S$$

Here, we get opposite signs between  $T$  and  $S$  and the given conclusion is ' $S > T$ '. Thus, we cannot define any relation between  $S$  and  $T$ . Hence, conclusion I does not follow.

For conclusion II:  $V > Q$

From the given statement, we have:

$$V \geq S > P \geq Q$$

Here, the common sign between  $V$  and  $Q$  is ' $>$ ', and the given conclusion is  $V > Q$ . Hence, conclusion II follows.

Thus, only conclusion II follows.

## Syllogism.

1

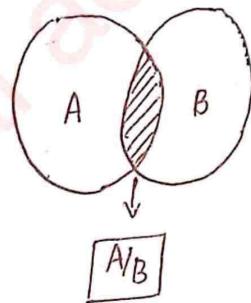
Introduction.

1. Some A are B

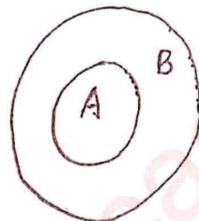
2. All A are B

3. No A is B.

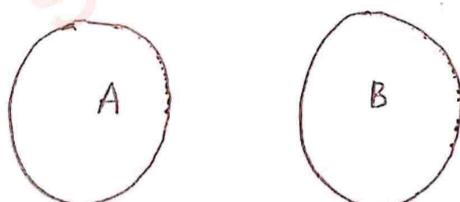
Some A are B  $\therefore$



All A are B  $\therefore$



No A is B  $\therefore$



Statement :-

1. Some trees are papers
2. All papers are inks
3. Some ink are blue

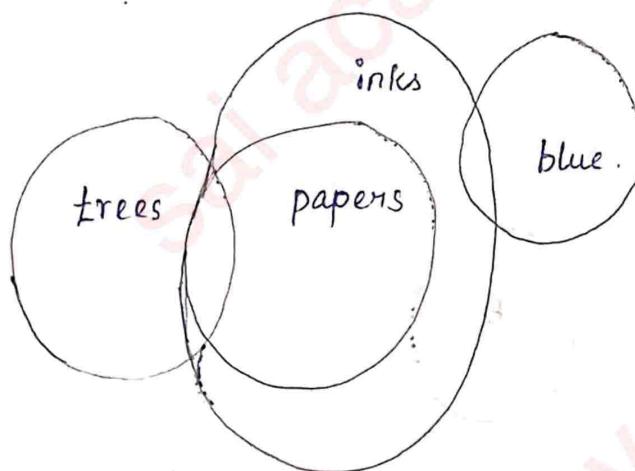
Conclusion :-

1. Some inks are trees
2. Some papers are trees
3. Some blue are paper
4. Some blue are ink.

Conclusion

1 v      2 v      3 x      4 v

Statement :-



1, 2, 4 Follows

3 not follows

2)

Statement :-

- 1) Some cars are Trucks
- 2) Some Trucks are cycles
- 3) All cycles are Tractors
- 4) All Tractors are bikes
- 5) Some Bike are white

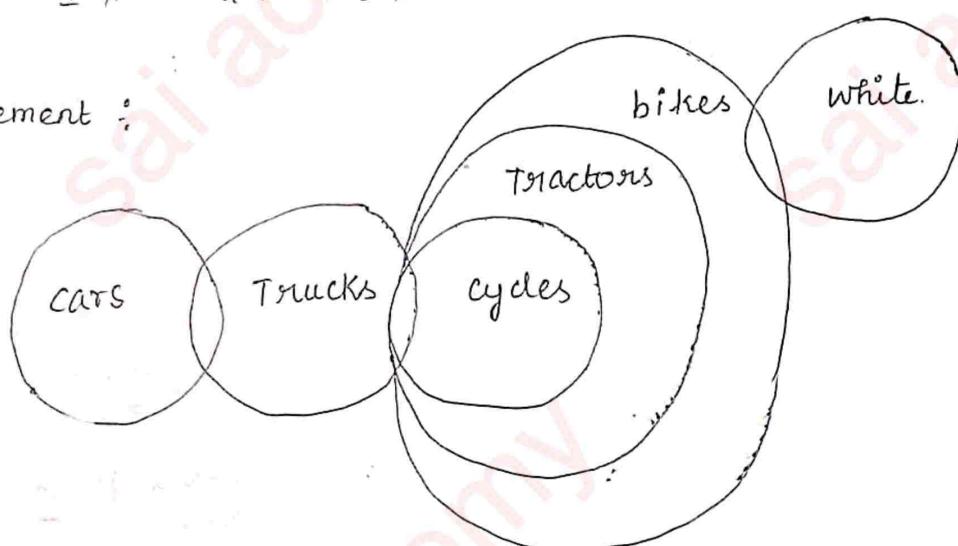
Conclusion :-

- 1) Some cycle are white
- 2) Some Bike are Truck
- 3) Some cycle are car
- 4) Some white are cycle
- 5) Some Bike are cycle
- 6) All cycle are Bike.

Conclusion .

1 X      2 ✓      3 X      4 X      5 ✓      6 ✓

Statement :-



3)

Statement

- 1) All Fruits are Apple
- 2) All Apple are Banana.
- 3) Some Bananas are orange
- 4) Some oranges are Grapes.

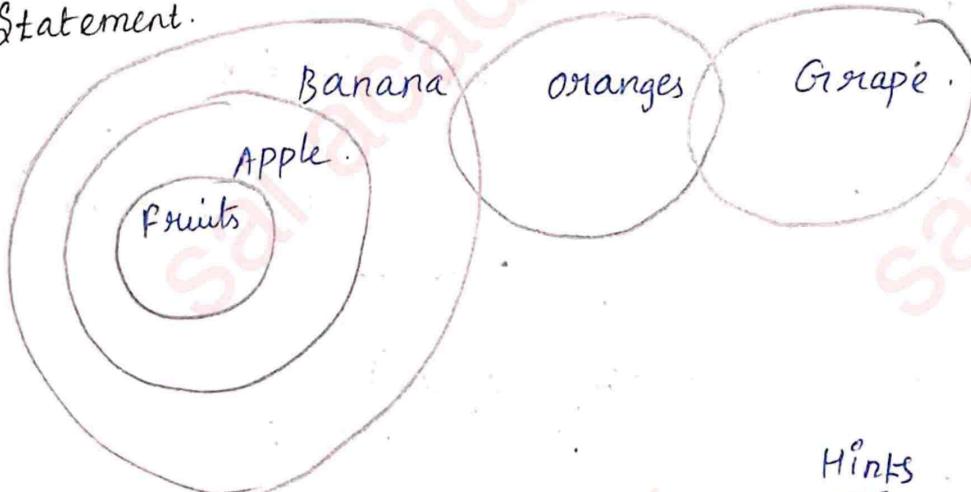
Conclusion.

- 1) Some orange are Apple
- 2) Some Grape are fruit
- 3) Some Banana are fruit
- 4) Some grapes are Banana.

Conclusion:

1 X      2 X      3 ✓    4 . X

Statement.



Hints

Conclusion All ↑ are ↑ ✓  
All ↑ are ↑ ✓

Some ↑ are ↑ ✓

4)

### Statement

- 1) Some Sun are Moon
- 2) All Moon are Star
- 3) No Star are Morning
- 4) Some Morning are Night.

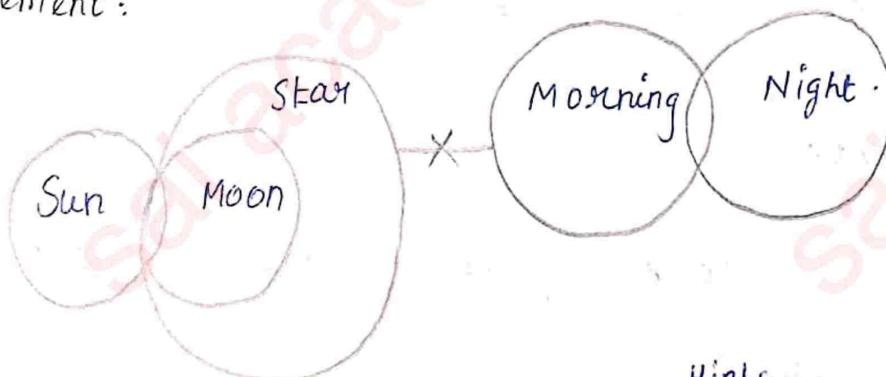
### Conclusion:

- 1) Some Star are Sun
- 2) Some Night are Sun
- 3) Some Morning are Moon
- 4) All Star are Moon.

### Conclusion:

1) ✓      2) ✗      3) ✗      4) ✗

### Statement:



### Hints

\* All Moon are Star ✓

All Star are Moon ✗

5) Statement

- 1) All chairs are Table
- 2) No Table is sofa
- 3) Some sofa are wood
- 4) No wood is Brown.

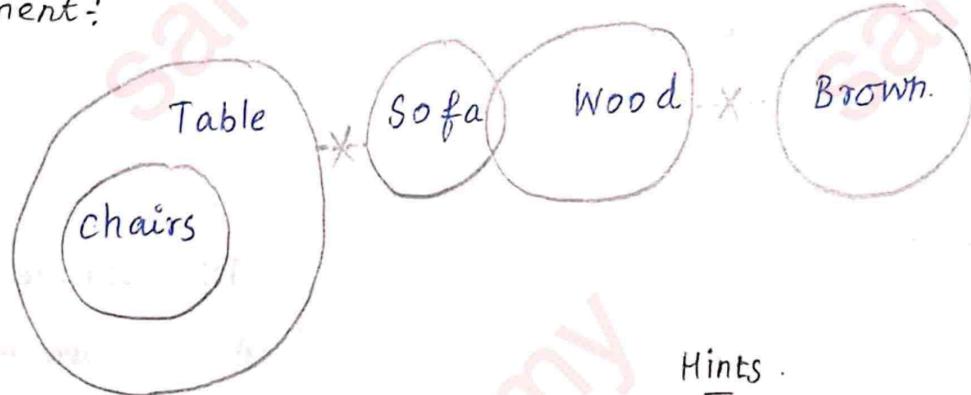
Conclusion:

- 1) Some Table are chair
- 2) Some wood are sofa
- 3) Some Brown are chair
- 4) Some Brown are sofa
- 5) All sofa are wood.

Conclusion:

1 ✓ 2 ✓ 3 ✗ 4 ✗ 5 ✗

Statement:



Hints:



All chair are Table ✓  
Some Table are chair ✓

# Syllogism

2.

Conclusion = No. \*

*	Basic Diagram	Possible Diagram
No : X (Ans)	✓	X
No : v (Ans)	v	✓
No : X (Ans)	X	X
No : X (Ans)	X	X

Statement .

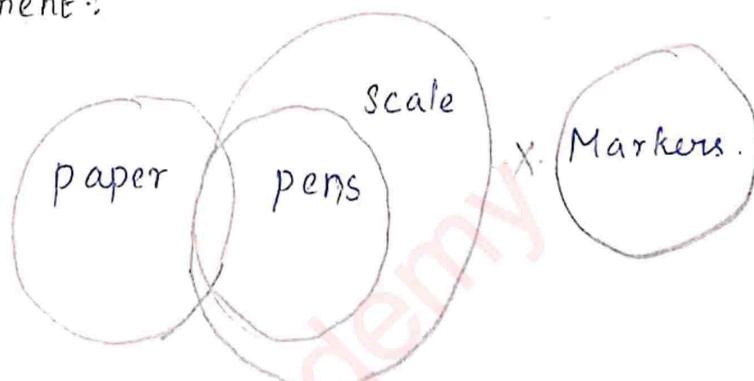
Conclusion .

- |                         |                       |
|-------------------------|-----------------------|
| 1. Some papers are pens | 1. No Marker is paper |
| 2. All pens are scales  | 2. No Marker is pen.  |
| 3. No scale is Markers. |                       |

Conclusion : I X    II : ✓

B.D	P.D
v	X
v	v

Statement :



Number series.

1.

4      18      85      336      1005 ?

Series pattern

4

$$4 \times 6 - 6$$

$$18 \times 5 - 5$$

$$85 \times 4 - 4$$

$$336 \times 3 - 3$$

$$1005 \times 2 - 2$$

Given series

4

18

85

336

1005

2008

✓

2.

9      265      393      457      489 ?

Series pattern

9

$$9 + 256$$

$$265 + 128$$

$$393 + 64$$

$$457 + 32$$

$$489 + 16$$

Given series

9

265

393

457

489

505

✓

3.

7      17      35      63      103 ?

Series pattern

Given series.

7

7

$$7 + 2 \times 5$$

$$17$$

$$17 + 3 \times 6$$

$$35$$

$$35 + 4 \times 7$$

$$63$$

$$63 + 5 \times 8$$

$$103$$

$$103 + 6 \times 9$$

$$157 \checkmark$$

4) 40    82    249    1250?

Series pattern

$$40$$

Given series

$$40$$

$$40 \times 2 + 2 = 82$$

$$82$$

$$82 \times 3 + 3 = 249$$

$$249$$

$$249 \times 5 + 5 = 1250$$

$$1250$$

$$1250 \times 7 + 7 = 8757$$

$$8757 \checkmark$$

5) 24    70    144    252    400?

Series pattern

$$5^2 \times 1 - 1$$

$$24$$

$$6^2 \times 2 - 2$$

$$70$$

$$7^2 \times 3 - 3$$

$$144$$

$$8^2 \times 4 - 4$$

$$252$$

$$9^2 \times 5 - 5$$

$$400$$

$$10^2 \times 6 - 6$$

$$594. \checkmark$$

6. 33 47 53 61 71 ?

Series pattern      Given pattern.

$$33 \quad 33$$

$$33 + 2^2 + 10 \quad 47$$

$$33 + 3^2 + 11 \quad 53$$

$$33 + 4^2 + 12 \quad 61$$

$$33 + 5^2 + 13 \quad 71$$

$$33 + 6^2 + 14 \quad 83 \checkmark$$

7. 660 656 620 520 324 ?

Series pattern      Given patt series.

$$660 \quad 660$$

$$660 - (4 \times 1^2) \quad 656$$

$$656 - (4 \times 3^2) \quad 620$$

$$620 - (4 \times 5^2) \quad 520$$

$$520 - (4 \times 7^2) \quad 324$$

$$324 - (4 \times 9^2) \quad 0 \checkmark$$

8. 133 207 353 501 741 ?

$$(5^3 + 8) \quad 133$$

$$(6^3 - 9) \quad 207$$

$$(7^3 + 10) \quad 353$$

$$(8^3 - 11) \quad 501$$

$$(9^3 + 12) \quad 741$$

$$(10^3 - 13) \quad 987 \checkmark$$

$$9. \quad 8.5 \quad 24 \quad ? \quad 79 \quad 118.5 \quad 166$$

$$3 \times 1.5 + 2^2 = 8.5 \quad 8.5$$

$$6 \times 2.5 + 3^2 = 24 \quad 24$$

$$9 \times 3.5 + 4^2 = 47.5 \quad 47.5 \checkmark$$

$$12 \times 4.5 + 5^2 = 79 \quad 79$$

$$15 \times 5.5 + 6^2 = 118.5 \quad 118.5$$

$$18 \times 6.5 + 7^2 = 166 \quad 166$$

$$10. \quad 2048 \quad 516 \quad 1032 \quad 262 \quad ? \quad 135 \quad 270$$

$$2048 \div 4 + 4 = 516 \quad 2048$$

$$516 \times 2 = 1032 \quad 516$$

$$1032 \div 4 + 4 = 262 \quad 1032$$

$$262 \times 2 = 524 \quad 262$$

$$524 \div 4 + 4 = 135 \quad 135$$

$$135 \times 2 = 270 \quad 270$$

$$11. \quad 7 \quad 9 \quad 12 \quad 48 \quad ? \quad 890$$

$$7 \times 1 + 1 \times 2 \quad 7$$

$$9 \times 2 - 2 \times 3 \quad 12$$

$$12 \times 3 + 3 \times 4 = 48$$

$$48 \times 4 - 4 \times 5 = 172 \checkmark$$

$$172 \times 5 + 5 \times 6 = 890$$

12.      47      58      71      79      95      ?

47

47

$$47 + (7+4) = 58$$

$$58 + (5+8) = 71$$

$$71 + (7+1) = 79$$

$$79 + (7+9) = 95$$

$$95 + (9+5) = 109. \checkmark$$

13.      8      39      79      394      789      ?

8

8

$$8 \times 5 - 1 = 39$$

$$39 \times 2 + 1 = 79$$

$$79 \times 5 - 1 = 394$$

$$394 \times 2 + 1 = 789$$

$$789 \times 5 - 1 = 3944$$

14. 15 17 36 17 86 ?

15

15

$$15 + (1^3 + 1) = 17$$

17

$$15 + (2^3 + 1) = 26$$

26

$$15 + (3^3 + 5) = 47$$

47

$$15 + (4^3 + 7) = 86$$

86

$$15 + (5^3 + 9) = 149.$$

149 ✓

15. 3 9 24 57 ? 267 552.

3

3

$$3 \times 2 + 3$$

9

$$9 \times 2 + 6$$

24

$$24 \times 2 + 9$$

57

$$57 \times 2 + 12$$

126 ✓

$$126 \times 2 + 15$$

267

$$267 \times 2 + 18$$

552

16. 2 8 28 102 432 ?

2

2

$$2 \times 1 + 6$$

8

$$8 \times 2 + 12$$

28

$$28 \times 3 + 18$$

102

$$102 \times 4 + 24$$

432

$$432 \times 5 + 50$$

2190 ✓

17. 6 16 44 126 370 ?

$$\begin{array}{ll}
 6 & 6 \\
 6 \times 3 - 2 & 16 \\
 16 \times 3 - 4 & 44 \\
 44 \times 3 - 6 & 126 \\
 126 \times 3 - 8 & 370
 \end{array}$$

$$370 \times 3 - 10 \quad 1100 \checkmark$$

18. 51 77 175 250 279 ?

$$\begin{array}{ll}
 51 & 51 \\
 51 + (5^2 + 1^2) = 77 & 77 \\
 77 + (7^2 + 7^2) = 175 & 175 \\
 175 + (1^2 + 7^2 + 5^2) = 250 & 250 \\
 250 + (2^2 + 5^2 + 0^2) = 279 & 279 \\
 279 + (2^2 + 7^2 + 9^2) = 413 & 413 \quad \checkmark
 \end{array}$$

19. 2 2 5 15.5 ? 267.125

$$\begin{array}{ll}
 2 & 2 \\
 2 \times 0.5 + 1 & 2 \\
 2 \times 1.5 + 2 & 5 \\
 5 \times 2.5 + 3 & 15.5
 \end{array}$$

$$15.5 \times 3.5 + 4 \quad 58.25$$

$$58.25 \times 4.5 + 5 \quad 267.125 \quad \checkmark$$

20. 219 223 232 248 ?

219

$$219 + (1^2 + 1 + 2) = 223$$

$$223 + (2^2 + 2 + 3) = 232$$

$$232 + (3^2 + 3 + 4) = 248$$

$$248 + (4^2 + 4 + 5) = 273$$

219

223

232

248

273 ✓

21. 10 17.5 32.5 55 85 ?

10

10

$$10 + 15 \times 0.5 = 17.5$$

17.5

$$17.5 + 15 \times 1 = 32.5$$

32.5

$$32.5 + 15 \times 1.5 = 55$$

55

$$55 + 15 \times 2 = 85$$

85

$$85 + 15 \times 2.5 = 122.5 \quad 122.5. \checkmark$$

22. 1 7 16 30 51 ?

1

1

$$1 + (1 \times 1 + 5) = 7$$

7

$$7 + (2 \times 2 + 5) = 16 \quad 16$$

$$16 + (3 \times 3 + 5) = 30 \quad 30$$

$$30 + (4 \times 4 + 5) = 51 \quad 51$$

$$51 + (5 \times 5 + 5) = 81 \quad 81. \checkmark$$

23. 0 6 24 60 100 ?

$$1^3 - 1 = 0 \quad 0$$

$$2^3 - 2 = 6 \quad 6$$

$$3^3 - 3 = 24 \quad 24$$

$$4^3 - 4 = 60 \quad 60$$

$$5^3 - 5 = 120 \quad 120$$

$$6^3 - 6 = 210 \quad 210 \checkmark$$

24. 6 6 18 90 630 ?

$$6 \times 1 = 6 \quad 6$$

$$6 \times 3 = 18 \quad 18$$

$$18 \times 5 = 90 \quad 90$$

$$90 \times 7 = 630 \quad 630$$

$$630 \times 9 = 5670 \quad 5670 \checkmark$$

25. 27 35 47 63 83 ?

$$27 \quad 27$$

$$27 + 8 = 35 \quad 35$$

$$35 + 12 = 47 \quad 47$$

$$47 + 16 = 63 \quad 63$$

$$63 + 20 = 83 \quad 83$$

$$83 + 24 = 107 \quad 107 \checkmark$$

26. 7 18 19 31 50 ?

$$7 + 7 = 14$$

$$14 + 7 = 21$$

$$21 + 12 = 33$$

$$33 + 19 = 52$$

$$52 + 31 = 83 \quad \checkmark$$

27. 2 3 8 27 112 ?

$$2 \times 1 + 1 = 3$$

$$3 \times 2 + 2 = 8$$

$$8 \times 3 + 3 = 27$$

$$27 \times 4 + 4 = 112$$

$$112 \times 5 + 5 = 565 \quad \checkmark$$

28. 30 128 346 732 ? 2200

$$3^3 + 3 = 30$$

$$5^3 + 3 = 128$$

$$7^3 + 3 = 346$$

$$9^3 + 3 = 732$$

$$11^3 + 3 = 1334 \quad \checkmark$$

$$13^3 + 3 = 2200$$

29. 16800 4200 1050 262.5 ? 16.40625

16800	16800
$16800 \div 4 = 4200$	4200
$4200 \div 4 = 1050$	1050
$1050 \div 4 = 262.5$	262.5
$262.5 \div 4 = 65.625$	65.625 ✓
$65.625 \div 4 = 16.40625$	16.40625

30. 156 145 123 90 46 ?

156	156
$156 - 11 = 145$	145
$145 - 22 = 123$	123
$123 - 33 = 90$	90
$90 - 44 = 46$	46
$46 - 55 = -9$	-9 ✓

31. 11 12 39 164 507 ?

11	11
$11 + 1^3 = 12$	12
$12 + 3^3 = 39$	39
$39 + 5^3 = 164$	164
$164 + 7^3 = 507$	507
$507 + 9^3 = 1236$	1236

32. 120 145 ? 197 224 257

$$(11^2 - 1) = 120 \quad 120$$

$$(12^2 + 1) = 145 \quad 145$$

$$(13^2 - 1) = 168 \quad 168 \checkmark$$

$$(14^2 + 1) = 197 \quad 197$$

$$(15^2 - 1) = 224 \quad 224$$

$$(16^2 + 1) = 257 \quad 257$$

33.

5 36 191 966 ? 24216

$$5 \times 5 + 11 = 36 \quad 36$$

$$36 \times 5 + 11 = 191 \quad 191$$

$$191 \times 5 + 11 = 966 \quad 966$$

$$966 \times 5 + 11 = 4841 \quad 4841 \checkmark$$

$$4841 \times 5 + 11 = 24216 \quad 24216$$

34.

5000 1000 200 40 8 ?  
5000

$$5000 \div 5 = 1000 \quad 1000$$

$$1000 \div 5 = 200 \quad 200$$

$$200 \div 5 = 40 \quad 40$$

$$40 \div 5 = 8 \quad 8$$

$$8 \div 5 = 1.6 \quad 1.6 \checkmark$$

35. 144 153 171 207 279 ?

$$144 \quad 144$$

$$144 + 9 = 153 \quad 153$$

$$153 + 18 = 171 \quad 171$$

$$171 + 36 = 207 \quad 207$$

$$207 + 72 = 279 \quad 279$$

$$279 + 144 = 423 \quad 423. \checkmark$$

36. 76 304 ? 43776 1094400 39398400

$$76 \quad 76$$

$$76 \times (2)^2 \quad 304$$

$$304 \times (3)^2 \quad 2736 \quad \checkmark$$

$$2736 \times (4)^2 \quad 43776$$

$$43776 \times (5)^2 \quad 1094400$$

$$1094400 \times (6)^2 \quad 39398400$$

37. 2 18 36 ? 98 146 188

$$2 + 2(7+1) \quad 18$$

$$18 + 3(7-1) \quad 36$$

$$36 + 4(7+1) \quad 68 \quad \checkmark$$

$$68 + 5(7-1) \quad 98$$

$$98 + 6(7+1) \quad 146$$

$$146 + 7(7-1) \quad 188$$

38. 94 99 108 119 130 ? 144

$$94 - (2)^2 + 9 \quad 99$$

$$99 - (3)^2 + 18 \quad 108$$

$$108 - (4)^2 + 27 \quad 119$$

$$119 - (5)^2 + 36 \quad 130$$

$$130 - (6)^2 + 45 \quad 139 \checkmark$$

$$139 - (7)^2 + 54 \quad 144$$

29. 15 15 25 58.33 ? 641.66 2780.55

$$15 \times 3 \div 3 \quad 15$$

$$15 \times 5 \div 3 \quad 25$$

$$25 \times 7 \div 3 \quad 58.33$$

$$58.33 \times 9 \div 3 \quad 175 \checkmark$$

$$175 \times 11 \div 3 \quad 641.66$$

$$641.66 \times 13 \div 3 \quad 2780.55$$

40. 35 65 ? 785 3605 21605 151205

$$35 \times 2 - 5 \quad 65$$

$$65 \times 3 - 10 \quad 185 \checkmark$$

$$185 \times 4 - 15 \quad 725$$

$$725 \times 5 - 20 \quad 3605$$

$$3605 \times 6 - 25$$

$$21605$$

$$21605 \times 7 - 30$$

$$151205.$$

41.

$$131 \quad 231 \quad 341 \quad 461 \quad ? \quad 731.$$

$$43 \times 3 + (1 \times 2) \quad 131$$

$$45 \times 5 + (1 \times 2) \quad 231$$

$$47 \times 7 + (3 \times 4) \quad 341$$

$$49 \times 9 + (4 \times 5) \quad 461$$

$$51 \times 11 + (5 \times 6) \quad 591 \checkmark$$

$$53 \times 13 + (6 \times 7) \quad 731$$

42.

$$81 \quad 108 \quad 124 \quad 249 \quad ? \quad 628.$$

$$81 \quad 81$$

$$81 + 3^3 \quad 108$$

$$108 + 4^2 \quad 124$$

$$124 + 5^3 \quad 249$$

$$249 + 6^2 \quad 285 \checkmark$$

$$285 + 7^3 \quad 628.$$

43.

$$824 \quad 108 \quad 124 \quad 249 \quad ? \quad 628.$$

43.

824

568

793

597

766

?

824

824

$$824 - 16^2$$

568

$$568 + 15^2$$

793

$$793 - 14^2$$

597

$$597 + 13^2$$

766

$$766 - 12^2$$

622 ✓

44.

10.5

20

39

67.5

? - 153

10.5

10.5

$$10.5 + (9 \times 1) + (0.5)$$

20

$$20 + (9 \times 2) + 1$$

39

$$39 + (9 \times 3) + (1.5)$$

67.5

$$67.5 + (9 \times 4) + (2)$$

105.5 ✓

$$105.5 + (9 \times 5) + (2.5)$$

153.

45.

9

31

73

141

241

?

$$1^2 + 2^3$$

9

$$2^2 + 3^3$$

31

$$3^2 + 4^3$$

73

$$4^2 + 5^3$$

141

$$5^2 + 6^3$$

241

$$6^2 + 7^3$$

379 ✓

47.	33	26.5	?	64.75	139.5	358.75.
	33			33		
	33 × 0.5 + 10			26.5		
	26.5 × 1.0 + 10			36.5 ✓		
	36.5 × 1.5 + 10			64.75		
	64.75 × 2.0 + 10			139.5		
	139.5 × 2.5 + 10			358.75,		

48.	31	17	26	64.5	?	1006.6
	31			31		
	(31 × 0.5 - 0.5) + 2 = 17				17	
	(17 × 1.5 - 1.5) + 2 = 26				26	
	(26 × 2.5 - 2.5) + 2 = 64.5				64.5	
	(64.5 × 3.5 - 3.5) + 2 = 224.25				224.25 ✓	
	(224.25 × 4.5 - 4.5) + 2 = 1006.625				1006.625	

49.      16                  19                  26                  39    62    ?

16  
19  
26  
39  
62  
103 ✓

$16 + 2^1 + 1 = 19$

$19 + 2^2 + 3 = 26$

$26 + 2^3 + 5 = 39$

$39 + 2^4 + 7 = 62$

$62 + 2^5 + 9 = 103$

50.      386                  379                  358                  323                  ?                  211.

386  
386  
379  
358  
323  
274 ✓  
211

$386 - 7 (= 1 \times 7) = 379$

$379 - 21 (= 3 \times 7) = 358$

$358 - 35 (= 5 \times 7) = 323$

$323 - 49 (= 7 \times 7) = 274$

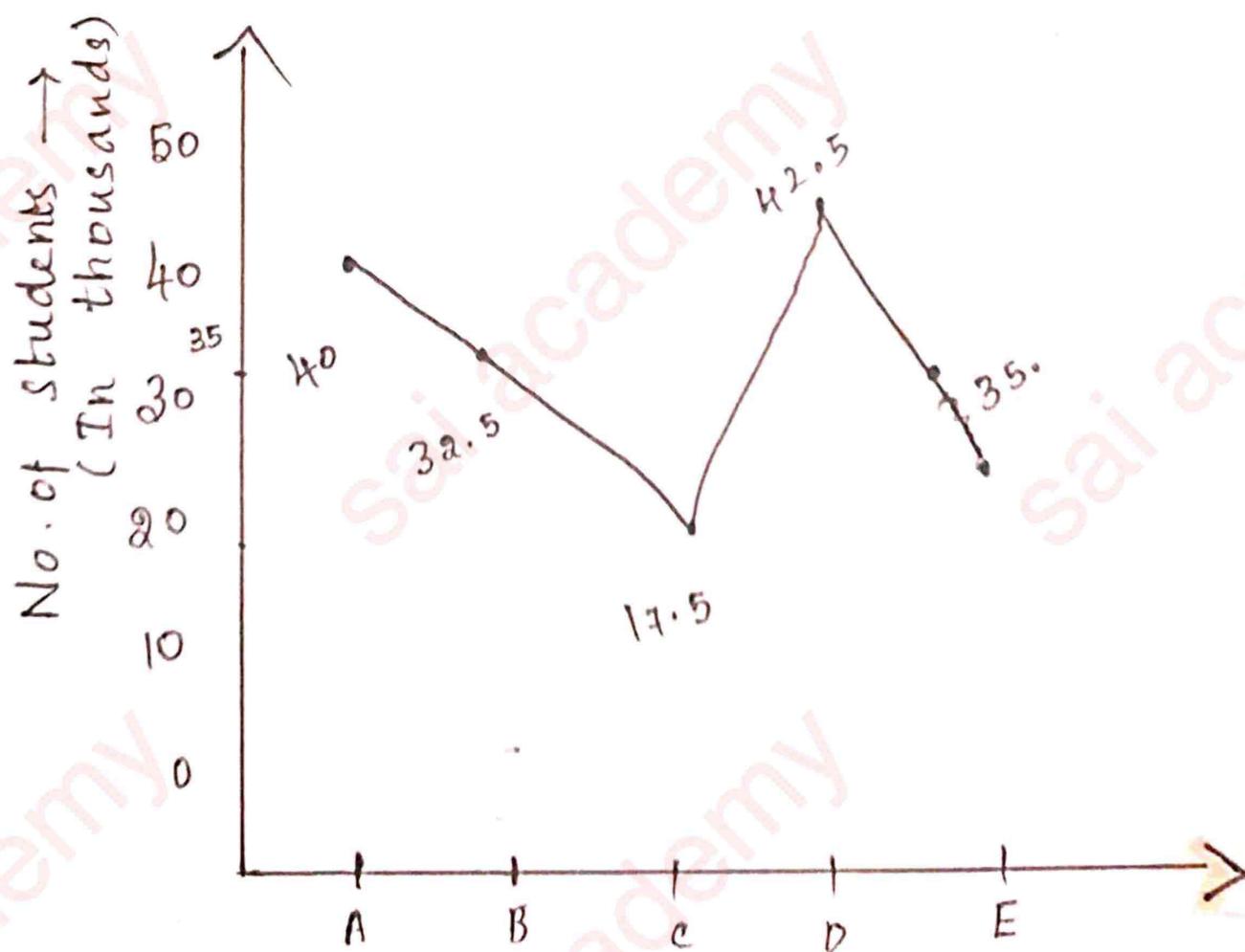
$274 - 63 (= 9 \times 7) = 211$

## Data interpretation. Line Graphs.

1) Study the following line graphs

Carefully and answer the questions given below :-

Number of students  
Appearing for aptitude  
Test from various Towns (in thousands)



1) What is the ratio of the no of  
Students appearing for the Aptitude test  
From Town B to that From Town A?

Ratio of no. of students

From Town B to that

From Town A

$$= \frac{\text{Town B}}{\text{Town A}} = \frac{32.5 \times 1000}{40 \times 1000}$$

$$= \frac{32.5}{40}$$

$$= \frac{325}{400}$$

$$= \frac{13}{16}$$

$$= 13.16.$$

2) What is the per average number of students appearing for the aptitude Test from all the towns together?

Average number of  
Students appearing  
in Aptitude Test  
from all towns

$$= \frac{(40 + 32.5 + 17.5 + 42.5 + 35)}{5} \times 1000$$

$$= \frac{167.5}{5} \times 100$$

$$= 33.5 \times 100 = \frac{33.5 \times 100}{100}$$

$$= 33500.$$

3) The number of students appearing for the aptitude Test from Town E is approximately what per cent of the total number of students appearing for the aptitude Test from all the towns together

$$\text{Required \%} = \left( \frac{35 \times 1000}{167.5 \times 1000} \times 100 \right) \%$$

$$= \left( \frac{350 \times 100}{1675} \right) \%$$

$$= \frac{1400}{67} \%$$

$$= 20.89 \%$$

$\approx 21\%$  (Nearly)

4) What is the ratio of the number of students appearing for the aptitude Test from Towns C and D together to the number of students appearing from the Aptitude Test from Towns A, D and E together?

(Students From Towns C and D) : (Students froms Town A, D & E)

$$\frac{(17.5 + 42.5) \times 1000}{(40 + 42.5 + 35) \times 1000} = \frac{60}{117.5} = \frac{600}{1175} = \frac{84}{47}$$

$$\boxed{24 : 47.}$$

5) The Number of students appearing for the Aptitude Test from the Town D is approximately what percentage of the number of students appearing for the Aptitude Test from Town C ?

Required percentage

$$= \left( \frac{42.5 \times 1000}{17.5 \times 1000} \times 100 \right) \%$$

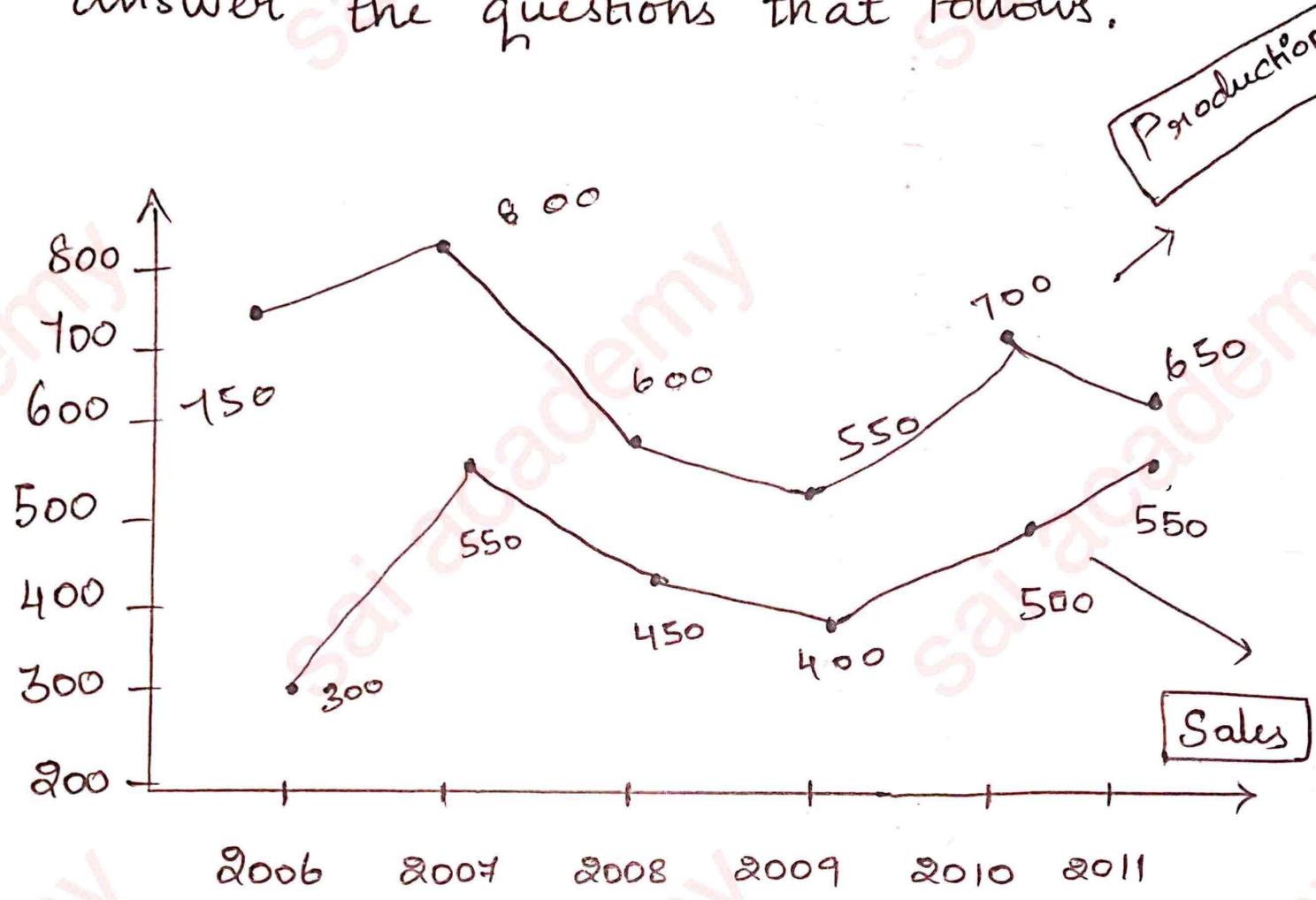
$$= \left( \frac{425}{175} \times 100 \right) \%$$

$$= \left( \frac{425 \times 4}{7} \right) \%$$

$$= \frac{1700}{7} \% = 242.85\%$$

$$= 243 \% \text{ (nearly).}$$

b) Study the following Graphs and answer the questions that follows.



The table given below represents the ratio of the production (in tonnes) of company A to the production (in tonnes) of company B and ratio of sales of company A and company B.

Year	Production (A:B)	Sales (A:B)
2006	5:4	2:3
2007	8:7	11:12
2008	3:4	9:14
2009	11:12	4:5
2010	14:13	10:9
2011	13:14	1:1

b) what is the approximate Percentage increases in the Production of company of company of A From 2009 to 2010?

Percentage increases in }

Production of A From  
2009 to 2010

$$= \left( \frac{700 - 550}{550} \times 100 \right) \%$$

$$= \left( \frac{150}{550} \times 100 \right) \%$$

$$= \frac{300}{11} \%$$

$$= 27.27\%$$

$\approx 27\%$  (approx)

7) The sales of company A in the year 2009 was approximately what Percentage of its Production in the same Year?

$$\text{Required \%} = \left( \frac{400}{550} \times 100 \right) \% = \frac{800}{11} \%$$

$$= 72.7\%$$

$\approx 73\%$  (approx)

8) what is the Average Production of Company B (in tonnes) From the Year 2006 to the Year 2011?

Average Production of Company B

from 2006 to 2011 =

$$\frac{1}{6} \times \left[ \left( \frac{4}{5} \times 750 \right) + \left( \frac{7}{8} \times 800 \right) + \left( \frac{4}{3} \times 600 \right) + \left( \frac{12}{11} \times 550 \right) + \left( \frac{13}{14} \times 700 \right) + \left( \frac{14}{13} \times 650 \right) \right] \text{tonnes}$$

$$= \frac{1}{6} (600 + 700 + 800 + 650 + 700) \text{ tonnes}$$

$$= \frac{4050}{6} \text{ tonnes}$$

$$= 675 \text{ tonnes.}$$

9) what is the ratio of the P. Total Production  
Population of company A to the total  
Sales of company A?

Total Production of  
Company A

$$Y = \left( 750 + 800 + 600 + 550 + 700 + 650 \right) \text{ tonnes}$$

$$= 4050 \text{ tonnes.}$$

Total Sales of company A =

$$(300 + 550 + 450 + 400 + 500 + 550) \text{ tonnes.}$$

$$= 2750 \text{ tonnes.}$$

Required ratio = 4050 : 2750

$$= \frac{4050}{2750} = \frac{81}{55}$$

$$= 81 : 55.$$

10) What is the ratio of Production of Company B in the Year 2006 to Production of company B in the year 2008?

Production of

$$\text{Company B in 2006} \quad \left. \begin{array}{l} \\ \end{array} \right\} = \left( \frac{4}{5} \times 750 \right) \text{ tonnes}$$
$$= 600 \text{ tonnes}$$

Production of

$$\text{Company B in 2008} \quad \left. \begin{array}{l} \\ \end{array} \right\} = \left( \frac{4}{3} \times 600 \right) \text{ tonnes}$$
$$= 800 \text{ tonnes}$$

Required ratio = 600 : 800

= 3 : 4

## Simplification.

1.  $4368 + 2158 - 596 - ? = 3421 + 1262$ .

let  $4368 + 2158 - 596 - x = 3421 + 1262$

$$x \neq 596 = (4368 + 2158) - (3421 + 1262)$$

$$x \neq 596 = 6526 - 4683 = 1843$$

$$x + 596 = 1843$$

$$x = 1843 - 596$$

$$\boxed{x = 1247}$$

$$2) \quad 3456 \div 12 \div 8 = ?$$

$$\frac{3456}{12} \div 8 = x$$

$$288 \div 8 = x$$

$$x = \frac{288}{8}$$

$$x = 36$$

$$3) \quad 13 \times 252 \div 42 \div 170 = ? + 47$$

let

$$13 \times 252 \div 42 + 170 = x + 47$$

$$13 \times \frac{252}{42} + 170 = x + 47$$

$$13 \times 6 + 170 = x + 47$$

$$x + 47 = 78 + 170.$$

$$x + 47 = 248$$

$$x = 248 - 47$$

$$\boxed{x = 201}$$

4) (i)  $460 \times 15 - 5 \times 20$

(ii)  $1 \div [1 + 1 \div (1 + 1 \div 1(1 + 1 \div 2)^3)] + 1$

(i)  $460 \times 15 - 5 \times 20$ .

$$x = 6900 - 100.$$

$$\boxed{x = 6800}$$

$$(ii) = 1 \div \left[ 1+1 \div \{ 1+1 \div 1 \left( 1+\frac{1}{2} \right)^2 \} \right] + 1$$

$$= 1 + \left[ 1+1 \div \{ 1+1 \div \frac{3}{2} \} \right] + 1$$

$$= 1 + \left[ 1+1 \div \{ 1+1 \times \frac{2}{3} \} \right] + 1$$

$$= 1 \div \left[ 1+1 \div \{ 1+\frac{2}{3} \} \right] + 1$$

$$= 1 \div \left[ 1+1 \div \frac{5}{3} \right] + 1$$

$$= 1 \div \left[ 1+1 \times \frac{3}{5} \right] + 1$$

$$= 1 \div \left[ 1+\frac{3}{5} \right] + 1$$

$$= 1 \div \frac{8}{5} + 1 = 1 \times \frac{5}{8} + 1 = \frac{5}{8} + 1$$

$$= \frac{13}{8}$$

5)

$$(i) ( ? - 2763 ) \div 86 \times 13 = 208$$

$$(ii) 2565 \div 23 + 4675 \div ? = 430$$

$$(i) \text{ Let } (x - 2763) \div 86 \times 13 = 208$$

$$\frac{(x - 2763)}{86} \times 13 = 208$$

$$\frac{(x - 2763)}{86} = \frac{208}{86}$$

$$\frac{(x - 2763)}{86} = 16$$

$$(x - 2763) = 16 \times 86$$

$$x - 2763 = 1376$$

$$x = 1376 + 2763$$

$$x = 4139$$

(ii) let  $3565 \div 23 + 4675 \div x = 430$

$$\frac{3565}{23} + \frac{4675}{x} = 430$$

$$155 + \frac{4675}{x} = 430$$

$$\frac{4675}{x} = 430 - 155$$

$$\frac{4675}{x} = 275$$

$$x = \frac{4675}{275} = 17$$

$$\therefore x = 17$$

$$6) \text{ (i)} \quad \frac{(6+6+6+6) \div 6}{4+4+4+4+4}.$$

$$\frac{24 \div 6}{4+4+4+1} = \frac{4}{13}.$$

$$\text{(ii)} \quad \frac{(2+3) \times 5 + 3 \div \frac{1}{2}}{6 + 5 \times 4 \div 4 \frac{1}{5}}$$

$$\frac{5 \times 5 + 3 \times 2}{6 + 5 \times 4 \times \frac{5}{4}} = \frac{25 + 6}{6 + 25}$$

$$= \frac{31}{31},$$

$$= 1.$$

7)

$$\frac{128 \div 16 \times x - 7 \times 2}{7^2 - 8 \times 6 + x^2} = 1.$$

$$8x - 7 \times 2 = 49 - 48 + x^2$$

$$8x - 14 = 49 - 48 + x^2$$

$$8x - 14 = 1 + x^2$$

$$8x - 14 - 1 - x^2 = 0$$

$$-x^2 + 8x - 15 = 0$$

$$x^2 - 8x + 15 = 0$$

$$x^2 - 3x - 5x + 15 = 0$$

$$x(x-3) - 5(x-3) = 0$$

$$(x-3)(x-5) = 0$$

$x = 3$
$x = 5$

∴ Missing No = 3 or 5

$$8) \text{ (i) } 108 \div 36 \text{ of } \frac{1}{4} + \frac{2}{5} \times \frac{3}{4}$$

$$= 108 \div 9 + \frac{2}{5} \times \frac{13}{4}$$

$$= \frac{108}{9} + \frac{13}{10}$$

$$= \left( 12 + \frac{13}{10} \right)$$

$$= \left( \frac{120 + 13}{10} \right)$$

$$= \frac{133}{10}$$

$$= 13\frac{3}{10}$$

(9i)

$$\frac{2}{3} \times \frac{5}{6} + \frac{4}{9} - \frac{3}{4} + \frac{2}{9} \times \frac{5}{9} \div \frac{2}{9}$$

$$= \frac{2}{3} \times \frac{5}{6} + \frac{4}{9} - \frac{3}{4} + \frac{2}{9} \times \frac{5}{9} \div \frac{2}{9}$$

$$= \frac{2}{3} \times \frac{5}{6} + \frac{4}{9} - \frac{3}{4} + \frac{2}{9} \times \frac{5}{9} \times \frac{1}{2}$$

$$= \frac{5}{9} + \frac{4}{9} - \frac{3}{4} + \frac{5}{9}$$

$$= \frac{14}{9} - \frac{3}{4}$$

$$= \frac{56 - 27}{36}$$

$$= \frac{29}{36}$$

$$9) \quad 4\frac{1}{2} + 3\frac{1}{6} + ? + 2\frac{1}{3} = 13\frac{2}{5}$$

$$\text{let, } 4\frac{1}{2} + 3\frac{1}{6} + x + 2\frac{1}{3} = 13\frac{2}{5}$$

$$9\frac{1}{2} + 19\frac{1}{6} + x + 7\frac{1}{3} = \frac{67}{5}$$

$$x = \frac{67}{5} - \left( \frac{9}{2} + \frac{19}{6} + \frac{7}{3} \right)$$

$$x = \frac{67}{5} - \left( \frac{27 + 19 + 14}{6} \right)$$

$$x = \left( \frac{67}{5} - \frac{60}{6} \right)$$

$$x = \left( \frac{67}{5} - 10 \right) = \frac{17}{5} = 3\frac{2}{5}$$

$$x = 3\frac{2}{5}$$

$$10) \left[ 3\frac{1}{4} \div 1\frac{1}{4} - \frac{1}{2} \left( 2\frac{1}{2} - \frac{1}{4} - \frac{1}{6} \right)^2 \right]$$

$$= \left[ \frac{13}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left( \frac{5}{2} - \frac{3-2}{12} \right)^2 \right\} \right]$$

$$= \left[ \frac{13}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left( \frac{5}{2} - \frac{1}{12} \right)^2 \right\} \right]$$

$$= \left[ \frac{13}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left( \frac{30-1}{12} \right)^2 \right\} \right]$$

$$= \left[ \frac{13}{4} \div \left\{ \frac{5}{4} - \frac{29}{24} \right\} \right]$$

$$= \left[ \frac{13}{4} \div \left\{ \frac{30-29}{24} \right\} \right] = \left[ \frac{13}{4} \div \frac{1}{24} \right] = \left[ \frac{13}{4} \times 24 \right]$$

$$= 78.$$

$$(1) \frac{7/2 \div 5/2 \times 3/2}{7/2 \div 5/2 \text{ of } 3/2} \div 5.25$$

$$= \frac{7/2 \times 2/5 \times 3/2}{7/2 \div 15/4} \div 5.25$$

$$= \frac{\frac{21}{10}}{7/2 \times 4/15} \div \frac{525}{100}$$

$$= \frac{21}{10} \times \frac{15}{14} \times \frac{100}{525}$$

$$= \frac{6}{14}$$

$$= \frac{3}{7}$$

$$\begin{aligned} 12) \quad & b - [b - (a+b) - \{b - (b-a-b)\} + 2a] \\ &= b - [b - (a+b) - \{b - (b-a+b)\} + 2a] \\ &= b - [b - a - b - \{b - (2b-a)\} + 2a] \\ &= b - [-a - \{b - 2b + a\} + 2a] \\ &= b - [-a + b - a + 2a] \\ &= b + a - b + a - 2a \\ &= b - b + 2a - 2a \\ &= 0. \end{aligned}$$

(3) If  $x+y = 23$ ,

$$xy = 126.$$

What is the value of  $x^2+y^2$ ?

$$(x+y) = 23$$

$$(x+y)^2 = (23)^2 = 529$$

$$(x+y)^2 = 529$$

$$x^2+y^2+2xy = 529$$

$$x^2+y^2+2(126) = 529$$

$$x^2+y^2+252 = 529$$

$$x^2+y^2 = 529 - 252$$

$$\therefore x^2+y^2 = 277$$

$$(4) \text{ If } \frac{a}{b} = \frac{4}{5} \text{ and } \frac{b}{c} = \frac{15}{16},$$

$$\text{Find the value of } \frac{c^2 - a^2}{c^2 + a^2}$$

$$\begin{aligned} \frac{a+2x}{a-2x} + \frac{a+2y}{a-2y} &= \frac{\frac{4xy}{x+y} + 2x}{\frac{4xy}{x+y} - 2x} + \frac{\frac{4xy}{x+y} + 2y}{\frac{4xy}{x+y} - 2y} \\ &= \frac{4xy + 2x(x+y)}{4xy - 2x(x+y)} + \frac{4xy + 2y(x+y)}{4xy - 2y(x+y)} \\ &= \frac{2x(2y+x+y)}{2x(2y-x-y)} + \frac{2y(2x+x+y)}{2y(2x-x-y)} \end{aligned}$$

$$= \frac{(3y+x)}{(y-x)} + \frac{(3x+y)}{(x-y)}$$

$$= \frac{(3x+y)}{(x-y)} - \frac{(3y+x)}{(x-y)}$$

$$= \frac{(3x+y) - (3y+x)}{(x-y)}$$

$$= \frac{3x+y - 3y-x}{(x-y)}$$

$$= \frac{3x-3y-x-y}{(x-y)} = \frac{2x-2y}{(x-y)}$$

$$= \frac{2(x-y)}{(x-y)} = 2$$

$$16) \text{ Find the value of } 4 - \frac{5}{1 + \frac{1}{3 + \frac{1}{2 + \frac{1}{4}}}}$$

Sol

$$\text{Given} = 4 - \frac{5}{1 + \frac{1}{3 + \frac{1}{(9/4)}}}$$

$$= 4 - \frac{5}{1 + \frac{1}{3 + \frac{4}{9}}}$$

$$= 4 - \frac{5}{1 + \left(\frac{1}{\frac{31}{9}}\right)}$$

$$= 4 - \frac{5}{1 + \frac{9}{31}}$$

$$= 4 - \frac{5}{(40/31)} = 4 - \frac{5 \times 31}{40}$$

$$= 4 - \frac{31}{8} = \frac{1}{8}$$

$$= \frac{1}{8}$$

(7) If  $\frac{2x}{1 + \frac{1}{1+x}} = 1$ , then find the value of  $x$ .

We have : 
$$\frac{2x}{1 + \frac{1}{\frac{(1-x)+x}{1-x}}} = 1$$

$$\frac{2x}{1 + \frac{1}{[1/(1-x)]}} = 1$$

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

$$2x = 1 + (1-x)$$

$$2x = 2 - x$$

$$2x + x = 2 \Rightarrow 3x = 2$$

$$x = 2/3$$

18) (i) If  $4x + 5y = 83$  and  $\frac{\partial z}{\partial y} = \frac{\partial z}{\partial x}$ ,

What is the value of  $y-x$ ?

$$\frac{\partial z}{\partial y} = \frac{\partial z}{\partial x} \Rightarrow \frac{x}{y} = \frac{\partial z}{\partial x} \times \frac{\partial z}{\partial y}$$

$$x = \frac{7}{11}y$$

$$4x + 5y = 83 \Rightarrow 4 \times \frac{7}{11}y + 5y = 83.$$

$$\frac{28}{11}y + 5y = 83 \Rightarrow \frac{83}{11}y = 83$$

$$y = 83 \times \frac{11}{83} = 11$$

$$y = 11$$

$$\therefore x = \frac{7}{11} y$$
$$= \frac{7}{11}(x_1)$$

$$\therefore (y=11)$$

$$\boxed{\therefore x = 7}.$$

(iii) If  $\frac{x}{4} - \frac{x-3}{6} = 1$ , then find the value of  $x$ .

$$\frac{x}{4} - \frac{x-3}{6} = 1$$

$$\Leftrightarrow \frac{3x - 2(x-3)}{12} = 1$$

$$3x - 2x + 6 = 12$$

$$x + 6 = 12$$

$$x = 12 - 6$$

$$\boxed{\therefore x = 6}$$

19) If  $2x + 3y = 34$  and  $\frac{x+y}{y} = \frac{13}{8}$ ,

then find the value of  $5y + 7x$ .

The Given Equation

$$2x + 3y = 34 \quad \text{(i)}$$

$$\frac{x+y}{y} = \frac{13}{8} \Rightarrow 8x + 8y = 13y \Rightarrow 8y - 5y = 0 \quad \text{(ii)}$$

Multiplying (i) by 5, (ii) by 3 and adding, we get.

$$34x = 170$$

$$\boxed{x = 5}$$

Put  $x = 5$  in (i)

$$\boxed{y = 8}$$

$$\begin{aligned}\therefore 5y + 7x &= (5 \times 8 + 7 \times 5) \\ &= 40 + 35 \\ &= 75.\end{aligned}$$

20) The cost of 4 bags and 3 boxes is £ 555 and the cost of 3 bags and 1 boxes is £ 460. what is the cost of one bag?

Let the cost of 1 bag be £  $x$  and that of 1 box be £  $y$

$$4x + 3y + 555 \rightarrow (i)$$

$$3x + 4y + 460 \rightarrow (ii)$$

Add (i) & (ii)

$$7x + 7y = 1015$$

$$x + y = 145 \longrightarrow (iii)$$

Sub (ii) and (i)

$$x - y = 95 \longrightarrow (iv)$$

Add (iii) & (iv)

$$2x = 240$$

$$\boxed{x = 120}$$

Hence, cost of 1 bag = ₹ 120.

81) If  $2x + 3y + z = 55$ ,  
 $x + z - y = 4$  and  
 $y - x + z = 12$ ,

then What are the values of  $x$ ,  $y$  and  $z$ ?

The given Equations are:

$$2x + 3y + z = 55 \rightarrow (i)$$

$$x + z - y = 4 \Rightarrow (ii)$$

$$y - x + z = 12 \rightarrow (iii)$$

Sub (ii) From (i)

$$x + 4y = 51 \rightarrow (iv)$$

Sub (iii) From (i)

$$3x + 2y = 43 \rightarrow (v)$$

Multiplying (v) by 2 and subtracting (iv)  
from it,

We get :  $5x = 35$

$$x = 7$$

Put  $x = 7$  in (iv)

$$x + 4y = 51$$

$$7 + 4y = 51$$

$$4y = 51 - 7$$

$$4y = 44$$

$$y = 11$$

$x = 7$ ,  $y = 11$  in (i)

$$2(7) + 3(11) + z = 55$$

$$14 + 33 + z = 55$$

$$47 + z = 55$$

$$z = 55 - 47$$

$$z = 8$$

22) If  $x^2 - 7x = -12$ , what is the value of  $x$ ?

$$x^2 - 7x = -12$$

$$x^2 - 7x + 12 = 0$$

$$x^2 - 3x - 4x + 12 = 0$$

$$x(x-3) - 4(x-3) = 0$$

$$(x-3)(x-4) = 0$$

$$\boxed{x=3 \text{ or } x=4}$$

23) Find the value of  $(1-\frac{1}{3})(1-\frac{1}{4})(1-\frac{1}{5}) \dots (1-\frac{1}{100})$

Given expression  $y = \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \dots \times \frac{99}{100}$

$$= \frac{2}{100}$$

$$= \frac{1}{50}$$

$$* \quad 1888 \div 32 \div 8$$

$$1888 \div 32 \div 8$$

$$\begin{array}{r} 1888 \\ \hline 32 \\ \end{array} \div 8$$

$$59 \div 8$$

$$\frac{59}{8} = 7.375$$

$$* \quad 4848 \div 24 \times 11 - 222$$

$$= \frac{4848}{24} \times 11 - 222$$

$$= 202 \times 11 - 222$$

$$= 2222 - 222$$

$$= 2000,$$

$$\star \quad \frac{425 \times 4000}{16000} \times 12$$

$$= \frac{425 \times 4000}{16000} \times 12$$

$$= \frac{425 \times 14}{164} \times 12$$

$$= \frac{425 \times 12}{14}^3 = 425 \times 3 = 1275.$$

$$\star) [(84)^2 \div 28 \times 12] \div 24 = 7 \times x$$

$$\left( \frac{84 \times 84}{28} \times 12 \right) \div 24 = 7 \times x$$

$$(84 \times 3 \times 12) \div 24 = 7x$$

$$7x = \frac{3024}{24} = 126$$

$$7x = 186$$

$$x = \frac{186}{7}$$

$$x = 18$$

(\*)  $354750 \div (4096 + x) = 55$

$$\frac{354750}{4096 + x} = 55$$

$$55(4096 + x) = 354750$$

$$55x = 354750 - 225280$$

$$55x = 129470$$

$$\therefore x = 2354$$

$$* \quad 853 + ? \div 17 = 1000$$

$$853 + x \div 17 = 1000$$

$$853 + \frac{x}{17} = 1000$$

$$\frac{x}{17} = 1000 - 853$$

$$\frac{x}{17} = 147$$

$$x = 147 \times 17$$

$$x = 2499.$$

$$* \quad (? - 968) \div 79 \times 4 = 512$$

$$\frac{(x - 968)}{79} \times 4 = 512$$

$$x - 968 = \frac{512 \times 79}{4}$$

$$x - 968 = 10112$$

$$x = 10112 + 968$$

$$\therefore x = 11080$$

\*  $999 \times 99 \times \frac{9}{99} \div 9 \div 3$

$$= 999 \times 99 \times \frac{9}{99} \times \frac{1}{9} \div 3$$

$$= 999 \times 99 \times \frac{9}{99} \times \frac{1}{9} \times \frac{1}{3}$$

$$= \frac{999}{3}$$

$$= 333$$

$$* \quad 45 - [28 - \{ 37 - (15-x) \}] = 58$$

$$45 - [28 - \{ 37 - (15+x) \}] = 58$$

$$45 - [28 - \{ 22+x \}] = 58$$

$$45 - [28 - 22+x] = 58$$

$$45 - [6-x] = 58$$

$$45 - 6 + x = 58$$

$$x = 58 - 45 + 6$$

$$= 64 - 45$$

$$\boxed{x = 19}$$

$$* \frac{7^3 \times 7^2}{6^3 \times 2^4 \times 3^4}$$

$$= \frac{7^3 \times 7^2}{6^3 \times 2^4 \times 3^4}$$

$$= \frac{7^{(3+2)}}{6^3 (2 \times 3)^4}$$

$$= \frac{7^5}{6^3 \times 6^4}$$

$$= \frac{7^5}{6^{(3+4)}} = \frac{7^5}{6^7}$$

$$= \frac{7^5}{6^7}$$

$$* \frac{113 \times 4 - x \times 2}{13 \times 9 - 5 \times 7} = 5.$$

$$\frac{452 - 2x}{117 - 35} = 5.$$

$$\frac{452 - 2x}{82} = 5$$

$$452 - 2x = 5 \times 82$$

$$452 - 2x = 410$$

$$-2x = 410 - 452$$

$$+2x = 42$$

$$x = 42/2$$

$$\therefore x = 21$$

$$* \quad \begin{array}{r} 252 - 48 \\ \hline 192 - 80 \\ = \frac{192}{102} \\ = 2 \end{array}$$

$$* \quad \begin{array}{r} \frac{15}{21} - \frac{10}{14} + \frac{5}{7} \\ = \cancel{\frac{5}{7}} - \frac{5}{7} + \frac{5}{7} \\ = \frac{5}{7} \end{array}$$

$$* \quad \begin{array}{r} \frac{3+2 \times 3}{4+3 \times 2/3} \\ = \frac{3+6}{4+2} \end{array}$$

$$\begin{array}{r} = \frac{9}{8} \\ = \frac{3}{2} \end{array}$$

$$* \frac{4+72-14}{}$$

$$138 - 130$$

$$\frac{76-14}{8}$$

$$= \frac{62}{8}$$

$$= 7.75$$

$$* \frac{2400 - 240}{}$$

$$1120 + 110$$

$$= \frac{2460}{1230}$$

$$= 2$$

$$* \frac{8 - [5 - (-1)] \div 2}{|2| - |-3| \div 3}$$

$$= \frac{8 - [5 + 1] \div 2}{2 - 3 \div 3}$$

$$= \frac{8 - 6 \div 2}{2 - 3 \div 3}$$

$$= \frac{8 - 2^3}{2 - 1} = \frac{8 - 3}{1} = \frac{5}{1} = 5.$$

$$= 5.$$

$$* (2^9 + 4^9 + 6^9 + \dots + 20^9)$$

$$= 2^9 (1^9 + 2^9 + 3^9 + \dots + 10^9)$$

$$= 4 \times 385$$

$$= 1540.$$

$$* \frac{9}{4} + \frac{4}{3} - \frac{9}{2} = \frac{27 + 16 - 54}{12}$$

$$= \frac{43 - 54}{12}$$

$$= \frac{-11}{12}$$

$$* 4\frac{3}{7} - 1\frac{3}{14} = ? + 2\frac{3}{28}$$

$$4\frac{3}{7} - 1\frac{3}{14} = x + 2\frac{3}{28}$$

$$\frac{31}{7} - \frac{17}{14} = x + \frac{59}{28}$$

$$x = \frac{31}{7} - \frac{17}{14} - \frac{59}{28}$$

$$x = \frac{124 - 34 - 59}{28}$$

$$x = \frac{124 - 93}{28}$$

$$x = \frac{31}{28}$$

$$x = 1\frac{3}{28} \text{ //}$$

$$* \quad \frac{37}{3} + \frac{65}{6} - \frac{23}{3} - \frac{11}{7}$$

$$\underline{518 + 455 - 322 - 66}$$

42

$$= \frac{585}{42} = \frac{195}{14} = 13 \frac{13}{14}.$$

$$* \quad \frac{87}{13} - \frac{48}{11} + \frac{12}{5}$$

$$= \underline{4785 - 3120 + 1716}$$

715

$$= \frac{3381}{715}$$

$$= \cancel{47.581} \quad 4 \frac{581}{715}$$

$$* \quad \frac{35}{6} - \frac{35}{9} = ? = 1$$

$$\frac{35}{6} - \frac{35}{9} - x = 1$$

$$x = \frac{35}{6} - \frac{35}{9} - 1$$

$$= \frac{35}{6} - \left( \frac{35}{9} + 1 \right)$$

$$= \frac{35}{6} - \frac{44}{9}$$

$$= \frac{105 - 88}{18}$$

$$= \frac{17}{18}$$

\*

$$\frac{1}{x} = 4 - \left( \frac{1}{3} + \frac{1}{2} \right)$$

$$\frac{1}{x} = 4 - \left( \frac{1}{3} + \frac{1}{2} \right)$$

$$\frac{1}{x} = 4 - \left( \frac{2+3}{6} \right)$$

$$= 4 - \frac{5}{6}$$

$$= \frac{24-5}{6}$$

$$\frac{1}{x} = \frac{19}{6}$$

$$\therefore x = \frac{6}{19}$$

$$* \quad \begin{array}{r} 532 \\ \times 438 \\ \hline 648 \end{array}$$

$$\begin{array}{r} 532 \\ \times 438 \\ \hline 288 \end{array}$$

$$= \frac{133}{81} \times \frac{54}{147}$$

$$= \frac{19}{3} \times \frac{2}{21}$$

$$= \frac{38}{63}$$

$$* \quad \begin{array}{r} 21 \\ \times 181 \\ \hline 11 \end{array} \quad \begin{array}{r} 181 \\ \times 217 \\ \hline 7 \end{array}$$

$$= \frac{2387}{2}$$

$$= 1193 \frac{1}{2},$$

$$* \left( \frac{41}{6} \times \frac{16}{3} + \frac{53}{3} \times \frac{9}{2} \right)$$

$$= 38^{\circ} \quad \frac{41}{6} \times \frac{16}{3} + \frac{53}{3} \times \frac{9}{2}$$

$$= \frac{328}{9} + \frac{159}{2}$$

$$= \frac{656 + 1431}{18}$$

$$= \frac{2087}{18}$$

$$x = 115 \frac{17}{18}$$

$$* \quad \frac{24}{5} \div \frac{32}{5}$$

$$= \frac{24}{5} \times \frac{5}{32}$$

$$* \quad = \frac{3}{4}$$

$$\frac{5}{4} + \frac{14}{9} \times \frac{13}{8} \times \frac{2}{13}$$

$$= \frac{5}{4} + \frac{7}{18} = \frac{45+14}{36} = \frac{59}{36}$$

$$= 1 \frac{23}{36}$$

$$* \quad \frac{225}{836} \times \frac{152}{245} \div \frac{120}{77}$$

$$= \frac{225}{836} \times \frac{152}{245} \times \frac{77}{120}$$

$$= \frac{3}{28}$$

$$* \left( \frac{82}{5} - \frac{181}{15} \right) \div \frac{247}{81}$$

$$= \left( \frac{846 - 181}{15} \right) \times \frac{81}{247}$$

$$= \frac{65}{15} \times \frac{81}{247} = \frac{27}{19} = 1 \frac{8}{19}$$

$$* 18 \frac{3}{4} \times ? \div \frac{6}{37} = 1480$$

$$18 \frac{3}{4} \times x \div \frac{6}{37} = 1480$$

$$\frac{75}{4} \times x \times \frac{37}{6} = 1480$$

$$x = \frac{1480 \times 4 \times 6}{75 \times 37}$$

$$x = \frac{64}{5}$$

$$x = 12 \frac{4}{5}$$

$$* \quad \frac{3}{2} \times \frac{11}{5} \div \frac{5}{4} \div \frac{33}{15}$$

$$= \frac{3}{2} \times \frac{11}{5} \times \frac{4}{5} \times \frac{15}{33} \text{ Ans.}$$

$$= \frac{3}{2} \times \frac{1}{5} \times \frac{4}{5} \times 1$$

$$= \frac{6}{25} = \frac{1}{25}$$

$$* \quad 1 + 2 \div \left\{ 1 + 2 \div \frac{4}{3} \right\}$$

$$= 1 + 2 \div \left\{ 1 + 2 \times \frac{3}{4} \right\}$$

$$= 1 + 2 \div \left\{ 1 + 3 \frac{1}{2} \right\}$$

$$= 1 + 2 \div \left\{ \frac{2+3}{2} \right\}$$

$$= 1 + 2 \div \left\{ 5/2 \right\}$$

$$= 1 + 2 \times \frac{2}{5}$$

$$= 1 + 4/5$$

$$= \frac{5+4}{5}$$

$$\boxed{x = 9/5. = 1 \frac{4}{5}}$$

$$* 5/3 \div 8/7 \times x/7 = 5/3 \times 2/3 \div 1/6 \rightarrow \text{Question} =$$

$$5/3 \times 7/2 \times x/7 = 5/4 \times 2/3 \times 6$$

$$\Rightarrow 5/6 x = 5 \Rightarrow x = \frac{5 \times 6}{5} = 6$$

$$\boxed{\therefore x = 6}$$

$$*\frac{16}{3} - \frac{11}{3} \div \frac{4}{3} \div x + \frac{16}{5} \div \frac{6}{5} = 7$$

$$\frac{16}{3} - \frac{11}{3} \times \frac{3}{4} \times \frac{1}{x} + \frac{16}{5} \times \frac{5}{6} = 7$$

$$\frac{16}{3} - \frac{11}{4} \times \frac{1}{x} + \frac{16}{6} = 7$$

$$\frac{16}{3} - \frac{11}{4x} + \frac{16}{6} = 7$$

$$\frac{16}{3} - \frac{11}{4x} + \frac{8}{3} = 7$$

$$\frac{24}{3} - \frac{11}{4x} = 7$$

$$\frac{11}{4x} = 8 - 7 = 1$$

$$4x = 1 \times 11$$

$$x = 11/4$$

$$\boxed{\therefore x = 2\frac{3}{4}}$$

$$* \frac{5}{6} \div \frac{6}{7} \times x - \frac{8}{9} \div \frac{8}{5} + \frac{3}{4} \times \frac{10}{3} = \frac{25}{9}$$

$$\frac{5}{6} \times \frac{7}{6} \times x - \frac{8}{9} \times \frac{5}{8} + \frac{3}{4} \times \frac{10}{3} = \frac{25}{9}$$

$$\frac{35}{36} x - \frac{40}{72} + \frac{10}{4} = \frac{25}{9}$$

$$\frac{35x}{36} - \frac{5}{9} + \frac{10}{12} = \frac{25}{9}$$

$$\frac{35x}{36} = \frac{25}{9} + \frac{5}{9} - \frac{5}{2}$$

$$\frac{35}{36} x = \frac{5}{6}$$

$$x = \frac{1}{6} \times \frac{36}{35}$$

$$\therefore x = \frac{6}{35}$$

$$* \left( \frac{5}{7} \times \frac{19}{13} \right) \div \left( \frac{19}{7} \times \frac{4}{13} \right)$$

$$= \left( \frac{5 \times 19}{7 \times 13} \right) * \left( \frac{7 \times 13}{19 \times 4} \right)$$

$$= \frac{5 \times 13}{13 \times 4}$$

$$\boxed{x = \frac{5}{4}}$$

$$* \frac{11}{4} \div \frac{8}{3} \div \frac{13}{12}$$

$$= \frac{11}{4} \times \frac{3}{8} \times \frac{12}{13}^3$$

$$= \frac{33 \times 3}{8 \times 13} = \frac{99}{104}$$

$$\boxed{\therefore x = \frac{99}{104}}$$

$$* \quad \frac{4335}{?} \div \frac{15}{8} = \frac{289}{528}$$

$$\frac{4335}{x} \div \frac{15}{8} = \frac{289}{528}$$

$$\begin{aligned}\frac{4335}{x} &= \frac{289}{528} \times \frac{8}{15} \\ &= \frac{289 \times 8}{176 \times 15}\end{aligned}$$

$$x = \left( \frac{4335 \times 176 \times 8}{289 \times 5} \right)$$

$$\therefore x = 4884$$

$$* \quad \frac{3}{4} \div \frac{9}{4} \text{ of } \frac{2}{3} - \frac{\left( \frac{3-2}{6} \right)}{\left( \frac{3+2}{6} \right)} \times \frac{10}{3} + \frac{5}{6}$$

$$= \frac{\frac{3}{4}}{\frac{9}{4}} \div \frac{3}{2} - \frac{1}{6} \times \frac{6}{5} \times \frac{10}{3} + \frac{5}{6}$$

$$= \frac{3}{4} \times \frac{2}{3} - \frac{6}{6 \times 5} \times \frac{10}{3} + \frac{5}{6}$$

$$= \frac{3}{6} - \frac{60}{6 \times 15} \times \frac{2}{3} + \frac{5}{6}$$

$$= \frac{3}{6} - \frac{2}{3} + \frac{5}{6}$$

$$= \left( \frac{1}{2} - \frac{2}{3} + \frac{5}{6} \right) = \left( \frac{3-4+5}{6} \right)$$

$$= \frac{4}{6}$$

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

$$* \frac{1}{3} + \frac{3}{4} \left( \frac{6-5}{15} \right)$$

$$\frac{5}{3} \text{ of } \frac{3}{4} - \frac{1}{5}$$

$$\frac{\frac{1}{3} + \frac{3}{4} \left( \frac{1}{15} \right)}{\frac{5}{3} \times \frac{3}{4} - \frac{1}{5}}$$

$$= \frac{\frac{1}{3} + \frac{1}{20}}{\frac{5}{4} - \frac{1}{5}} = \frac{\frac{20+3}{60}}{\frac{25-4}{20}} = \frac{23}{60} / \frac{21}{20}$$

$$= \frac{23}{60} \times \frac{20}{21}$$

$$= \frac{23}{60} \times \frac{20}{21}$$

$x = \frac{23}{63}$

## Simple Interest.

1. Find the simple Interest on ₹ 68000 at  $16\frac{2}{3}\%$  per annum for 9 months.

$$P = ₹ 6800$$

$$R = \frac{50}{3}\% \text{ pa} \text{ and } T = 9 \text{ months}$$

$$= \frac{9}{12} \text{ years} = \frac{3}{4} \text{ years}$$

$$SI = \left( \frac{PRT}{100} \right)$$

$$= \left( \frac{6800 \times \frac{50}{3} \times \frac{3}{4}}{100} \right) = ₹ \left( 6800 \times \frac{50}{3} \times \frac{3}{4} \times \frac{1}{100} \right)$$

$$= ₹ \left( \frac{68 \times 50}{4} \right) = ₹ 8500$$

Q. Find the S.I on ₹ 3000 at  $6\frac{1}{4}\%$  per annum for the periods from 4th Feb, 2009 to 18th April, 2009

$$\text{Time} = (24 + 31 + 18) \text{ days} = 73 \text{ days}$$

$$= 73 \text{ days} = \frac{73}{365} \text{ years} = \frac{1}{5} \text{ year}$$

$$P = ₹ 3000, R = 6\frac{1}{4}\% = \frac{25}{4}\% \text{ p.a}$$

$$S.I = ₹ \left( 3000 \times \frac{25}{4} \times \frac{1}{5} \times \frac{1}{100} \right)$$

$$= ₹ \left( \frac{30 \times 5}{4} \right)$$

$$= ₹ 37.50.$$

3) A sum at simple Interest at  $13\frac{1}{2}\%$  per annum amounts to ₹ 2502.50 after 4 years. Find the sum.

Let the sum be ₹  $x$ .

$$SI = ₹ \left( x \times \frac{27}{2} \times 4 \times \frac{1}{100} \right) = ₹ \frac{27x}{50}$$

$$\text{Amount} = ₹ \left( x + \frac{27x}{50} \right) = \frac{77x}{50} = \left( \frac{77x}{50} \right)$$

$$\therefore \frac{77x}{50} = 2502.50$$

$$x = \frac{2502.50 \times 50}{77}$$

$$x = 1625$$

Hence, sum = ₹ 1625.

4) The simple interest accrued on an amount of ₹ 2500 at the end of 6 years is ₹ 1875. What would S.I accrued on an amount of ₹ 6875 at the same rate and for the same period?

$$P = ₹ 2500, T = 6 \text{ years}, SI = ₹ 1875.$$

$$\therefore \text{Rate} = \left( \frac{100 \times 1875}{2500 \times 6} \right) \% = 12\frac{1}{2}\%.$$

$$\text{Now, } P = ₹ 6875, T = 6 \text{ years}, R = 12\frac{1}{2}\%.$$

$$\therefore S.I = ₹ \left( \frac{6875 \times 25 \times 6}{100 \times 2} \right)$$

$$S.I = ₹ 5156.25$$

\* At what rate of SI a certain sum will be doubled in years?

let Principal = P

Then, SI = P and

T = 15 years

$$\therefore \text{Rate} = \left( \frac{100 \times P}{P \times 15} \right) \%$$

$$= \frac{100}{15} \%$$

$$\boxed{\therefore \text{Rate} = 6\frac{2}{3} \%}$$

\* On certain sum, the SI at the end of  $12\frac{1}{2}$  years becomes  $\frac{3}{4}$  of the sum.  
What is the rate of interest p.c.p.a?

Let Principal = P

Then  $S.I = \frac{3}{4} P$  and

$T = 12\frac{1}{2}$  yrs.

$$\therefore \text{Rate} = \left( \frac{100 \times \frac{3}{4} P}{P \times 25\frac{1}{2}} \right) \%$$

$$= \left( \frac{100 \times 3 \times 2}{4 \times 25} \right) \%$$

$$\boxed{\therefore \text{Rate} = 6 \%}$$

In how Many years will a sum of Money double itself at  $6\frac{1}{4}\%$ . S.I per annum.

let the Principal = P, Then,

$$SI = P \text{ and}$$

$$R = 6\frac{1}{4}\%$$

$$\text{Time} = \left( \frac{100 \times P}{P \times \frac{25}{4}} \right) \text{ years}$$

$$= \left( \frac{100 \times 4}{25} \right) \text{ years}$$

$$\boxed{\text{Time} = 16 \text{ years}}$$

A certain sum of Money becomes three times of itself at  $6\frac{1}{4}\%$  S.I per annum in 20 years at S.I. In how Many years does it become double of itself at the same rate of S.I.

let the principal = P, Then S.I = 2P & T = 20 years.

$$\text{Rate} = \left( \frac{100 \times 2P}{P \times 20} \right) \% = 10\%$$

Principal = P, S.I = P, R = 10%.

$$\text{Time} = \left( \frac{100 \times P}{P \times 10} \right) \text{ years}$$

$$\therefore \text{Time} = 10 \text{ years}$$

\* The simple interest on a sum of money is  $\frac{4}{9}$  of the Principal. Find the rate per cent and time if both are numerically equal.

let  $Bum = \text{£ } X$ , Then  $SI = \text{£ } 4X/9$ .

let rate =  $R\%$ . and Time =  $R$  years.

$$\text{Then, } \left( \frac{X \times R \times R}{100} \right) = \frac{4X}{9} \text{ or}$$

$$R^2 = \frac{400}{9} \text{ or } R = \frac{20}{3} = 6\frac{2}{3}.$$

$\therefore$  Rate =  $6\frac{2}{3}\%$  and

Time =  $6\frac{2}{3}$  years

$\boxed{\therefore \text{Time} = 6 \text{ years } 8 \text{ Months.}}$

\* The sum A Person lends out of ₹ 9000 on the conditions that the loan is payable in 10 months by 10 Monthly Equal instalments of 1000 Each. Find the rate of simple Interest charged.

We have,

$$\text{₹ } 9000 + \text{S.I on ₹ } 9000 \text{ for 10 Months}$$

$$= \text{₹ } 10,000 + \text{SI on ₹ } 1000 \text{ for } (1+2+\dots+9) \text{ Months}$$

$$\Rightarrow \text{₹ } 9000 + \text{S.I on ₹ } 1000 \text{ for 90 months}$$

$$= \text{₹ } 10,000 + \text{SI on ₹ } 1000 \text{ for 45 months.}$$

$$\Rightarrow \text{SI on ₹ } 1000 \text{ for 45 months} = \text{₹ } 1000$$

$$\therefore \text{Rate} = \left( \frac{100 \times 1000 \times 12}{1000 \times 45} \right) \% = \frac{80}{3} \% = 26\frac{2}{3} \%$$