① $\frac{12x}{48}, \frac{20}{30}, \frac{28}{42x} \Rightarrow \frac{x}{4}, \frac{2}{3}, \frac{2}{3x}$.

HCF of above frac^n $= \frac{1}{6}$

HCF of frac^n $= \frac{\text{HCF of Numerators}}{\text{LCM of Denominators}}$

$\frac{1}{6} = \frac{\text{HCF}(x, 2, 2)}{\text{LCM}(4, 3, 3x)}$

$\frac{1}{6} = \frac{1}{12x}$

$x = 2$ Ans

② Given :- 5 digit no $= 74abc$.

a, b, c = distinct digits.

No. is divisible by 13, 11 & 7

Calculate :- Since no. is divisible by 13, 11 & 7.

It should be multiple of LCM (13 11 & 7), i.e., 1001

No. divisible by 1001 are in the form of $abcabc$.

∴ 5-digit no. $= 74abc$

$= 074abc$

It should be 074074

$a = 0$ $b = 7$ $c = 4$

$$a^2+b^2+c^2 = (0)^2+(-7)^2+(4)^2$$
$$= 0+49+16$$
$$= 65 \quad \text{Ans}$$

Solu 3. $\frac{1}{15}+\frac{1}{35}+\frac{1}{63}+\frac{1}{99}+\frac{1}{143}$

$$\frac{1}{3\times5}+\frac{1}{5\times7}+\frac{1}{7\times9}+\frac{1}{9\times11}+\frac{1}{11\times13}$$

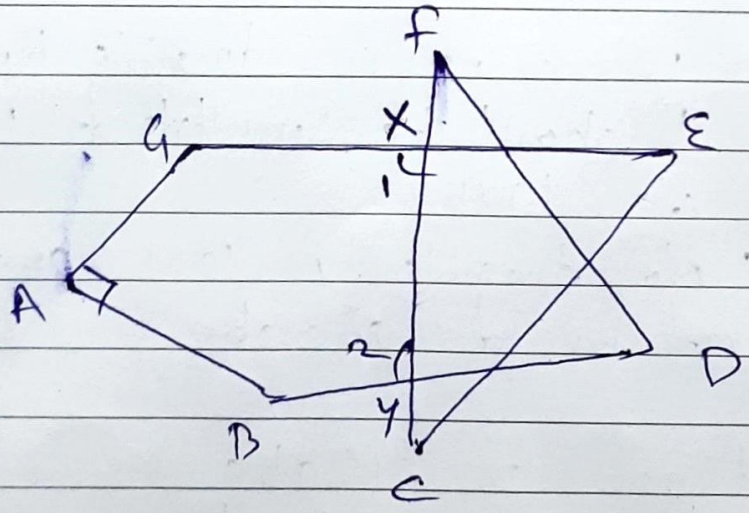
$$\left[\because \frac{1}{3\times5} = \frac{1}{2}\left(\frac{1}{3}-\frac{1}{5}\right)\right]$$

$$\frac{1}{2}\left[\frac{1}{3}-\cancel{\frac{1}{5}}+\cancel{\frac{1}{5}}-\cancel{\frac{1}{7}}+\cancel{\frac{1}{7}}-\cancel{\frac{1}{9}}+\cancel{\frac{1}{9}}-\cancel{\frac{1}{11}}+\cancel{\frac{1}{11}}-\frac{1}{13}\right]$$

$$\frac{1}{2}\left[\frac{1}{3}-\frac{1}{13}\right]$$

$$\frac{1}{2}\left[\frac{13-3}{39}\right] = \frac{1}{\cancel{2}}\times\frac{\cancel{10}^{5}}{39} = \frac{5}{39} \quad \text{Ans}$$

Solu 4.



In above Let the angles be 1 & 2 & their point be x & y.

By exterior property of triangle.

In ΔCXE & ΔFYD

$\angle 1 = \angle C + \angle E$ — (1) & $\angle 2 = \angle F + \angle D$. — (2)

In polygon AGXYB ; Sum of angle $= (5-2) \times 180$

$= 540°$.

[Sum of interior angles of polygon $= (n-2) \times 180°$].

In Polygon AGXYB.

$\angle A + \angle G + \angle B + \angle 1 + \angle 2 = 540°$.

from (1) & (2)

$\angle A + \angle G + \angle B + \angle C + \angle E + \angle F + \angle D = 540°$

Ans.

Solu's. Given: $(a+b) : (b+c) : (c+a) = 7 : 6 : 5$

$\therefore a+b+c = 27$

To find: $\frac{1}{a} : \frac{1}{b} : \frac{1}{c}$

Calculate: $(a+b) : (b+c) : (c+a) = 7 : 6 : 5$

Let $a+b = 7x$ — (1)

$b+c = 6x$ — (2)

$c+a = 5x$ — (3)

On adding above, $2(a+b+c) = 18x$

$a+b+c = 9x$ — (4)

(4) - (1) (4) - (2) (4) - (3)

$c = 2x$ $a = 3x$ $b = 4x$

$$\frac{1}{a} : \frac{1}{b} : \frac{1}{c} = \frac{1}{3x} : \frac{1}{4x} : \frac{1}{2x}$$

$$= \frac{}{12} \quad \text{LCM of } (3,4,2) = 12$$

$$= \frac{1\times4}{3\times4} : \frac{1\times3}{4\times3} : \frac{1\times6}{2\times6}$$

$$= 4 : 3 : 6 \quad \text{Ans}$$

Solve. Given : $pqr = 1$

To Prove : $\frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}} = 1$

Proof :

L.H.S $\Rightarrow \frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}}$

$= \frac{1}{1+p+\frac{1}{q}} + \frac{1}{1+q+\frac{1}{r}} + \frac{1}{1+r+\frac{1}{p}}$

$\Rightarrow \frac{q}{1+pq+q} + \frac{r}{1+qr+r} + \frac{p}{p+pr+1}$

$\Rightarrow \frac{1}{1+p+\frac{1}{q}} + \frac{1}{1+q+pq} + \frac{1}{1+\frac{1}{pq}+\frac{1}{p}}$

$\because pqr = 1$

$r^{-1} = pq$

$\Rightarrow \frac{q}{q+pq+1} + \frac{1}{1+q+pq} + \frac{pq}{pq+1+q}$

$$\Rightarrow \frac{q}{1+q+pq} + \frac{1}{1+q+pq} + \frac{pq}{1+q+pq}$$

$$\Rightarrow \frac{1+q+pq}{1+q+pq}$$

$\Rightarrow$ Numerator = Denominator.

$\Rightarrow 1$

Hence L.H.S = R.H.S Proved

Sol7. Given : 150 L mixture.
containg 60% milk, 40% water.

let water added in sol^n be x litre.
Resultant mixture contains 50% milk, 50% water.

Initial & final mixture will have same quantity of milk.

60% of 150L = 50% of $(150+x)$

$180 = 150+x$

$x = 30L$ Ans

Solu 8. Population of town increased by 5% annually
Present population = 18522

Let the population a year ago be x

$$x \times \frac{105}{100} \times \frac{21}{20} = 18522$$

$$x = 882 \times 20$$

$$= 17640 \quad \text{Ans}$$

Solu 9. Time taken by A to fill tank = 30 hrs.
B " " " = 40 hrs.
C " " " = 60 hrs

Pipe A opened = 7 a.m
B " = 8 a.m
C " = 10 a.m.

Let capacity of tank = 1 L

Rate$_A$ = $\frac{1}{30}$ L/h Rate$_B$ = $\frac{1}{40}$ L/h Rate$_C$ = $\frac{1}{60}$ L/h.

$$\frac{1}{30} \times 1 + \left(\frac{1}{30} + \frac{1}{40}\right) \times 2 + \left(\frac{1}{30} + \frac{1}{40} + \frac{1}{60}\right) \times t = 1$$

(7am - 8am) = Pipe A (8am - 10am) = Pipe B

After 10am all 3 will work.

$$\frac{1}{30} + \left(\frac{4+3}{120}\right) \times 2 + \left(\frac{4+3+2}{120}\right) \times t = 1$$

$$\frac{1}{30} + \frac{14}{120} + \frac{9}{120} t = 1$$

$$\frac{4 + 14 + 9t}{120} = 1$$

$$18 + 9t = 120$$

$$9t = 102$$

$$t = \frac{102}{9} = \frac{34}{3}$$

$$t = 11\frac{1}{3} \text{ hrs.}$$

$$= 11 \text{ hrs. } 20 \text{ min.}$$

Tank will be full at $\Rightarrow$ 10 a.m + 11 hr 20 min

$\Rightarrow$ 9:20 pm Ans

Sol 10. Average of 5 consecutive integers is x.

In case of consecutive integers, average is middle number.

Hence, 3rd number = x

Since, next 2 integers are also added.

Total integers will be 7

and average will be 4th no.

3rd no. = x

4th no. = x + 1 Ans

Quell. $l = 21\text{cm}$. ∴ radius of each circles $= 2\text{cm}$.
$b = 17\text{cm}$. ∴ Diameter " " " $= 4\text{cm}$.

No. of circles (horizontally) $= \frac{21}{4} = 5.25 = 5$ circles

No. of circles (vertically) $= \frac{17}{4} = 4.25 =$ 4 circles

Total no. of circles $= 5 \times 4 =$ 20 circles

Area of all 20 circles $= 20 \times (\pi r^2)$

$= 20 \times 3.14 \times 2$
$= 20 \times 6.28$
$= 365.60$
$= 365.6\ \text{cm.}^2$ Ans.

Que. 12 let the income of the person = ₹ x

His saving = 30%

Total saving = $x \times 30\% = x \times \frac{30}{100} = ₹ \frac{3x}{10}$

$\therefore$ Expenditure = $x - \frac{3x}{10} = \frac{10x - 3x}{10} = ₹ \frac{7x}{10}$

Now, Increased salary = $x + x \times 20\%$

$= x + x \times \frac{20}{100}$

$= x + \frac{x}{5} = ₹ \frac{6x}{5}$

Decreased in saving = $\frac{3x}{10} - \frac{3x \times 20}{10\ 100}$

$= \frac{15x - 3x}{50}$

$= \frac{6\cancel{12}x}{\cancel{2550}} = ₹ \frac{6x}{25}$

$\therefore$ New expenditure = $\frac{6x}{5} - \frac{6x}{25}$

$= \frac{30x - 6x}{25} = ₹ \frac{24x}{25}$

% increase in expenditure

$$\frac{\frac{13x}{50}}{\frac{7x}{10}} \times 100$$

$$= \frac{13\cancel{x} \times \cancel{10}}{\cancel{50} \times 7\cancel{x}} \times \overset{20}{\cancel{100}} = \frac{260}{7}\%$$

13. Product of all prime numbers b/w 1 and (11)''

∵ numbers b/w 1 and 11 = 2, 3, 5, 7

∵ 2 × 5 = 10

∴ The unit digit is zero.

∴ The product b/w '' all prime numbers b/w 1 and 11'' will always be 'zero'.

Ans. 14 i) Taxi Cab number = 1729
Sum of its digit = 1+7+2+9 = 19

ii) $\frac{22}{7}$ is a rational number.

iii) The base of a ~~figure~~ pyramid is in 'triangular' shape.

iv) A perfect number is a positive integer that is equal to the sum of its positive proper divisors that is divisors excluding the number itself

Ex: Division of 6 = 1, 2, 3, 6

$\therefore (1+2+3+6) - 6 = 6$

$\therefore$ 6 is a perfect number.

v) LCM of first 10 natural no. is '2520'.

Que:15 Solve $2^{2x+3} - 9 \times 2^{2x} + 1 = 0$

$$2^{2x} \times 2^{3} - 9 \times 2^{2x} + 1 = 0$$

$$\left[\because a^m \times a^n = a^{m+n}\right]$$

let $2^x = y$

$$y^2 \times 8 - 9 \times y + 1 = 0$$

$$8y^2 - 9y + 1 = 0$$

$$8y^2 - (8+1)y + 1 = 0$$

$$8y^2 - 8y - y + 1 = 0$$

$$8y(y-1) - 1(y-1) = 0$$

$$(y-1)(8y-1) = 0$$

$y - 1 = 0$

$y = 1$

$2^x y = 1$.

$2^x = 2$

$\boxed{x = 0}$

$8y - 1 = 0$

$8y = 1$

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

$y = 2^{-3}$

$2^x = 2^{-3}$

$\boxed{x = -3}$

Ans:16 No. of days in feb. 2009 = 28 days
Payment for working days = ₹500
Deduction of non-working days = ₹100

let he worked for 'x' days and did not work for 'y' days.

$$\therefore x + y = 28$$
$$y = 28 - x \quad \text{— (1)}$$

Now,
$$500x - 100y = 9100$$
$$500x - 100(28 - x) = 9100$$
$$500x - 2800 + 100x = 9100$$
$$600x = 9100 + 2800$$
$$600x = 11900$$
$$x = \frac{11900}{600}$$
$$\therefore x = \frac{119}{6} \text{ days}$$

∴ He worked for $19\frac{5}{6}$ days.

Ans: 17

$M_1 = 8$ Men

$H_1 = 6$ hours

$D_1 = 14$ days

$M_2 = 8$ Men

$H_2 = 8$ hours

$D_2 = x$ days

$\therefore M_1 \times H_1 \times D_1 = M_2 \times H_2 \times D_2$

$$D_2 = \frac{M_1 \times H_1 \times D_1}{M_2 \times H_2} = \frac{8 \times 6 \times 14}{8 \times 8} = \frac{21}{2}$$

$\therefore D_2 = 10.5$ days — Ans.

18. Diameter of the wheel = 70 cm.
radius " " " = 35cm.

Total distance to be covered = 77 Km.
$= 77 \times 1000 \times 100$
$= 77 \times 100000$ cm.

∴ Total number of revolution of the wheel

$n \times 2\pi r = 77 \times 100000$

$n = \frac{77 \times 100000 \times 7}{2 \times 22 \times 35_5}$

$n = \frac{7 \times 100000}{20}$

$n = 7 \times 5000$
$n = 35000$

∴ The wheel will take 35000 revolutions to cover the distance.

Ans:19 Ajay can erect a shed in = 20 days
Ajay and Vijay can erect the shed in = 12 days

∴ Vijay Alone can erect the shed in

$$= \frac{1}{12} - \frac{1}{20}$$

$$= \frac{5-3}{60}$$

$$= \frac{2}{60} = \frac{1}{30}$$

∴ Vijay alone can erect the shed in 30 days.

Ans 20 259875

LCM of 259875 = $5\times5\times5\times3\times3\times3\times7\times11$

So we have to divide the no. by 77 to make it a perfect cube.

And the cube root hence found will be

$5\times3 = 15$

(21) $225 = 25 \times 9$.

I Divisibility Rule of 25, last 2-digits should be multiple of 25, i.e, 00, 25, 50, 75.

∴ Number consist of 1 & 0 only, it should be 00.

II Divisibility Rule of 9. = (sum of digits) ÷ 9.

Hence No. should be 111111111, as it should consist of 1 and 0 only.

Smallest no. divisible by 225 consisting of digits 1 & 0 will be

11111111100

Sum of digits = 1+1+1+1+1+1+1+1+1+0+0 = 9 Hy

Q22: Distance = 525 m

Speed of thief = 18 km/hr

Speed of Policeman = 27 km/hr.

Effective speed = 27 - 18 = 9 km/hr.

$$= \frac{9 \times 5}{18} = \frac{5}{2} \text{ m/sec.}$$

$$\text{Time} = \frac{D}{S} = \frac{525}{5/2} = \frac{525 \times 2}{5}$$

$$= 210 \text{ sec.}$$

Distance covered by policeman

$$= S \times t$$

$$= 27 \times \frac{5}{18} \times 210$$

$$= 1575 \text{ m.}$$

Twice more distance covered by policeman = 1575 - 525

$$= 1050 \text{ m.}$$

023. $SI = \frac{P \times R \times T}{100} = \frac{10000 \times R_s \times 2}{100}$

$= 200 R_s$

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

$= \frac{10000(100+R_c)^2}{10000}$

$= (100+R_c)^2$

$CI = A - P = (100+R_c)^2 - 10000$

$CI = SI$ (Given)

$(100+R_c)^2 - 10000 = 200 R_s$

$10000 + R_c^2 + 200R_c - 10000 = 200R_s$

$R_c^2 = 200(R_s - R_c)$

$R_s - R_c = \frac{R_c^2}{200}$

Given R_s, R_c are integers

$R_s - R_c$ = integer

let $R_c = 20$

$R_s - R_c = \frac{20^2}{200} = \frac{400}{200} = 2$

$R_s - R_c = 2$

(Minimum value)

024. $x + \frac{1}{x} = \sqrt{3}$

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

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

$3\sqrt{3} = x^3 + \frac{1}{x^3} + 3\sqrt{3}$

$x^3 + \frac{1}{x^3} = 0$

(b) $x^3 + \frac{1}{x^3} = 0, \quad x^3 = -\frac{1}{x^3}$

$x^3 \times x^3 = -1$

$x^6 = -1$

(c) $(x^2)^3 = -1, \quad x^2 = (-1)^{1/3}$

$(x^2)^{25} = (-1)^{1/3 \times 25}$

$x^{50} = (-1)^{25/3}$

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

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

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

$x^4 + \frac{1}{x^4} = -1$

$x^{50} + \frac{1}{x^{50}} = 1$

Q25. Watch$_1$

S.P = 12600

Gain = 26%

$$C.P = \frac{100 \times S.P}{100 + Gain\%}$$

$$= \frac{100 \times 12600}{126}$$

C.P = 10000

Watch$_2$

S.P = 12600

Loss = 10%

$$C.P = \frac{100 \times S.P}{100 - L\%}$$

$$= \frac{100 \times 12600}{90}$$

C.P = 14000

Total C.P = 10000 + 14000

= 24000

Total S.P = 12600 + 12600

= 25200

Profit = 25200 − 24000

= 1200

$$P\% = \frac{1200}{24000} \times 100$$

= 5%.

Q 26. Perimeter = 240cm

$2(l+b) = 240$

$l+b = 120$ —— (1)

New length = 110% of $l = \frac{110\,l}{100}$

New breadth = 80% of $b = \frac{80\,b}{100}$

$\frac{110l}{100} + \frac{80b}{100} = 120$ (Given)

$11l + 8b = 1200$ —— (ii)

Multiply (1) by 8

$8l + 8b = 960$ —— (iii)

Subtracting (iii) from (ii)

$11l + 8b - 8l - 8b = 1200 - 960$

$3l = 240$

$l = 80$

from (1)

$l + b = 120, \quad b = 40$

$l = 80, \quad b = 40.$

027. Area of 1 circular tile = πr^2

$2r = 50\,cm$

$r = 25\,cm$

$r = \frac{25}{100}\,m, \quad \frac{1}{4}\,m$

Area of 1 circular tile = $\frac{22}{7} \times \frac{1}{4} \times \frac{1}{4}$

Area of 15 circular tile = $15 \times \frac{22}{7} \times \frac{1}{4} \times \frac{1}{4}$

$= \frac{330}{112}\,m^2$

Area of floor = $l \times b = 5m \times 4m$

$= 20\,m^2$

Area of Remaining floor = $20 - \frac{330}{112}$

$= \frac{1910}{112}\,m^2$

A

Q28. (a) $3x^2y - 3xy + 12x - 12$

$3xy(x-1) + 12(x-1)$

$(x-1)(3xy+12)$

$(x-1)\,3(xy+4)$ Ans.

(b) $15(x-2y)^2 - 8(x-2y) - 16$

Let $x-2y = m$

$15m^2 - 8m - 16$

$15m^2 - 20m + 12m - 16$

$5m(3m-4) + 4(3m-4)$

$(3m-4)(5m+4)$

$(3(x-2y)-4)(5(x-2y)+4)$

$(3x-6y-4)(5x-10y+4)$

Q29. Area of path Along Length = $90 \times 3.5\,m$
$= 315\,m^2$

Area of path Along Breadth = 50×3.5
$= 175\,m^2$

Area of square At the center = 3.5×3.5
$= 12.25\,m^2$

Area of path (Total) = $(315 + 175) - 12.25$
$= 477.75\,m^2$

Area of 4 equal parts = Area of Rectangle − Area of cross path
$= 90 \times 50 - 477.75$
$= 4022.25\,m^2$

Q30. Area of 4 walls = $2(l+b) \times h$

$l = 9m, \quad b = 8m, \quad h = 6.5m$

Area of 4 walls = $2(9+8) \times 6.5$

$= 2 \times 17 \times 6.5 = 117 m^2$

Area of Door = $2m \times 1.5m = 3m^2$

Area of 3 window = $(1.5 \times 1m) \times 3$

$= 4.5 m^2$

Area to be painted = $117 - (3 + 4.5)$

$= 117 - 7.5$

$= 109.5 m^2$

Cost of white washing = Area x Rate

$= 109.5 \times 38$

$= Rs. 4161.$