BM

Determinants :-

$$\begin{vmatrix} 2 & 4 \\ 3 & 1 \end{vmatrix}_{2\times 2}, \quad \begin{vmatrix} 3 & 2 & 1 \\ 3 & 2 & 2 \\ 2 & 1 & 2 \end{vmatrix}_{3\times 3}$$

Properties of determinants :-

(i)

In a determinante if row or a column Interchange and the value of determinante do not change.

ex :-

$$\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = 10 - 12 = -2$$

$$\begin{vmatrix} 2 & 4 \\ 3 & 5 \end{vmatrix} = 10 - 12 = -2$$

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(ii) If two rows or two colums are Interchange the sign is change:-

Ex:- $\begin{vmatrix} 2 & 7 \\ 6 & 3 \end{vmatrix} = 6-42 = -3$

$\begin{vmatrix} 7 & 2 \\ 3 & 6 \end{vmatrix} = 42-6 = 36$

(iii) If two rows or two colums of a determinante are same the value of determinante is ~~same~~ 0.

$\begin{vmatrix} 2 & 2 \\ 2 & 2 \end{vmatrix} = 0$

(iv) If all elements of any rows any any colum is 0 value of determinante is 0.

$\begin{vmatrix} 2 & 0 & 2 \\ 3 & 0 & 1 \\ 4 & 0 & 2 \end{vmatrix} = 0$

(V) EX:-

$$\begin{vmatrix} 2\times2 & 3 \\ 2\times2 & 4 \end{vmatrix} = 8-6=2$$

$$\begin{vmatrix} 4 & 3 \\ 4 & 4 \end{vmatrix} = 16-12 = 4$$

$= 2\times2$

(vi) Minor of a determinante :-

$$\begin{vmatrix} 2 & 3 \\ 4 & 3 \end{vmatrix}$$

$M_{11} = 3$
$M_{12} = 4$
$M_{21} = 3$
$M_{22} = 2$

$$\begin{vmatrix} 2 & 3 & 4 \\ 6 & 2 & 8 \\ 7 & -1 & 10 \end{vmatrix} = M_{11} = \begin{vmatrix} 2 & 8 \\ -1 & 16 \end{vmatrix}$$

$M_{11} = 20+8 = 28$

$M_{12} = 4$
$M_{13} = -20$
$M_{21} = 34$
$M_{22} = -8$

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→ The minor of a determinante is defi[ned] as a determinante obtained by deleting the row and column containg the element.

Co- factor :-

$(-1)^{i+j} \times$ Minor (m_{ij})

→ $i+j =$ even, $= (+)$ sign

$i+j =$ odd $= (-)$ sign

$$\begin{vmatrix} 2 & 3 & 4 \\ 6 & 2 & 8 \\ 7 & -1 & 10 \end{vmatrix} \Rightarrow$$

$C_{11} = (28)$

$C_{12} = -4$

$C_{13} = -20$

$C_{21} = -34$

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Q.1 The minors and Co-factor of -4 and 9 in determinant

$$\begin{vmatrix} -1 & 2 & 3 \\ -4 & 5 & -6 \\ -7 & -8 & 9 \end{vmatrix}$$

$$M_{21} = \begin{vmatrix} 2 & 3 \\ -8 & 9 \end{vmatrix} = 18 + 24 = 42$$

$$C_{21} = -42$$

$$M_{33} = \begin{vmatrix} -1 & 2 \\ -4 & 5 \end{vmatrix} = -5 + 8 = 3$$

$$C_{33} = 3$$

$a_1x + b_1y + c_1z = d_1$

$a_2x + b_2y + c_2z = d_2$

$a_3x + b_3y + c_3z = d_3$

$$D = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

$$D_1 = \begin{vmatrix} d_1 & b_1 & c_1 \\ d_2 & b_2 & c_2 \\ d_3 & b_3 & c_3 \end{vmatrix}$$

$$D_2 = \begin{vmatrix} a_1 & d_1 & c_1 \\ a_2 & d_2 & c_2 \\ a_3 & d_3 & c_3 \end{vmatrix}$$

$$x = \frac{D_1}{D}, \quad y = \frac{D_2}{D}, \quad z = \frac{D_3}{D}$$

Solve the following equation by using cramer's rule:-

$$2x - 3y + 4z = -9$$

$$-3x + 4y + 2z = 12$$

$$4x - 2y - 3z = -3$$

$$D = \begin{vmatrix} 2 & -3 & 4 \\ -3 & 4 & 2 \\ 4 & -2 & -3 \end{vmatrix}$$

$$= 2\,|-12+4| + 3\,|9-8| + 4\,|+6-16|$$

$$= -16 + 3 - 40 = -53$$

$$D_1 = \begin{vmatrix} -9 & -3 & 4 \\ -12 & -4 & 2 \\ -3 & -2 & -3 \end{vmatrix}$$

$$D_1 = -9 \begin{vmatrix} -4 & 2 \\ -2 & -3 \end{vmatrix} + 3 \begin{vmatrix} -12 & 2 \\ -3 & -3 \end{vmatrix} + 4 \begin{vmatrix} -12 & -4 \\ -3 & -2 \end{vmatrix}$$

$$D_1 = -9\,[-12+4] + 3\,[+36+6] + 4\,[+24+12]$$

$$D_1 = -9\,[-8] + 3\,[-42] + 4\,[+36]$$

$$D_1 = 72 + (+126) + 144$$

$$\cancel{D_1 = 72 - 138}$$

$$\cancel{D_1 = -66}$$

$$D_1 = 342$$

$$x = \frac{D_1}{D} = \frac{342}{-53}$$

$$D_2 = \begin{vmatrix} 2 & -9 & 4 \\ -3 & -12 & 2 \\ 4 & -3 & -3 \end{vmatrix}$$

$$D_2 = 2[36+6] + 9[9+8] + 4[9+48]$$

$$D_2 = 84 + 9 + (57 \times 4)$$

$$D_2 = 84 + 9 + 228$$

$$D_2 = 321$$

$$y = \frac{D_2}{D} = \frac{321}{-53}$$

$$D_3 = \begin{vmatrix} 2 & -3 & -9 \\ -3 & 4 & -12 \\ 4 & -2 & -3 \end{vmatrix}$$

$$D_3 = 2\,|-12+24| + 3\,|9+48| + (-9)\,|-6-16|$$

$$D_3 = 2(12) + 3(57) - 9(-22)$$

$$D_3 = 189 \qquad z = \frac{189}{-53}$$

Q.1 Solve using cramer's rule:-

$$5x - 7y + z = 11$$
$$6x - 8y - z = 15$$
$$3x + 2y - 6z = 7$$

$$D = \begin{vmatrix} 5 & -7 & 1 \\ 6 & -8 & -1 \\ 3 & 2 & -6 \end{vmatrix}$$

$$|D| = 5[48+2] + 7[-36+3] + 1[12+24]$$

$$D = 250 + (-231) + 36$$

$$D = \cancel{\begin{array}{r} 286 \\ +\ 231 \\ \hline 517 \end{array}} \qquad \begin{array}{r} 286 \\ -\ 251 \\ \hline 35 \end{array} \qquad \begin{array}{r} 286 \\ -\ 231 \\ \hline 55 \end{array}$$

$$D = 55$$

$$D_1 = \begin{vmatrix} 11 & -7 & 1 \\ 15 & -8 & -1 \\ 7 & 2 & -6 \end{vmatrix}$$

$$D_1 = 11[48+2] + 7[-90+7] + 1[30+56]$$

$$D_1 = 555 + [-(63 \times 7)] + 86$$

$$D_1 = +55$$

$$x = \frac{D_1}{D} = \frac{55}{55} = 1$$

$$D_2 = \begin{vmatrix} 5 & 11 & 1 \\ 6 & 15 & -1 \\ 3 & 7 & -6 \end{vmatrix} = -55$$

$$y = -1$$

$$D_3 = \begin{vmatrix} 5 & -7 & 11 \\ 6 & -8 & 15 \\ 3 & 2 & 7 \end{vmatrix} = -55$$

$$z = -1 = \frac{D_3}{D}$$

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matrics:- Let us consider a set of simultanous equation

$$3x + y + 4z = 0$$

$$2x + 3y + 8z = 0$$

$$5x + 4y + 7z = 0$$

→ cofiecient ~~cots~~ close In square bracket, we call them bracket, the above system of number's arrange In a rectuligiar array In rows and colums and boundad by bracket is called a matrix:-

$$A = \begin{bmatrix} 3 & 1 & 4 \\ 2 & 3 & 8 \\ 5 & 4 & 7 \end{bmatrix}$$

Types of matrices:-

(i)

Row matrix:-

If a matrix has only one row and any numbers of colums is called row matrix.

Ex:- $\cancel{\begin{bmatrix} 2 \\ 3 \\ 3 \\ 2 \end{bmatrix}}$ $\begin{bmatrix} 2 & 3 & 4 & 7 \end{bmatrix}_{1\times 4}$

(ii)

Column:-

one column, and any number of rows is known as column matrix

Ex: $\begin{bmatrix} 2 \\ 4 \\ 8 \\ 7 \end{bmatrix}_{4\times 1}$ $\underset{\text{row}}{m} \times \underset{\text{column}}{n}$

(iii)

NULL matrix [zero]:-

Any matrix In which all the elements are zero called NULL or zero matrix.

(iv) **Square matrix :-** A matrix In which the number of colums is equal to = no. of rows is called square matrix

(v) **Digoanal matrix :-** A square matrix is called Digoanal matrix, If all non Digoanal are zero.

Ex:-

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & \end{bmatrix}$$

(vi) unit or identity matrix :-

A square matrix is called unit or identity matrix if all digoanal elements are one and all non digoanal are zero. [I].

$$I_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}_{3\times 3}$$

$$I_2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}_{2\times 2}$$

:- Basic formula:-

$(a+b)^2 = a^2 + b^2 + 2ab$

$(a-b)^2 = a^2 + b^2 - 2ab$

$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

$a^2 - b^2 = (a+b)(a-b)$

$a^3 + b^3 = (a+b)(a^2 + b^2 - ab)$

$a^3 - b^3 = (a-b)(a^2 + b^2 + ab)$

$ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{+2a}$$

$3x^2 + 9x - 4 = 0$

$x+3=$
$x=-3$

$x^2-5x+6=0$
$x^2-3x-2x+6$
$x(x-3)-2(x-3)=0$
$(x-2)=0 \quad (x-3)=0$
$x=2, \quad x=3$

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

~~$x^2+5x-3x-15=0$~~
~~$x(x+5)-3(x+5)=0$~~
~~$x=-5, \quad x=3$~~

$x^2-5x+3x-15$
$x(x-5)+3(x-5)$
$x=5, \quad x=-3$

$x^2+10x+25=0$
$x^2+5x+5x+25=0$
$x(x+5)+5(x+5)=$
$x=-5,-5$
$(x+5)^2=0$

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$x^2 - 48x + 576 = 0$

$$x = \frac{48 \pm \sqrt{(48)^2 - 4\times1\times576}}{2\times1}$$

$x = 48 + \sqrt{\quad}$

$x^2 - 24x - 24x + 576 = 0$

$x(x-24) - 24(x-24) = 0$

$(x-24)^2 = 0$

$x^3 - 12x^2 + 36x - 32 = 0$

→ remainder theroem.

$x = 2$

$8 - 36 + 72 - 32 = 0$

$80 - 80 = 0$

$(x-2) = 0$

$x-2 \overline{)\, x^3 - 12x^2 + 36x - 32 \,}(\, x^2 - 10x + 16$

$\cancel{x^3} - 2x^2$

$- \quad +$

$-10x^2 + 36x - 32$

$-10x^2 + 20x$

$+ \quad -$

$16x - 32$

$16x - 32$

0

$x^2 - 10x + 16$

$x^2 - 2x - 8x + 16$

$x(x-2) - 8(x-2)$

$x = 2, \; x = 8$

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$27 + 9 - 63$

$\begin{array}{r}36 \\ 18 \\ \hline 54\end{array}$

$-27 + 9 + 7 + 21$

$x^3 + x^2 - 21x - 45 = 0$

$x = 1$

$1 + 1 - 21 - 45$

$x = -2$

$x = 2$

$8 + 4 -$

$\cancel{-8 + 4 + 42 - 45 = 0}$

$x = -3$

$x + 3 = 0$

$x + 3 \,\big)\, x^3 + x^2 - 21x - 45 \,\big(\, x^2 - 2x \ldots$

$\cancel{x^3} + 3x^2$

$- \quad -$

$-2\cancel{x^2} - 21x - 45$

$-2x^2 - 6x$

$+ \quad +$

$-15x - 45$

$-18x$

0

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

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

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

$x = -3, \; x = 5$

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$x^3 - 6x^2 + 9x - 4 = 0$

$x = 1$: $1 - 6 + 9 - 4$

$1 - 6 + 9 - 4 \neq 0$ $10 - 10 = 0$

$x = -1$ $x = 1$,

$-1 - 6 - 9 - 4 \neq 0$ $(x - 1) = 0$

$x = 2$

$8 - 24 + 18 - 4 \neq 0$

$x = -2$

$= 8 - 24 + 18 - 4$

$x - 1 \overline{) x^3 - 6x^2 + 9x - 4} (x^2 - 5x + 4$

$\cancel{x^3} \; \underset{+}{-} x^2$

$-5\cancel{x^2} + 9x - 4$

$-5x^2 + 5x$

$+ \quad -$

$4\cancel{x} - 4$

$4x - 4$

$- \quad +$

0

$x^2 - 5x + 4$

$x^2 - 4x - x + 4$

$x[x-4] - 1[x-4]$

$[x-1][x-4]$

$x = 1$, $x = 4$

$x = 1$

-15

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$x^3 + x^2 - 21x - 45 = 0$

$x = 1$

$1 + 1 - 21 - 45 \neq 0$

$x = -1$

$\cancel{-1} + \cancel{1} + 21 - 45 =$

$x = 2$

$8 + 4 - 42 - 45 \neq 0$

$x = -2$

$-8 + 4 + 42 - 45 =$

$46 - \quad \neq 0$

$x = 3$

$27 + 9 - 63 - 45 \neq 0$

63

$x = -3$

$\cancel{+27}$

$$\begin{array}{r} -45 \\ 27 \\ \hline 72 \end{array}$$

$-27 + 9 + 63 - 45 = 0$

$x + 3 = 0$

$$x + 3 \,\big)\, x^3 + x^2 - 21x - 45 \,\big(\, x^2 - 2x - 15$$

$\cancel{x^3} + 3x^2$

$-$

$-2x^2 - 21x - 45$

$-2x^2 - 6x$

$+ \quad +$

$-15x - 45$

$-15x - 45$

$+ \quad +$

0

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

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

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

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

$x = +3, x = 5, x = -3$

Natural numbers:-

counting numbers 1, 2, 3, 4 --- are called natural numbers.

whole numbers:-

All counting numbers toghther toghter with 0 from the set of whole numbers.

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Even numbers:- A number divisible 2 is called Even number

Ex:- 2, 4, ---

odd number:- Not divisible by 2 is called odd number

Ex:- 1, 3, 5, 7 ---

prime number:- A number greater than 1 is called a prime number If it as excatly two factors namly 1 and number itself

composite numbers:- number greater than one which are not prime are known as composite number

2 is the only Even number which is prime

There are 25 prime number b/w 1 - 100

Types of divisiblity:-

(i) divisiblity by 2 → A number is divisible by 2 if its unit digit is any of 0, 2, 4, 6, 8

(ii) divisiblity by 3 →

2	64, 128, 412, 624
2	32, 64, 206, 312
2	16, 32, 153, 156
2	8, 16, 153, 78
2	4, 8, 153, 39
2	2, 4, 153, 39
2	1, 2, 153, 39
3	1, 1, 153, 39
3	1, 1, 51, 13
17	1, 1, 17, 13
13	1, 1, 17, 13
	1, 1, 1, 1

HCF $2 \times 2 \times 2 \times 3 = 24$

LCM $= 2 \times$

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Q1. $896 \times 896 - 204 \times 204$

$A^2 - B^2$

$(A+B)(A-B)$

$(896+204)(896-204)$

~~1090~~

~~1100 = 692 =~~ 410

1100×692

1 2 2 0 0	0
1 9 9 0 0	×
6 6 0 6 ×	×

761,200

Q. $387 \times 387 + 114 \times 114 + 2 \times 387 \times 114$

$(387+114)^2 = [501]^2$

Inverse of a matrix :-

$$(A^{-1}) = \frac{adj.A}{|A|}$$

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 6 & 2 & 8 \\ 7 & -1 & 10 \end{bmatrix}$$

$$|A| = 2|20+8| - 3|60 \cancel{-} 56| + 4[-6-1$$

$$|A| = 56 - 12 - 80$$

$$|A| = -36 \neq 0$$

$$adj.A = \begin{bmatrix} 28 & -4 & -20 \\ -34 & -8 & 23 \\ 16 & 8 & -4 \end{bmatrix}^T$$

→ matrix obtained by the co-factor of A

$$adj \cdot A = \begin{bmatrix} 28 & -34 & 16 \\ -4 & -8 & 8 \\ -20 & 23 & -14 \end{bmatrix}$$

$$A^{-1} = \frac{adj \cdot A}{|A|}$$

$$\begin{bmatrix} \frac{28}{36} & \frac{-34}{36} & \frac{16}{36} \\ \frac{-4}{36} & \frac{-8}{36} & \frac{8}{36} \\ \frac{-20}{36} & \frac{23}{36} & \frac{-14}{36} \end{bmatrix}$$

$$= \frac{1}{36} \begin{bmatrix} 28 & -34 & 16 \\ -4 & -8 & 8 \\ -20 & 23 & -14 \end{bmatrix}$$

A.P :-

2, 4, 6, 8 .... n

$a_n = a + (n-1)d$

$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$

How many number between 11, 90 are divisible by 9

18, 27, ... 81

a = 18, d = 9

a_n

$81 = 18 + (n-1)9$

$81 = 18 + 9n - 9$

81 = 18 + 9n - 9

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odd numbers sum 100.

1, 3, 5, 7, - - - - 99

$99 = 1 + (n-1)2$

$99 = 1 + 2n - 2$

$99 = -1 + 2n$

$98 = 2n$

$n = 50$

$S_n = \frac{49}{2}[2 \times 1 + (49-1)2]$

$S_n = \frac{49}{2}[2 + 96]$

46

$S_n = 49 \times 98$

35

$S_n = \frac{49 \times 46}{24}$

4

156 ×

1804

$S_n = \frac{50}{2}[2 \times 1 + 49 \times 2]$

$S_n = 25(100 = 2500)$

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Find the sum of all 2 digit number which ar divis by 3

12, 15, 18 - - - 99

$a = 12, \quad d = 3$

a_n

$99 = 12 + (n-1)3$

$99 = 12 + 3n - 3$

$99 = 9 + 3n$

$\frac{90}{3} = n$

$= 30$

~~$S_n = \frac{n}{2} \times 12$~~

$S_n = \frac{30}{2} \left(2 \times 12 + (30-1) \times 3\right)$

$S_n = 15 \left[24 + 29 \times 3\right]$

$S_n = 15 \left[24 + 67\right]$

$S_n = 15 \times 91 = 1665$

$\begin{array}{r} 29 \times 3 \\ \hline 67 \end{array}$

$\begin{array}{r} 24 \\ 67 \\ \hline 91 \end{array}$

$\begin{array}{r} 91 \\ 5 \\ \hline 135 \end{array}$

$540 = 240 + (n-1)\,60$

$540 = 240 + 60n - 60$

$540 = 180 + 60n$

$360 = 60n$

$n = 6$

G.P.

$a,\ ar,\ ar^2,\ ar^3,\ \ldots\ ar^n$

$\cancel{\frac{ar}{a} = \frac{ar^2}{a} =}$

$\frac{a}{r} \quad \frac{b}{r} =$

$\cancel{a_n = a(r^n - 1)}$

$a_n = ar^{n-1}$

$S_n = \frac{a(1-r^n)}{(1-r)}$

... there in $2, 4, 8, 16, \ldots \rightarrow 1024$

$a = 2, \quad r = \frac{8}{4} = \frac{1}{2} \quad r =$

$a_n = a(r^n - 1)$

$1024 = 2(2^n - 1)$

$1024 = 2^{n+1} - 1$

$1023 = 2^{n+1}$

$a_n = a(r^n - 1)$

$1024 = 2\left(\left(\frac{1}{2}\right)^n - 1\right)$

$1024 = 2 \cdot \left(\frac{1}{2}\right)^{n-1}$

$512 = \left(\frac{1}{2}\right)^{n-1}$

$T_n = ar^{n-1}$

$1024 = 2(2)^{n-1}$

$512 = 2^{n-1}$

$2^9 = 2^{n-1}$

$n - 1 = 9$

$n = 10$

Find the sum of serise :-

$2 + 2^2 + 2^3 + \cdots 2^8$

$a_n = a r^{n-1}$

$2^8 = 2 \cdot 2^{n-1}$

$2^8 = 2^n$

$n = 8$

$$S_n = \frac{2(1 - 2^8)}{1 - 2} = \frac{2 - 2^9}{+1}$$

$S_n = 2 - 2^9$ $\qquad 2 - 512$

$S_n = \cancel{254}\ 510$ $\qquad = 510$

FIND Inverse of this matrix:

$$A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$$

$|A| =$

$3|$

$3 \quad +4) -2)$

-8

1

$M_{11} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3+4 = 1$

$M_{12} = \begin{vmatrix} 2 & 4 \\ 0 & 1 \end{vmatrix} = 2-0 = 2$

$M_{13} = \begin{vmatrix} 2 & -3 \\ 0 & -1 \end{vmatrix} = -2$

$M_{21} = \begin{vmatrix} -3 & 4 \\ -1 & 1 \end{vmatrix} = -3+4 = 1$

$M_{22} = \begin{vmatrix} 3 & 4 \\ 0 & 1 \end{vmatrix} = 3-0 = 3$

$M_{23} = \begin{vmatrix} 3 & -3 \\ 0 & -1 \end{vmatrix} = -3+0 = -3$

$M_{31} =$

M_{32}

M_{33}

$M_{31} = \begin{vmatrix} -3 & 4 \\ -3 & 4 \end{vmatrix} = -12 + 12 = 0$

$M_{32} = \begin{vmatrix} 3 & 4 \\ 2 & 4 \end{vmatrix} = 12 - 8 = 4$

$M_{33} = \begin{vmatrix} 3 & -3 \\ 2 & -3 \end{vmatrix} = -9 + 6 = -3$

$+4 \,|\, -2$

-8

1

$C_{11} = 1, \quad C_{12} = -2, \quad C_{13} = -2$

$C_{21} = -1, \quad C_{22} = +3, \quad C_{23} = +3$

$C_{31} = 0, \quad C_{32} = -4, \quad C_{33} = -3$

$\text{AdJ.A} = \begin{bmatrix} 1 & -2 & 2 \\ -1 & 3 & 3 \\ 0 & -4 & -3 \end{bmatrix}^T$

$\text{AdJ.A} = \begin{bmatrix} +1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & -3 \end{bmatrix}$

$A^{-1} = \frac{1}{|A|} \text{adJ.A}$ 1

$A^{-1} = \begin{bmatrix} 1 & -1 & 0 \\ -2 & 3 & -4 \\ -2 & 3 & -3 \end{bmatrix}$ Ans

permutation and combination

→ let n be a positive number than factorial n denoted by → $\lfloor n = n!$

n is define as $n! = n \times (n-1) \times$

$\lfloor 3 = 3 \times 2 = 6$

$\lfloor 0 = 1$

$\lfloor 4 = 24$

$5! = 120$

$6! = 720$

permutation:-

The different arrangement of a given number by taking sum of all at a time are called permutation.

Ex:- All permutation made with the letter a, b, c by taking 2 ~~time~~ at a time are a, b, c =>

(ab, bc, ac, ba, cb, aa)

→ no. of all permutation of n things written are at a time given by

=> ^nP_r

$^nP_r = \frac{n!}{(n-r)!}$

NOTE:- Number of all permutations of n things taken all at a time is factorial n.

Q.1 $\frac{30!}{28!}$ $\frac{30!}{28!} = \frac{30 \times 29 \times \cancel{28!}}{\cancel{28!}}$

30×29

270
$60 \times$

870

→ Find the value of

$$^{60}P_{28} = \frac{60!}{32!}$$

:combinations:- Each of different group or selection which can be form by taking sum or all of a number of object is called a combination.

Ex:- Suppose we want to select 2 out of 3 boys A, B, C then possible selection ar

AB, BC, CA

→ Not that AB and BA represent same selection

→ The number of all combinations of n things taken are at a time is

$^{n}C_{r}$

$$^nC_r = \frac{n!}{r!\,(n-r)!}$$

→ Note than $^nC_n = 1$, $^nC_0 = 1$

Find the value of

$$^{10}C_3 = \frac{10!}{3!\,7!}$$

$$\frac{10 \times \cancel{9}^{3} \times \cancel{8}^{4}}{\cancel{3} \times \cancel{2}} = \frac{\cancel{120}}{3} = 90$$

120

→ In how many ways can a cricket team were selected out of 15 player

$$^{15}C_{11} = \frac{15!}{11!\,4!} =$$

$$\frac{15 \times \cancel{14}^{12} \times 13 \times \cancel{12}^{6}}{\cancel{4} \times \cancel{3} \times \cancel{2}}$$

$$\frac{15 \times 12 \times 13}{2}$$

$$\frac{15 \times 12}{30}$$

15 ×

180

180 × 13

540

180 ×

2340

= ~~2730~~ 1365

and of –

In how many ways a commite from of 5 member and 5 la[illegible] 6 men of 3 men consiting of 3 men and 2 ladies

$$^6C_3 * {}^5C_2$$

$$\frac{6!}{3!\times 3!} * \frac{5!}{2!\times 3!}$$

$$\frac{\cancel{6}^{2}\times 5 \times 4\times\cancel{3!}}{\cancel{3}\times\cancel{2}\times\cancel{3!}} * \frac{5\times\cancel{4}^{2}\times\cancel{3!}}{\cancel{2}\times\cancel{3!}}$$

$$20 * 10 = 200$$

→ How many words can be form by using all the letter of word Bihar.

$$5! = 120$$

Evaluate 28% of $450 + 45\%$ of 280

$$\frac{450 \times 28}{100} + \frac{280 \times 45}{100}$$

$$\frac{1}{100}\left[450 \times 28 + 280 \times 45\right)$$

12

$$1\ [\ \ 12600 + \quad 12600]$$

2 is what % of 50

$\cancel{what}$ = x

$$\frac{2}{\frac{50 \times x}{100}}$$

$$50 = \frac{x \times 2}{100}$$

difference of two numbers is 1660. If 7.5% of one number is 12.5% of the other number Find the 2 number

x
y

$$x - y = 1660$$

$$\frac{75}{\cancel{10}} x = \frac{125}{\cancel{10}} y$$

$$75x = 125y$$

$$x = \frac{125y}{75}$$

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

$$\frac{5y}{3} - \frac{y}{1} = 1660$$

$$\frac{5y - 3y}{3} = 1660 \times 3$$

$$2y = \frac{1660 \times 3}{4980}$$

$$2y = 4980$$

$$y = \frac{4980}{2} = 24$$

2490

$$x - 2490 = 1660$$

$$x = 1660 + 2490$$

$$\begin{array}{r} 2490 \\ 1660 \\ \hline 4150 \end{array}$$

Q. If the G.S.T. Be reduced from $\frac{7}{2}\%$ to $\frac{10}{3}\%$ what differ does It make to a person who purchase an artical with mark Price 8400

$$\left(\frac{84\cancel{00} \times \frac{7}{2}}{1\cancel{00}}\right) - \left(\frac{84\cancel{00} \times \frac{10}{3}\%}{1\cancel{00}}\right)$$

$$\left(\overset{42}{\cancel{84}} \times \frac{7}{\cancel{2}}\right) - \left(84 \times \frac{10}{3}\right)$$

$$(42 \times 7) - 280$$

$$294 - 280 = 14$$

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$S.I. = \frac{T \times R \times P}{100}$

Find the simple I

$P = 68000$

$R = \frac{50}{3}\%$

$T = 1$ year for 9 months

$= \frac{9}{12}$

$$S.I. = \frac{68000 \times \frac{50}{3} \times \frac{9}{12}}{100}$$

$S.I. = 680 \times \frac{50}{3} \times \frac{1}{4}$

$S.I. = 680 \times \frac{50}{12}$

$S.I. = \frac{680 \times 50}{000}$

$3400 \times$

$\frac{34000}{12}$

$= 17000$

6

→ Find the S.I. on Rupees = 3000, at the rate = $\frac{24}{4}$% per year for the period from 4th feb 2005 to 18th April 2005

1 year = 365 days

$24 + 31 + 18 = 73$ days

$= \frac{73}{365}$

$$S.I. = \frac{3000 \times 6 \times \frac{73}{365}}{100}$$

$$= 180 \times \frac{73}{365}$$

$$= 180 \times \frac{1}{5} = 36$$

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Compound Interest :-

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

$C.I. = A - P$

→ First we find A.

Find compound Interest on Rs. = 7500, 4% per annum for 2 years compound anually.

$P = 7500$

$r = 4\%$

$n = 2$

$C.I. = 7800$

$C.I. = 300$

$A = 7500\left(1 + \frac{4}{100}\right)^2$

$C.I. = 8112 - 7500$

$C.I. = 612$

$A = 7500 + 1 + \frac{8}{10000} + \frac{4 \times 4}{100}$

$A = 7500 + 1 + \frac{4}{5000} + \frac{4}{50}$

$A = 7500 + 1 + \frac{2}{2500} + \frac{2}{25}$

$A = 7500 + 1 + \frac{1}{1750} + \frac{2}{25}$

$A = \frac{300 \times 26}{18000} \times \frac{26}{25}$

$600\times$

7800

$A = 8112$

$P = 10000$, $T = 2$ years, $r = 4\%$, compounded Half yearly:-

$$A = 10000\left(1 + \frac{2}{100}\right)^4$$

$$A = 10000\left(1 + \frac{1}{50}\right)^4$$

$$A = 10000\left(\frac{51}{50}\right)^4$$

$$A = \cancel{10000} \times \frac{51}{\cancel{50}} \times \frac{51}{\cancel{50}} \times \frac{51}{\cancel{50}} \times \frac{51}{\cancel{50}}$$

$$A = \frac{51^4}{5^4}$$

$$A = \frac{51 \times 51 \times 51 \times 51}{5 \times 5 \times 5 \times 5}$$

$$\begin{array}{r} 51 \\ \times 51 \\ \hline 51 \\ 255\times \\ \hline 2601 \end{array}$$

$$\begin{array}{r} 2601 \times 51 \\ \hline 2601 \\ 13005\times \\ \hline 132651 \end{array}$$

$$\begin{array}{r} 132651 \times 51 \\ \hline 132651 \\ 663255\times \\ \hline 6765201 \end{array}$$

$$\frac{6765201}{125 \times 5} = \frac{6765201}{625} = 10824.3216$$

$I = 824.32$

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(iii) when the interest compounded quarterly:-

$$A = P\left(1 + \frac{r}{4 \times 100}\right)^{4n}$$

Find the compound interest P=16000

r = 20% per annum for

9 months compound quarterly

$$A = 16000\left(1 + \frac{\cancel{20}^{5}}{4 \times 100}\right)^{4 \times \frac{9}{12}}$$

$$A = 16000\left(1 + \frac{1}{20}\right)^{3}$$ 2522

$$A = 16000\left(\frac{21}{20}\right)^{3}$$

$$A = 16000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$A = 441 \times 21 \times 16$$ = 18522

A = 441 × 21

$$\begin{array}{r} 441 \\ 882\times \\ \hline 9261 \end{array}$$

$$\begin{array}{r} 9261 \times 16 \\ \hline 55566 \\ 9261\times \\ \hline 148176 \end{array}$$

Ans

→ If the simple Interest sum of money at 5% per annum for 3 years is rupees 12000, find the compound Interest on the same sum, for the same time and same Interest

$$\cancel{A = 12000\left(1 + \frac{5}{100}\right)}$$

$$12000 = \frac{3 \times m \times 5}{100}$$

$$1200000 = 15 \times m$$

$$m = \frac{1200000}{15}$$

$$m = \cancel{60000}\ 80000$$

$\boxed{9261}$

$$A = 60000\left(1 + \frac{5}{100}\right)^3$$

$A = 60\times$

$$A = 60000 \times \frac{105 \times 105 \times 105}{}$$

$$\cancel{6000} \times \frac{105 \times 105 \times 105}{}$$

$$A = 4 \times \frac{105 \times 105}{400} \quad 100 \times \frac{105}{5} \times 105$$

P.C. → Percentage
S.I., C.I.

PKFA

→ A certain sum amounts to Rs. 7380 in 2 years and Rs. 8575 in 3 years find the sum and rate of intrest

$$\frac{7380 \times r \times 2}{100} = \frac{8575 \times r \times 3}{100}$$

$7380 \times 2 \times \cancel{r} = 8575 \times 3 \times r$

$$7380 = \frac{P_1 \times r_1 \times 2}{100} \qquad 8575 = \frac{P_1 \times r_1 \times 3}{100}$$

$738000 = 2 P_1 r_1 \qquad 857500 = 3 P_1 r_1$

Let the sum be x rs.

$8575 - 7380 = 1195$

S.I. of 1 year

$$S.I. = \frac{P \times R \times T}{100}$$

$$1195 = \frac{7380 \times R \times 1}{100}$$

$$R = 16\frac{2}{3}$$

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

$A =$

$$7380 = x\left(1 + \frac{50}{3 \times 100}\right)^2$$

$$7380 = x\left(1 + \frac{5}{30}\right)$$

$$\frac{30 + 5}{30} = \frac{35}{30}$$

$$7380 = x\left(\frac{35}{30}\right)$$

$$7380 = \frac{7}{6} \times \frac{7}{6} x$$

$$x = \frac{7380 \times 6 \times 6}{7 \times 7 \times 36}$$

$= 54$

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Q. A sum of money to Rs. 6690 at [illegible] 3 years and to 10035 at [illegible] 6 years on compound Interest find the sum.

Let the sum be P

$$P\left(1+\frac{R}{100}\right)^3 = 6690 \quad -(1)$$

$$P\left(1+\frac{R}{100}\right)^6 = 10035 \quad -(2)$$

$$\frac{\cancel{P}\left(1+\frac{R}{100}\right)^{6}}{\cancel{P}\left(1+\frac{R}{100}\right)^3} = \frac{10035}{6690} = \frac{3}{2}$$

$$\left(1+\frac{R}{100}\right)^3 = \frac{3}{2}$$

$$\left(1+\frac{R}{100}\right)^{3} = \frac{3}{2}$$

$$P \times \frac{3}{2} = 6690$$

$$P = \frac{\overset{2230}{\cancel{6690}} \times 2}{\cancel{3}} = 4460$$

probility $P(A) \to \frac{m}{n}$

→ where m is the number of cases ~~fovrat~~ favrable to the event, n is the total no. of cases.

(Q.) Two unbiased dice are thrown find the probality:-

(i) Both the dice show the same number $\frac{6}{36} = \frac{1}{6}$

(ii) the first dice showes 6 $\frac{6}{36} = \frac{1}{6}$

(iii) the total of numbers on the dice greater than 8

(iv) the total of the numbers on the dice is 13. 0

(1, 1) (1, 2) (1, 3) (1, 4) (1, 5)
(1, 6)

(2, 1) (2, 2), (2, 3), (2, 4), (2, 5)
(2, 6)

(3, 1), (3, 2), (3, 3), (3, 4), (3, 5)
(3, 6)

(4, 1), (4, 2), (4, 3), (4, 4), (4, 5)
(4, 6)

(5, 1), (5, 2), (5

→ Impossible event $p(A) \to 0$

Q. what is pro. of getting at most two head in tossing of three coins

$(\{H,T\} \times \{H,T\}) \times \{H,T\}$

$= \{HH, HT, TH, TT\} \times \{H,T\}$

$= \{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}$

$\Rightarrow \frac{4}{8}$

Q) what is the chace that a leap year selected at random will contain 53 sunday.

→ In a leap year consist of 366 days 52 complete week and 2 more days

S	M
M	T
T	W
W	Th
Th	fr
fr	sat
sat	sun

$= \frac{2}{7}$

ABC Are three events associate with a random experiment find P(A) given that P(B) is $\frac{3}{2}$ $P(C) = \frac{1}{2} \cdot P(B)$

$$P = P(A) + P(B) + P(C)$$

$$1 = P(A) + \frac{3}{2} + \frac{1}{2} \cdot P(B)$$

$$1 = P(A) + \frac{3}{2} + \frac{1}{2} P(B)$$

$$2 = 2P(A) + 3 + P(B) \quad 2$$

$$2 = 2P(A) + 3 + \frac{3}{2}$$

$$\cancel{2} \; 4 \quad 4 = 4P(A) + 6$$

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→ The probability of an event A is sum number b/w and including 0 and 1.

→ probability of a certain event is always 1

therefore

$$P(A) + P(\bar{A}) = 1$$

$P(A) = P$

$P(B) = \frac{3}{2}P$

$P(A) + P(B) + P(C) = 1$

$P + \frac{3}{2} + \frac{3}{4}$

Theoram:- If A and B are any two events then

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ AND } B)$$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B)$$

Q. An Integer is taken at random from the first 200(+) integer what is the proability that the integer is divisible by 6 and 8.

$P(A) =$ 6, 12, ---- 198

$a_n = 33$

$a_n = 6 + (n-1)6$

$198 = 6 + (n-1)6$

$198 = \cancel{6} + 6n - \cancel{6}$

$= 33$

$A = 33$

24, 48

$P(B) = 25$

A

$A \cap B = 8$

$= 4$

$P(A) = \frac{33}{200}$

$P(B) = \frac{25}{200}$

$P(A \cap B) = \frac{8}{200}$

$P(A \cup B) = \frac{33}{200} + \frac{25}{200} - \frac{8}{200}$

$P(A \cup B) = \frac{1}{4}$

Q.

:- profit and loss :-

$$Gain = S.P. - C.P.$$; $CP = SP - Gain$

$SP = Gain + CP$

$$loss = C.P. - S.P$$

$$Gain\% = \cancel{\frac{S.P. - C.P}{100}} \quad \frac{Gain \times 100}{C.P.}$$

$$loss\% = \frac{loss \times 100}{C.P.}$$

$$SP = \frac{100 + gain\%}{100} \times CP$$

$$SP = \frac{100 - loss\%}{100} \times CP$$

→ If an article is sold at gain of say 35%, then SP = 135% of CP,

→ If an article is loss at gain of 35%, then SP = 65% of CP.

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→ A men buy an article for rs. 27.50 and sells It for rs. 28.0 find It gain percent

gain = 0.50

$$gain(\%) = \frac{0.50 \times 10\cancel{0}}{27.5\cancel{0}}$$

$$gain(\%) = \frac{\cancel{500}}{\cancel{275}} = \frac{100}{55}$$

55)100(1.81
55

→ If a pen is purchase for rs. 490 and sold for rs. 465.50 find the loss %.

loss = 490 − 465.50 = 24.50

$$loss\,\% = \frac{24.50 \times 1\cancel{00}}{490\cancel{0}\cancel{0}}$$

$$= \frac{245\cancel{0}}{49\cancel{0}} = 5\%$$

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Find CP when S.P. = 56.25
Gain = 16%

$$SP = \frac{100 + gain\%}{100} \times CP$$

$$56.25 = \frac{100+16}{100} \times CP$$

$$5625 = 116 \times CP$$

$$CP = \frac{5625}{116}$$

$$CP = 48.49$$

→ A book was ~~total~~ sold for = 27.50 with a profit of 10%. If it were sold for RS. 25.75 find what is percentage of profit or loss

S.P. = 27.50

~~C.P. = 27.50~~
~~S.P = 25.75~~

~~C.P. - S.P = 27.50 - 25.75 = 2.75~~

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S.P. = 27.50
profit = 10%
after S.P. = 25.75

$\frac{110}{100} \times CP = 27.5$

$CP = \frac{27.5 \times 100}{110}$

$CP = \frac{275 \times 11}{100}$

$CP = 2.75 \times 11$

$CP = 25$

$SP = 25.75$

$Gain = 0.75$

$Gain\% = \frac{0.75 \times 100}{25} = 3\%$

→ The

→ The CP of 21 artical = SP of 18 artical) find the gain or loss.

let the CP of 1 artical = 1

~~21 × gain × 100 = 18 × gain × 100~~

~~gain%~~

~~21 × (gain + SP) = 18 × (gain + CP)~~

there for SP of 18 artical = ₹ 21 Rs.

and CP of 18 artical = Rs. 18

$21 - 18 = Rs.3$

$$\text{Profit\%} = \frac{3 \times 100}{18} = \frac{\cancel{300}^{150}}{\cancel{18}} = \frac{\cancel{150}}{\cancel{9}} = \frac{50}{3}$$

$4 \overline{)150} (1$
9

$3 \overline{)50} (16.$
3
20
18
2

16.66

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→ monica purchased a pressure cooker at $\frac{9}{10}$ th of it S.P. and sold it at 8 % more than Its S.P. find the gain %.

let

$S.P. = 100$

$CP = \frac{9}{10} \times 100 = 90$

$SP = 108 \times 100$ ...

→ A dealer sold $\frac{3}{4}$ th of its artical at a gain of 20% and the remeing at the cost price find the gain by the dealer In the all transcation

~~Let all trans C.P. = x~~

~~$SP = \frac{x \times 100}{CP}$~~

~~SP =~~

~~SP =~~

Let CP = 100

$100 \times \frac{3}{4} = 75$

Gain% $= \frac{75 \times 200}{100} = 15\%$

$SP = 100 + 15 = 115$

gain% = 15

work

Time and distance:

→ If a men do a piece of work In n days, then one day work of A = $\frac{1}{n}$

Q. → worker A and B takes 8 houres and 10 houres to do the same work how long should It take both A and B working toghther but Indepently to do the same Job.

A = 8
B = 10

1 hour work of A = $\frac{1}{8}$

B = $\frac{1}{10}$

and One work of A and B total = $\frac{1}{8} + \frac{1}{10}$

$\frac{10+8}{80} = \frac{\cancel{18}}{\cancel{80}}$

$= \frac{9}{40}$

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→ there-fore A and B finish the work

$= \frac{40}{9}$ Ans.

Q. A and B toghter can complete a piece of work In 4 days If a alone can complete the same work 12 days In how many days can B complete that work.

let $B = \frac{1}{x}$

$A = \frac{1}{4}$

$\frac{1}{4} + \frac{1}{x} = 12$

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

$\frac{5x}{4x}$

$B = \left(\frac{1}{A+B}\right) - \frac{1}{A}$

$\frac{1}{6}$

one day of work $= \frac{1}{4}$

$\frac{1}{4} + \frac{1}{x} = \frac{1}{12}$

$\frac{1}{B} = \frac{1}{12} - \frac{1}{4}$

$\frac{1-3}{12}$

do it, working toghter
$8\frac{2}{5}$ hours per day.

$\frac{42}{5}$

A — = 63 hours
B — = 42 hours

~~A 1 - day = $\frac{1}{63}$~~
~~B 1 - dy = $\frac{1}{42}$~~

therefore

A का एक hr, work = 1

Q. ~~A can complete +~~

$$\frac{126}{\cancel{5}} * \frac{\cancel{5}}{42} = \frac{126}{42}$$

Q. A and B can do piece of work In 18 days, B + C = 24 days A + C = 36 days In How may days A, B, C = ?

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{18}$$

$$\frac{1}{B} + \frac{1}{C} = \frac{1}{24}$$

$$= \frac{1}{B} = \left(\frac{1}{24} - \frac{1}{C}\right)$$

$$\frac{1}{A} + \frac{1}{C} = \frac{1}{36}$$

$$\frac{1}{C} = \frac{1}{36} - \frac{1}{A}$$

$$\frac{1}{A} + \frac{1}{24} - \frac{1}{C} = \frac{1}{18}$$

$$\frac{1}{A} + \frac{1}{24} - \frac{1}{36} + \frac{1}{A} = \frac{1}{18}$$

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$$\frac{1}{A}+\frac{1}{B}=\frac{1}{18} \quad - \text{(1)}$$

$$\frac{1}{B}+\frac{1}{C}=\frac{1}{24} \quad - \text{(2)}$$

$$\frac{1}{A}+\frac{1}{C}=\frac{1}{36} \quad - \text{(3)}$$

(1) + (2) + (3)

$$\frac{1}{A}+\frac{1}{B}+\frac{1}{B}+\frac{1}{C}+\frac{1}{A}+\frac{1}{C}=\frac{1}{18}+\frac{1}{24}+\frac{1}{36}$$

$$\frac{4+3+2}{72}$$

$$2\left(\frac{1}{A}+\frac{1}{B}+\frac{1}{C}\right)=\frac{9}{72}$$

$$\frac{1}{A}+\frac{1}{B}+\frac{1}{C}=\frac{9}{72\times 2}$$

$$\frac{1}{A}+\frac{1}{B}+\frac{1}{C}=\frac{9}{144}$$

$$\frac{1}{A}+\frac{1}{24}=\frac{9}{144}$$

$$\frac{1}{A}=\frac{9}{144}-\frac{1}{24}$$

$$\frac{9-6}{144}$$

$$\frac{1}{A}=\frac{3}{144}$$

18) 144

$A+B+C = \frac{1}{16}$

$\frac{1}{A} + \frac{1}{B} + \frac{1}{C} = \frac{9}{144}$

$\frac{1}{18} + \frac{1}{C} = \frac{9}{144}$

$\frac{1}{C} = \frac{9}{144} - \frac{1}{18}$

$\frac{9-8}{144} = \frac{1}{144}$

$C = 144$

$+\frac{1}{24} + \frac{1}{36}$

$\frac{3+2}{}$

45 men can complete the work in 18 days. 6 days after they ~~day~~ started working 30 more men join then how will the take to complete the days remaining work

16 days

$= \frac{1}{45} \times \frac{1}{18}$

$\frac{4}{45} \div \frac{1}{18}$ $\quad$ $\frac{4}{45} \times \frac{1}{18}$

1 days $= \frac{1}{45}$

$$\frac{1}{45} \times \frac{1}{18} = \frac{1}{810}$$

one day work of 1 m $= \frac{1}{810}$

6 days work of 45 =

$$6 \times \frac{45}{810} = \frac{1}{3}$$

Remaining work $\Rightarrow 1 - \frac{1}{3} = \frac{2}{3}$

one day work of 75 m $= \frac{75}{810} = \frac{5}{54}$

$\frac{5}{54}$ — = 1 day

$$\frac{2}{3} \text{ — } = \frac{2}{3} \cdot \frac{54}{5} = \frac{36}{5}$$

$= 7.2$ days

Time & Distance:-

$D = V \times T$

$D = S \times T$

$km/h = \frac{5}{18}$ m/sec.

Q. How many minute does aditya take to cover a distance of 400m If he runs at a spped of 20 km/h

$\cancel{20}^{10} \times \frac{5}{\cancel{18}_9} = \frac{50}{9}$ m/sec

$D = S \times T$

$\frac{100}{9} = \cancel{5\times} \; T \times 2$

$400 = \frac{500}{9} \times T$

$\frac{400 \times 9}{500} = T$

$\frac{360m}{5} = T$

$= T = 5 \overline{)360}$ (72 sec

35

10

10

0

Q. While covering a distance of 24 ... a men notice that af... walking 1hr 40minuts the distance covers by way 3/7 of the remining distance what was his speed

$D = 24\,km$

$D = 24000\,m$

$t = 100\,min$

$24 \times \frac{5}{7}$

$17.14 \times 1000 =$ 171...

let remining distance $= x$

~~$D = S \times t$~~

~~$24000 = S \times 100 \times 60$~~

~~$S = \frac{240}{60} m/min$~~

~~$S = 4\,m/sec$~~

~~$\frac{5}{7} - x = \frac{2}{7}$~~

~~$D = S \times t$~~

— 24 – km –

—— 24 ——

let total distance = x

Remining d = (24 – D)

$D = \frac{5}{7} * (24 - D)$

D = 10 km

(10 * 1000) / (100 * 60) = 1.66 m/s

Q. Peter can cover a certain distance In 1 hour 24 minuts by covering $\frac{2}{3}$ of the distance at 4 km/h and the rest 5 km/h find the total distance

60
24
84

—— D ——

— 84 min —

18

$$\frac{2}{3} x/4 + \frac{1}{3} x/5 = \frac{7}{5}$$

$$\frac{x}{6} + \frac{x}{15} = \frac{7}{15}$$

$$\frac{(10+4)x}{60} = \frac{7}{5}$$

$$x = \frac{7 \times 60}{5 \times 14} = 6$$