Linear Equations in One Variable

M T W T F S

Date: / / Page No.

Exercise :- 2.1

Solve the following equations :-

i) $6m = 12$

$m = \frac{12}{6}$

$m = \underline{2}$

ii) $14P = -42$

$P = \frac{-42}{14}$

$P = \underline{-3}$

iii) $-5y = 30$

$y = \frac{30}{-5}$

$y = \underline{-6}$

iv) $-2x = -12$

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

$x = \underline{6}$

v) $34x = -51$

$x = \frac{-51}{34}$

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

vi) $\frac{n}{7} = -3$

$n = 7 \times (-3)$

$n = \underline{-21}$

vii) $\frac{2x}{3} = 18$

$2x = 18 \times 3$

$x = \frac{54}{2} = \underline{27}$

viii) $3x + 1 = 16$

$3x = 16 - 1$

$3x = 15$

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

$x = \underline{5}$

M T W T F S

Date: / / Page No.

ix) $3p - 7 = 0$

$3p = 7$

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

x) $13 - 6n = 7$

$-6n = 7 - 13$

$-6n = -6$

$n = \frac{-6}{-6}$

$n = 1$

xi) $200y - 51 = 49$

$200y = 49 + 51$

$200y = 100$

$y = \frac{100}{200}$

$y = \frac{1}{2}$

xii) $11n + 1 = 1$

$11n = 1 - 1$

$11n = 0$

$n = \frac{0}{11}$

$n = 0$

xiii) $7x - 9 = 16$

$7x = 16 + 9$

$7x = 25$

$x = \frac{25}{7}$

xiv) $8x + \frac{5}{2} = 13$

$8x = 13 - \frac{5}{2}$

$8x = \frac{26 - 5}{2}$

$8x = \frac{21}{2}$

$8x = \frac{21}{8 \times 2}$

$x = \frac{21}{16}$

xv) $4x - \frac{5}{3} = 9$

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

$4x = \frac{27 + 5}{3}$

$4x = \frac{32}{3}$

$x = \frac{32}{3 \times 4} = \frac{8}{3}$

M T W T F S

Date: / / Page No.

xvi) $x + \frac{4}{3} = 3\frac{1}{2}$

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

$x = \frac{7}{2} - \frac{4}{3}$

$x = \frac{21 - 8}{6}$

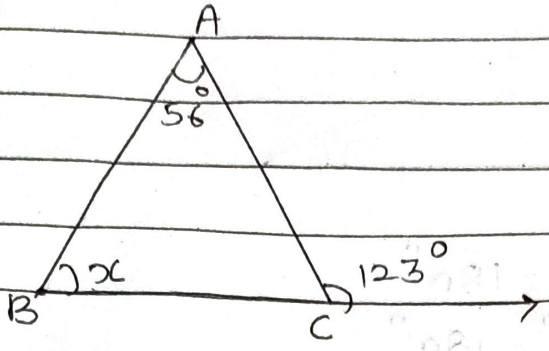
$x = \frac{13}{6}$

Exercise 2:2

M T W T F S
Date: / / Page No.

1. Find x in the following figures?

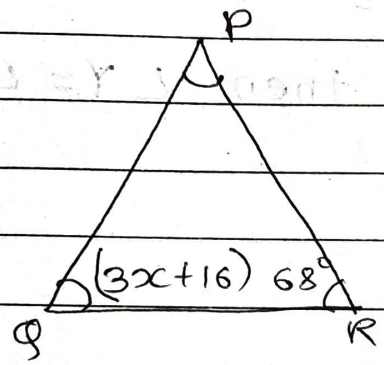
i)



Ans:- In $\triangle ABC$, exterior angle is equal to sum of its opposite interior angles.

$$\angle ACD = \angle A + \angle B$$
$$123^\circ = 56^\circ + x$$
$$x = 123^\circ - 56^\circ$$
$$= \underline{67^\circ}$$

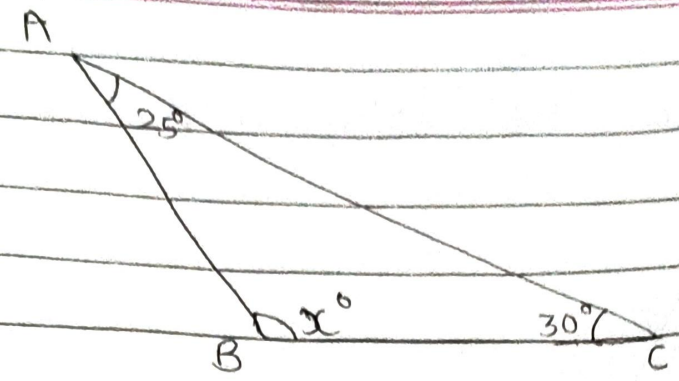
ii)



Sum of three angles of triangle $= 180^\circ$

$$\angle P + \angle Q + \angle R = 180^\circ$$
$$46^\circ + 3x + 16 + 68^\circ = 180^\circ$$
$$3x + 129^\circ = 180^\circ$$
$$3x = 180 - 129 = 51$$
$$3x = 51$$
$$x = \frac{51}{3} = \underline{17^\circ}$$

iii)



$\angle A + \angle B + \angle C = 180^\circ$

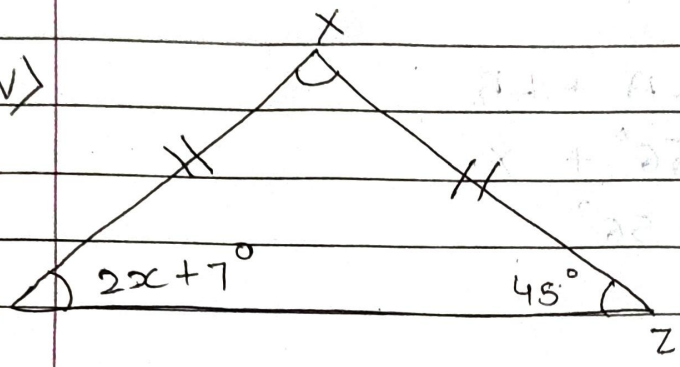
$25^\circ + x + 30^\circ = 180^\circ$

$x + 55^\circ = 180^\circ$

$x = 180^\circ - 55$

$x = 125^\circ$

iv)



In $\triangle XYZ$, $\overline{XY} = \overline{XZ}$ then $\angle Y = \angle Z$

$2x + 7^\circ = 45^\circ$

$2x = 45^\circ - 7^\circ$

$2x = 38$

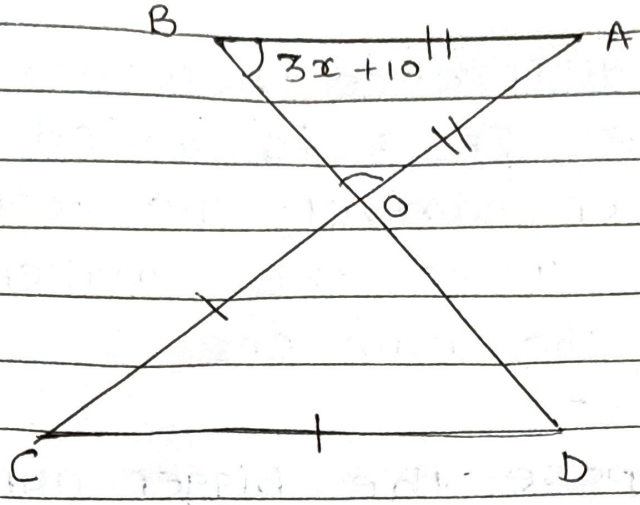
$x = \frac{38}{2}$

$x = \underline{19^\circ}$

M T W T F S

Date: / / Page No.

v)



From ΔBOA, $AB = OA \Rightarrow \angle B = \angle O = 3X + 10^\circ$

From ΔCOD, $\overline{OC} = \overline{CD} \Rightarrow \angle O = \angle D$

(∵ The angles which are opposite to equal sides are equal)

From above, $\angle BOA = \angle COD$ (vertically opposite angles are equal)

But $\angle COD = 90 - X$

(∵ $2X + \angle O + \angle D = 180$)

$2X + \angle O + \angle O = 180^\circ$ (∵ $\angle O = \angle D$)

$2\angle O = 180^\circ - 2X$

$\angle O = \frac{180 - 2X}{2} = 90 - X$

From $\angle BOA = \angle COD$

$3X + 10 = 90 - X$

$3X + X = 90^\circ - 10^\circ$

$4X = 80^\circ$

$X = \underline{\underline{20^\circ}}$

M T W T F S

Date: / / Page No.

Q.2 The difference between two number is 8. If 2 is added to the bigger number the result will be three times the smaller number. Find the numbers.

Soln :-

Suppose the bigger number is x

Difference betn two number is 8.

∴ smaller number = x - 8

From given condition, if two is added x will be 3 times than smaller number.

So, $x + 2 = 3(x - 8)$

$x + 2 = 3x - 24$

$x - 3x = -24 - 2$

$-2x = -26$

$x = \frac{-26}{-2} = 13$

∴ Bigger number = 13

∴ smaller number = 13 - 8 = 5

M T W T F S

Date: / / Page No.

Q.3 What are those two numbers whose sum is 58 & difference is 28 ?

Ans:- Suppose bigger number is x.

Sum of two numbers = 58

smaller number = 58 - x

Difference of two numbers = 28

$x - (58 - x) = 28$

$x - 58 + x = 28$

$2x = 28 + 58$

$2x = 86$

$x = \frac{86}{2} = \underline{43}$

∴ Bigger number = 43

∴ Smaller number = 58 - 43 = 15

Q.4. The sum of two consecutive odd numbers is 56. Find the numbers

Suppose, the consecutive odd number is $x+1$, $x+3$

$(x+1) + (x+3) = 56$

$2x + 4 = 56$

M T W T F S

Date: / / Page No.

$2X = 56 - 4$

$2X = 52$

$X = \frac{52}{2} = 26$

$\therefore$ 1st no :- $X + 1 = 26 + 1 = \underline{27}$

$\therefore$ 2nd no :- $X + 3 = 26 + 3 = \underline{29}$

$\therefore$ The consecutive numbers are 27, 29.

Q 5 The sum of three consecutive multiples of 7 is 777. Find these multiples.

Ans:- Suppose 3 consecutive multiples of 7 are X, $X+7$, $X+14$

From given data,

$X + (X+7) + (X+14) = 777$

$3X + 21 = 777$

$3X = 777 - 21$

$3X = 756$

$X = \frac{756}{3}$

$X = \underline{252}$

M T W T F S

Date: / / Page No.

$\therefore X + 7 = 252 + 7 = 259$

$\therefore X + 14 = 252 + 14 = 266$

$\therefore$ The required three consecutive multiples of 7 are 252, 259, 266.

Q.6 A man walks 10 km, then travels a certain distance by train & then by bus as far as twice by the train. If the whole journey is of 70 km, how far did he travel by train?

Ans:- The distance travelled by walk = 10 km

The distance travelled by ~~bus~~ train
= X km (suppose)

The distance travelled by bus
$= 2 \times X = \underline{2X}$ km

$\therefore 10 + X + 2X = 70$

$3X + 10 = 70$

$3X = 70 - 10$

$3X = 60$

$X = \frac{60}{3} = \underline{20}$

$\therefore$ The distance travelled by train is 20 k

M T W T F S

Date: / / Page No.

Q7. Vinay bought a pizza & cut it into three pieces. When the weighed the first piece he found that it was 7g lighter than the second piece & 4g heavier than the third piece. If the whole pizza weighed 300g How much did each of three pieces weight?

Ans:- If Pizza is cut into 3 pieces.

Suppose the weight of 1st piece is x gm.

Weight of 2nd piece = x + 7

Weight of 3rd piece = x - 4

From given,

$$x + (x+7) + (x-4) = 300$$

$$3x + 7 - 4 = 300$$

$$3x = 300 - 3$$

$$3x = 297$$

$$x = \frac{297}{3} = \underline{99}$$

$$x + 7 = 99 + 7 = \underline{106}$$

$$x - 4 = 99 - 4 = \underline{95}$$

M T W T F S

Date: / / Page No.

∴ The weight of 3 pieces is 95 gm, 99 gm, 106 gm.

Q 8 The distance around a rectangular field is 400 meters. The length of the field is 26 meters more than breadth. Calculate length & breadth of the field?

Ans:- Suppose the breadth of a rectangular field is x.

Length $= (x + 26)$ m

Perimeter of rectangular field

$= 2(l + b) = 400$

$= 2(l + b) = \frac{400}{2}$

$l + b = 200$

$x + 26 + x = 200$

$2x + 26 = 200$

$2x = 200 - 26$

$2x = 174$

$x = \frac{174}{2}$

$x = 87$

Length $= x + 26 = 87 + 26 = 113$ m

Breadth $= x = 87$ m

M T W T F S

Date: / / Page No.

Q 9 The length of a rectangular field is 8 meters less than twice its breadth. If perimeter of rectangular is 56 meters. Find its length & breadth?

Ans:- Suppose breadth of rectangular field is x.

Length = $2x(x-8) = 2x-8$

Perimeter of a Field = 56 m

$2(l+b) = 56$

$l+b = \frac{56}{2}$

$l+b = 28$

$2x-8+x = 28$

$3x = 28+8$

$3x = 36$

$x = \frac{36}{3}$

$x = \underline{12}$

Breadth = 12 m

Length = $2x-8$

$= 2 \times 12 - 8$

$= 24 - 8$

$= \underline{16}$ m

M T W T F S

Date: / / Page No.

Q.10 Two equal sides of a triangle are each 5 meters less than twice the third side. If the perimeter of triangle is 55 meters. Find the length of its sides?

Ans:- Suppose the length of third side is x.

The length of 1st & 2nd sides

$= 2x(x-5) = 2x-5$

Perimeter = 55 m

Perimeter of triangle = $a+b+c$

$55 = (2x-5) + (2x-5) + x$

$55 = 5x - 10$

$55 + 10 = 5x$

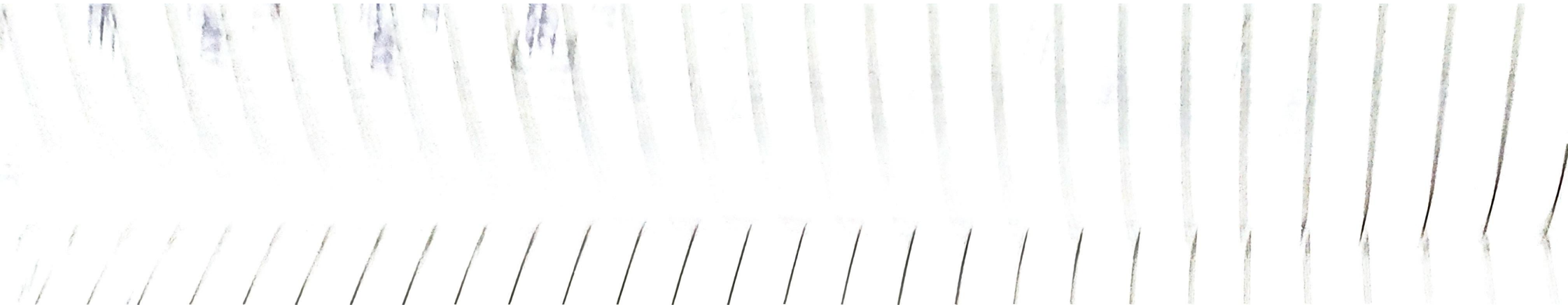
$65 = 5x$

$x = \frac{65}{5}$

$x = \underline{13}$ m

$2x - 5 = 2 \times 13 - 5 = 26 - 5 = \underline{21}$ m

∴ The lengths of three sides of a triangle are 13, 21, 21 m.



M T W T F S

Date: / / Page No.

Ans:- The ratio of ages of Rahul & Lakshmi = 5:7

Suppose their ages are $5x$ & $7x$.

After 4 years, Rahul's age = $5x+4$

Lakshmi's age = $7x+4$

After 4 years the sum of their ages = 56

$(5x+4)+(7x+4) = 56$

$12x+8 = 56$

$12x = 56-8$

$12x = 48$

$x = \frac{48}{12}$

$x = 4$

∴ Rahul's present age = $5x = 5 \times 4$

$= 20$ years

∴ Lakshmi's present age = $7x$

$= 7 \times 4$

$= 28$ years

Q.16 There are 120 multiple choice questions in a test. A candidate gets 4 marks for every correct answer and loses one mark for every incorrect answer. If all the questions are attempted, how many questions did the student answer correctly? The candidate scores 120 marks in the test. How many questions did he answer correctly?

Ans: Number of questions attempted for correct answer = x

Number of questions attempted for wrong answers = 120 - x

4 marks are awarded for every correct answer.

The number of marks obtained for correct answer 4 × x = 4x

1 mark is deducted for every wrong answer.

M T W T F S

Date: / / Page No.

Number of marks deducted for wrong answers

$= (180 - x) \times 1 = 180 - x$

According to sum,

$4x - (180 - x) = 450$

$4x - 180 + x = 450$

$5x = 450 + 180$

$5x = 630$

$x = \frac{630}{5}$

$x = 126$

∴ Number of questions attempted for correct answers is 126.

Q14. A sum of ₹ 500 is in the form of denominations of ₹ 5 & ₹ 10. If the total number of notes is 90. Find the number of notes of each denomination.

Ans:- Suppose No. of ₹5 notes is x

No. of ₹10 notes is $90 - x$

$5x + 10(90 - x) = 500$

$5x + 900 - 10x = 500$

M T W T F S

Date: / / Page No.

$5x - 10x = 500 - 900$

$-5x = -400$

$x = \frac{400}{5}$

$x = 80$

Number of ₹ 5 notes = 80

Number of ₹ 10 notes = $90 - x$

$= 90 - 80$

$= 10$

M T W T F S

Date: / / Page No.

Q.15 A person spent ₹ 564 in buying pens & pencils if cost of each pen is ₹ 7 & each pencil is ₹ 3 & if the total number of things bought was 108, how many of each type did he buy?

Ans: Suppose the number of pens is x.

The total number of things is 108.

The number of pencils = 108 − x

The cost of pens of x = ₹ 7 x x

= ₹ 7x

The cost of pencils of (108 − x)

The amount spent to buy pens & pencils = ₹ 564

$$7x + (324 - 3x) = 564$$

$$7x - 3x + 324 = 564$$

$$4x = 564 - 324$$

$$4x = 240$$

$$x = \frac{240}{4} = \underline{\underline{60}}$$

M T W T F S

Date: / / Page No.

∴ The number of pens = 60

∴ The number of pencils = 108 − 60

= 48

S.16 The perimeter of a school volley-ball court is 177 ft & the length is twice the width. What are dimensions of the volleyball court ?

Ans:- Breadth of a volleyball court = x Feet

Length = 2 x x = 2x feet

Perimeter of a court = 177 Feet

$2(l+b) = 177$

$2(2x + x) = 177$

$2x \; 3x = 177$

$6x = 177$

$x = \frac{177}{6}$

$x = 29.5$

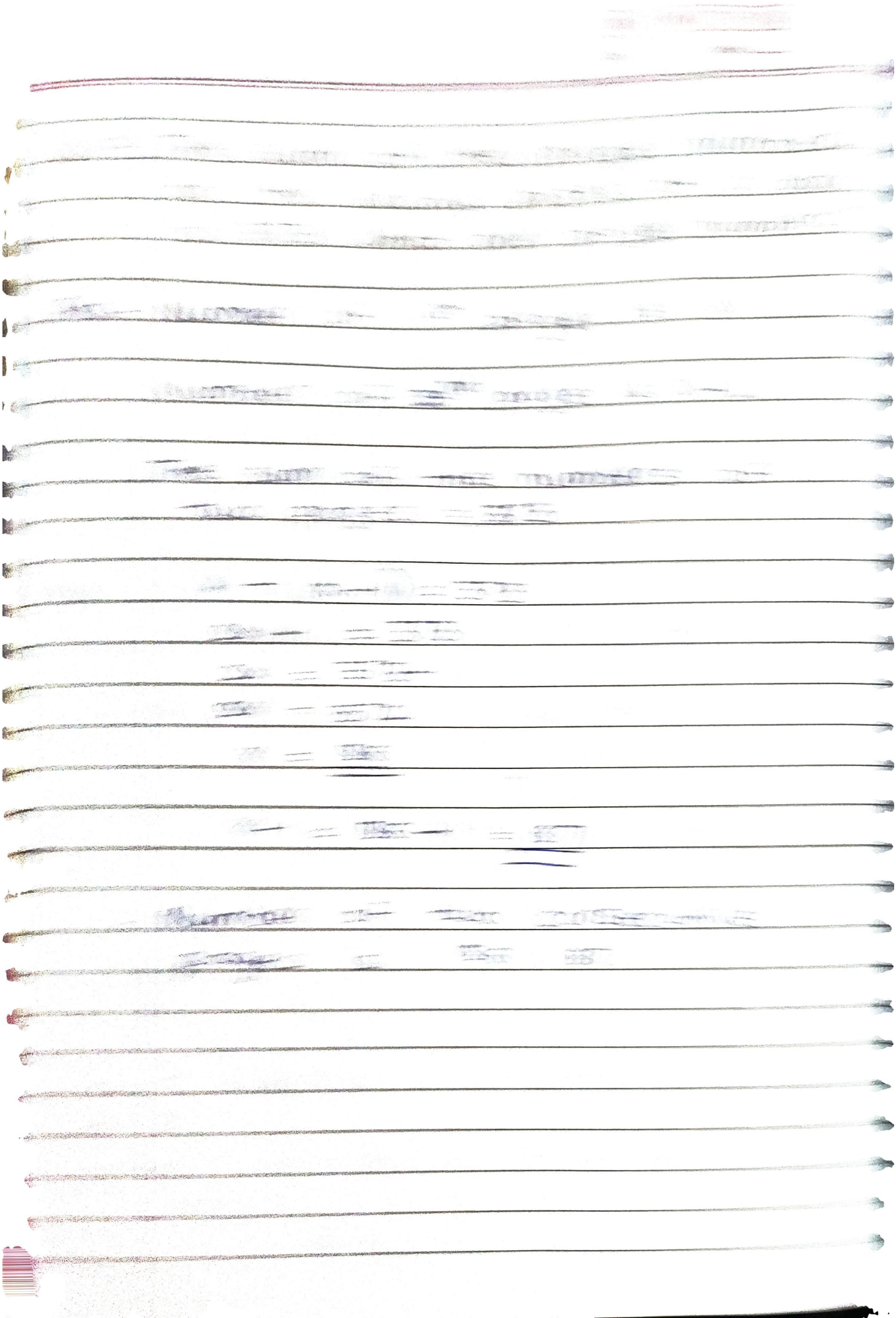
The breadth of a volleyball court

= 29.5 ft

The length of a volleyball court

= 2x = 2 x 29.5

= 59 ft



Exercise - 2.3

Solve the following equations :

1) $7x - 5 = 2x$

$7x - 2x = 5$

$5x = 5$

$x = \frac{5}{5} = \underline{1}$

2) $5x - 12 = 2x - 6$

$5x - 2x = -6 + 12$

$3x = 6$

$x = \frac{6}{3}$

$x = \underline{2}$

3) $7p - 3 = 3p + 8$

$7p - 3p = 8 + 3$

$4p = 11$

$p = \frac{11}{4}$

4) $8m + 9 = 7m + 8$

$= 8 - 9$

5) $7z + 13 = 2z + 4$

$7z - 2z = 4 - 13$

$5z = -9$

$z = \frac{-9}{5}$

6) $9y + 5 = 15y - 1$

$9y - 15y = -1 - 5$

$-6y = -6$

$y = \frac{-6}{-6}$

$y = 1$

7) $3x + 4 = 5(x - 2)$

$3x + 4 = 5x - 10$

$3x - 5x = -10 - 4$

$-2x = -14$

$x = \frac{-14}{-2}$

$x = \underline{7}$

M T W T F S

Date: / / Page No.

8) $3(t-3) = 5(2t-1)$

$3t - 9 = 10t - 5$

$3t - 10t = -5 + 9$

$-7t = 4$

$t = \frac{-4}{7}$

9) $5(p-3) = 3(p-2)$

$5p - 15 = 3p - 6$

$5p - 3p = -6 + 15$

$2p = 9$

$p = \frac{9}{2}$

10) $5(z+3) = 4(2z+1)$

$5z + 15 = 8z + 4$

$5z - 8z = 4 - 15$

$-3z = -11$

$z = \frac{11}{3}$

11) $15(x-1) + 4(x+3) = 2(7+x)$

$15x - 15 + 4x + 12 = 14 + 2x$

$19x - 15 + 12 = 14 + 2x$

$19x - 03 = 14 + 2x$

$19x - 2x = 14 + 03$

$17x = 17$

$x = \frac{17}{17} = 1$

M T W T F S

Date: / / Page No.

12) $3(5z-7)+2(9z-11) = 4(8z-7)-111$

$15z - 21 + 18z - 22 = 32z - 28 - 111$

$33z - 21 - 22 = 32z - 139$

$33z - 32z = -139 + 21 + 22$

$z = -139 + 43$

$z = \underline{-96}$

13) $8(x-3) - (6-2x) = 2(x+2) - 5(5-x)$

$8x - 24 - 6 + 2x = 2x + 4 - 25 + 5x$

$10x - 30 = 7x - 21$

$10x - 7x = -21 + 30$

$3x = 9$

$x = \frac{9}{3} = \underline{3}$

14) $3(n-4) + 2(4n-5) = 5(n+2) + 16$

$3n - 12 + 8n - 10 = 5n + 10 + 16$

$11n - 22 = 5n + 26$

$11n - 5n = 26 + 22$

$6n = 48$

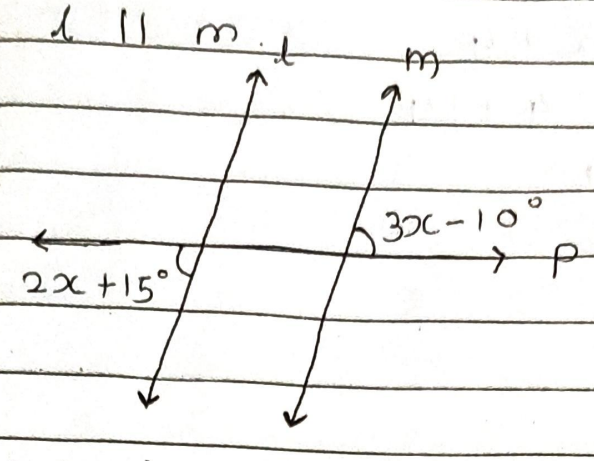
$n = \frac{48}{6} = \underline{8}$

Exercise :- 2 4

M T W T F S

Date: / / Page No.

Q.1 Find the value of 'x' so that $l \parallel m$



Solution :- $l \parallel m$

So, $3x - 10^\circ = 2x + 15^\circ$

$3x - 2x = 15^\circ + 10^\circ$

$x = 25^\circ$

Q.2 Eight times of a number reduced by 10 is equal to the sum of six times the number & 4. Find the number

Ans :- Suppose the number is x.

8 times of a number $= 8 \times x = 8x$

If 10 ~~time~~ is reduced from $8x$ then $8x - 0$

6 times of a number $= 6 \times x = 6x$

If 4 is added to $6x$ then $6x + 4$.

From given :

$3x - 10 = 6x + 4$

$3x - 6x = 4 + 14$

$2x = 14$

$x = \frac{14}{2}$

$x = 7$

∴ The number is 7

Q 3 A number consists of two digits whose sum is 9 IF 27 is subtracted from the number its digits are reversed. Find the number.

Ans:- Suppose two digit number is x.

The sum of two digits = 9

Another digit = $9 - x$

The number $= 10(9-x) + x$

$= 90 - 10x + x$

$= 90 - 9x$

If 27 subtracted from the number its digits are reversed.

$(90 - 9x) - 27 = 10x + (9 - x)$

$90 - 27 - 9x = 10x + 9 - x$

$-9x + 9x = 9 - 63$

$63 - 9x = 9x + 9$

$-9x - 9x = 9 - 63$

$-18x = -54$

$x = \frac{54}{18} = \underline{3}$

Units digit = 3

Tens digit = $9 - x = 9 - 3 = 6$

∴ The number = 63

4 The number is divided into two parts such that one part is 10 more than the other. If two parts are in the ratio 5:3, find the number & two parts.

Ans:- If two parts are in the ratio - 5:3

Suppose two parts are $5x$ & $3x$.

According to sum,

$5x = 3x + 10$

$5x - 3x = 10$

$2x = 10$

$x = \frac{10}{2} = \underline{5}$

M T W T F S

Date: / / Page No.

The number is $x + 3x = 8x$

$= 8 \times 5$

$= 40$

The parts of number are

$5x = 5 \times 5 = 25$

$3x = 3 \times 5 = 15$

Q.5 When I triple a certain number & add 2, I get the same answer as I do when I subtract the number from 50. Find the number

Ans:- Suppose the number is x.

3 times of a number $= 3x$

If 2 is added to $3x$ then $3x+2$

If x is subtracted from 50 then it becomes $50-x$.

According to sum,

$3x + 2 = 50 - x$

$3x + x = 50 - 2$

$4x = 48$

$x = \frac{48}{4}$

$x = 12$

$\therefore$ The number is 12.

M T W T F S

Date: / / Page No.

6. Mary is twice older than her sister. In 5 years time, she will be 2 years older than her sister. Find how old are they both now.

Ans:- Suppose age of Marys sister = x

Mary's age = $2x$

After 5 years her sister's age

$= (x + 5)$ years

After 5 years Mary's age $= (2x + 5)$ years

According to sum,

$2x + 5 = (x + 5) + 2$

$2x + 5 = x + 5 + 2$

$2x - x = 5 + 2 - 5$

$x = 2$

The age of Mary's sister is 2 years.

Mary's age $= 2x = 2 \times 2 = 4$ years.

7. In 5 years time, Reshma will be 3 times old as she was 9 years ago. How old is she now?

Ans:- Reshma's present age = x years

After 5 years Reshma's age $= (x + 5)$ years

M T W T F S

Date: / / Page No.

Before 9 years Reshma's age
$= (x - 9)$ years

According to the sum,

$x + 5 = 3(x - 9)$

$x + 5 = 3x - 27$

$x - 3x = -27 - 5$

$-2x = -32$

$x = \frac{32}{2}$

$x = 16$

∴ Reshma's present age = 16 years

Q.8 A town's population increased by 1200 people & then this new population decreased 11 %. The town had 32 less people than it did before the 1200 increase Find the orginal population.

Ans:- Suppose the population of a town after increase of 1200 is x.

11 % of present population

$= 11\%$ of $x = \frac{11}{100} \times x = \frac{11x}{100}$

M T W T F S

Date: / / Page No.

According to sum,

$$\frac{11x}{100} = 1200 + 32$$

$$\frac{11x}{100} = 1232$$

$$x = \frac{112}{1232} \times 100$$

$$= 112 \times 100$$

$$x = 11200$$

∴ The present population of a town is $11200 - 1200 = \underline{10000}$.

Q A man on his way to dinner shortly after 6 pm observes that the hands of his watch form an angle of 110°. Returning before 7 p.m he notices that again the hands of his watch form an angle of 1100. Find the number of minutes that he has been away.

Ans:- Suppose the number is x.

$\frac{1}{3}$rd of a number $= \frac{1}{3} \times x = \frac{x}{3}$

$\frac{1}{5}$th of a number $= \frac{1}{5} \times x = \frac{x}{5}$

M T W T F S

Date: / / Page No.

According to the sum,

$$\frac{x}{3} - \frac{x}{5} = 4$$

$$\frac{5x - 3x}{15} = 4$$

$$\frac{2x}{15} = 4$$

$$2x = 15 \times 4$$

$$x = \frac{15 \times 4^{2}}{2}$$

$$x = 15 \times 2$$

$$x = 30$$

∴ The number is 30.

Exercise 2:5

M T W T F S

Date: / / Page No.

Q.1 Solve the following equations

i) $\frac{n}{5} - \frac{5}{7} = \frac{2}{3}$

$\frac{n \times 7 - 5 \times 5}{5 \times 7} = \frac{2}{3}$

$\frac{7n - 25}{35} = \frac{2}{3}$

$3(7n - 25) = 35 \times 2$

$21n - 75 = 70$

$21n = 70 + 75$

$21n = 145$

$n = \frac{145}{21}$

ii) $\frac{x}{3} - \frac{x}{4} = 14$

$\frac{x \times 4 - x \times 3}{3 \times 4} = 14$

$\frac{4x - 3x}{12} = 14$

$\frac{x}{12} = 14$

$x = 12 \times 14$

$= 168$

M T W T F S

Date: / / Page No.

iii) $\frac{z}{2} + \frac{z}{3} - \frac{z}{6} = 8$

$\frac{z + z - z}{2 \quad 3 \quad 6} = 8$

$\frac{z \times 3 + z \times 2}{2 \times 3} - \frac{z}{6} = 8$

$\frac{3z + 2z}{6} - \frac{z}{6} = 8$

$\frac{5z}{6} - \frac{z}{6} = 8$

$\frac{4z}{6} = 8$

$4z = 8 \times 6$

$z = \frac{8 \times 6}{4}$

$z = 2 \times 6$

$z = 12$

iv) $\frac{2p}{3} - \frac{p}{5} = 11\frac{2}{3}$

$\frac{2p \times 5 - p \times 3}{3 \times 5} = \frac{35}{3}$

$\frac{10p - 3p}{15} = \frac{35}{3}$

$\frac{7p}{15} = \frac{35}{3}$

$7p \times 3 = 35 \times 15$

$$7P = \frac{35 \times 15}{3}$$

$$7P = 35 \times 5$$

$$P = \frac{35 \times 5}{7}$$

$$P = 5 \times 5$$

$$P = \underline{25}$$

v) $9\frac{1}{4} = y - 1\frac{1}{3}$

$$\frac{37}{4} = y - \frac{4}{3}$$

$$y = \frac{37}{4} + \frac{4}{3}$$

$$y = \frac{37 \times 3 + 4 \times 4}{4 \times 3}$$

$$y = \frac{111 + 16}{12}$$

$$y = \underline{\frac{127}{12}}$$

vi) $\frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$

$$\frac{x + x + 3x}{2,5,10} - \frac{4}{5} = \frac{1}{5}$$

$$\frac{5x + 2x + 3x}{10} = \frac{1}{5} + \frac{4}{5}$$

$$\frac{7x + 3x}{10} = \frac{5}{5}$$

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

$$x = 1$$

vii) $$\frac{x}{2} - \frac{1}{4} = \frac{x}{3} + \frac{1}{2}$$

$$\frac{x}{2} - \frac{x}{3} = \frac{1}{2} + \frac{1}{4}$$

$$\frac{3x - 2x}{6} = \frac{4 + 2}{8}$$

$$\frac{x}{6} = \frac{6}{8}$$

$$x = \frac{6}{8} \times 6$$

$$x = \frac{36}{8}$$

$$x = \frac{9}{2}$$

viii) $$\frac{2x - 3}{3x + 2} = \frac{-2}{3}$$

$$3(2x - 3) = -2(3x + 2)$$

$$6x - 9 = -6x - 4$$

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

$$12x = 5$$

$$x = \frac{5}{12}$$

M T W T F S

Date: / / Page No.

ix) $\frac{8P-5}{7P+1} = \frac{-2}{4}$

Ans:- $4(8P-5) = -2(7P+1)$

$32P - 20 = -14P - 2$

$32P + 14P = -2 + 20$

$46P = 18$

$P = \frac{18}{46} = \frac{9}{23}$

x) $\frac{7y+2}{5} = \frac{6y-5}{11}$

$11(7y+2) = 5(6y-5)$

$77y + 22 = 30y - 25$

$77y - 30y = -25 - 22$

$47y = -47$

$y = \frac{-47}{47}$

$y = 1$

xi) $\frac{x+5}{6} - \frac{x+1}{9} = \frac{x+3}{4}$

$\frac{9(x+5) - 6(x+1)}{6 \times 9} = \frac{x+3}{4}$

$\frac{9x + 45 - 6x - 6}{54} = \frac{x+3}{4}$

$\frac{3x + 39}{54} = \frac{x+3}{4}$

$4(3x + 39) = 54(x+3)$

$$x = \frac{5}{21}$$

$$12x + 156 = 54x + 162$$
$$12x - 54x = 162 - 156$$
$$-42x = 6$$
$$x = \frac{-6}{42}$$
$$x = \frac{-1}{7}$$

xii) $\frac{3t+1}{16} - \frac{2t-3}{7} = \frac{t+3}{8} + \frac{3t-1}{14}$

$$\frac{7(3t+1) - 16(2t-3)}{16 \times 7} = \frac{14(t+3) + 8(3t-1)}{8 \times 14}$$

$$\frac{21t + 7 - 32t + 48}{112} = \frac{14t + 42 + 24t - 8}{112}$$

$$21t + 7 - 32t + 48 = 14t + 42 + 24t - 8$$
$$-11t + 7 + 48 = 38t + 42 - 8$$
$$-11t + 125 = 38t + 34$$
$$-11t - 38t = 34 - 125$$
$$-49t = -91$$
$$t = \frac{91}{49} = \frac{13}{7}$$

M T W T F S

Date: / / Page No.

$12x + 156 = 54x + 162$

$12x - 54x = 162 - 156$

$-42x = 6$

$x = \frac{6}{-42}$

$x = -\frac{1}{7}$

ii) $\frac{3t+1}{16} - \frac{2t-3}{7} = \frac{t+3}{8} + \frac{3t-1}{14}$

$\frac{7(3t+1) - 16(2t-3)}{16 \times 7} = \frac{14(t+3) + 8(3t-1)}{8 \times 14}$

$\frac{21t + 7 - 32t + 48}{112} = \frac{14t + 42 + 24t - 8}{112}$

$21t - 32t + 7 + 48 = 14t + 24t + 42 - 8$

$-11t + 55 = 38t + 34$

$-11t - 38t = 34 - 55$

$-49t = -21$

$t = \frac{-21}{-49}$

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

Q.2 What number is that of which the third part exceeds the fifth part by 4?

Ans:- Suppose the number is x.

Third part of number is $\frac{x}{3}$

Fifth part of number is $\frac{x}{5}$.

From given,

$$\frac{x}{3} - \frac{x}{5} = 4$$

$$\frac{5x - 3x}{15} = 4$$

$$2x = 15 \times 4$$

$$2x = 60$$

$$x = \frac{60}{2}$$

$$x = \underline{30}$$

The number is 36

The difference between two positive integers is 36. The quotient when one integer is divided by other is 4. Find the integers.

Suppose one integer is x.

The difference between two integers is 36

The other integer = x − 36

According to given:

$$\frac{x}{x-36} = 4$$

$$x = 4(x-36)$$

$$x = 4x - 144$$

$$x - 4x = -144$$

$$-3x = -144$$

$$x = \frac{144}{3}$$

$$x = 48$$

$$x - 36 = 48 - 36 = 12$$

∴ The two integers are 48 & 12

M T W T F S

Date: / / Page No.

Q 4 The numerator of a fraction is 4 less than denominator. If 1 is added to both its numerator & denominator, it becomes 1/2. Find the fraction

Ans:- Suppose numerator of a fraction is x.

Denominator of a fraction is y.

According to condition,

$$x = y - 4 \quad ---(i)$$

$$\frac{x+1}{y+1} = \frac{1}{2}$$

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

$$2x + 2 = y + 1$$

$$2x - y = 1 - 2$$

$$2x - y = -1 \quad ---(ii)$$

Put $x = y - 4$ (From (i)) in (ii)

$$2(y-4) - y = -1$$

$$2y - 8 - y = -1$$

$$y - 8 = -1$$

$$y = -1 + 8$$

$$y = \underline{7}$$

Put $y = 7$ in eq^n (i)

$$x = 7 - 4 = \underline{3}$$

∴ The numerator of a fraction is 3 & denominator is 7 & the fraction $\frac{3}{7}$

Q5 Find three consecutive numbers such that if they are divided by 10, 17 & 26 respectively, the sum of their quotients will be 10.

Ans:- Suppose 3 consecutive numbers are x, $x+1$, $x+2$

The quotient when divided by 10 = $\frac{x}{10}$

The quotient when divided by 17 = $\frac{x+1}{17}$

The quotient when divided by 26 = $\frac{x+2}{26}$

Sum of quotients = 10

According to given condition,

$$\frac{x}{10} + \frac{x+1}{17} + \frac{x+2}{26} = 10$$

$$\frac{17x + 10(x+1)}{10 \times 17} + \frac{x+2}{26} = 10$$

$$\frac{17x + 10x + 10}{170} + \frac{x+2}{26} = 10$$

$$\frac{27x + 10}{170} + \frac{x+2}{26} = 10$$

$$\frac{26(27x + 10) + 170(x+2)}{170 \times 26} = 10$$

$$\frac{702x + 260 + 170x + 340}{4420} = 10$$

$$872x + 600 = 10 \times 4420$$

$$872x + 600 = 44200$$

$$872x = 44200 - 600$$

$$872x = 43600$$

$$x = \frac{43600}{872}$$

$$x = 50$$

$$x + 1 = 50 + 1 = 51$$

$$x + 2 = 50 + 2 = 52$$

∴ Three consecutive numbers are 50, 51, 52

M T W T F S

Date: / / Page No.

Q 6 In class of 40 pupils the number of girls is three -fifts of no. of boys. Find the number of boys in class.

Ans: The no. of boys is x

Total no. of students is 40

No. of girls $= \frac{3}{5} \times x = \frac{3x}{5}$

According the sum,

$$x + \frac{3x}{5} = 40$$

$$\frac{5x + 3x}{5} = 40$$

$$8x = 40 \times 5$$

$$x = \frac{40^{5} \times 5}{8}$$

$$x = 5 \times 5$$

$$x = 25$$

∴ The no. of boys in class is 25.

Q 7 After 15 years, Mary's age will be four times of her present age. Find her present age.

M T W T F S

Date: / / Page No.

Ans: Suppose the present age of Mary is x years.

After 15 years Mary's age = $(x+15)$ years

According to sum,

$$x + 15 = 4 \times x$$

$$x + 15 = 4x$$

$$x - 4x = -15$$

$$-3x = -15$$

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

$$x = \underline{5}$$

∴ The present age of Mary is 5 years.

Q.8 Aravind has a kiddy bank. It is full of one-rupee & fifty paise coins. It contains 3 times as many Fifty paise as one rupee coins. The total amount of money in the bank is 35. How many coins of each kind are there in bank.

Ans:- No. of 1 rupee coins = x

No. of 50 paise coins = $3 \times x = 3x$.

M T W T F S

Date: / / Page No.

The value of total coins $= \frac{3x}{2} + x$

According to sum,

$$\frac{3x}{2} + x = 35$$

$$\frac{3x + 2x}{2} = 35$$

$$5x = 2 \times 35$$

$$x = \frac{2 \times 35^{7}}{\cancel{5}}$$

$$x = 2 \times 7$$

$$x = 14$$

No. of 1 rupee coins is 14

No. of 50 paisa coins $= 3x$

$= 3 \times 14$

$= 42$

Q 9 A & B together can finish a piece of work in 12 days. If 'A' alone can finish the same work in 20 days, in how many days B alone can finish it ?

ns :- A, B can do work in 12 days.

M T W T F S

Date: / / Page No.

(A+B)'s 1 day work = $\frac{1}{12}$.

A can complete work in 20 days.

Then A's one day work = $\frac{1}{20}$

B's 1 day work = (A+B)'s 1 day work − A's 1 day work

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

$= \frac{20-12}{20\times12}$

$= \frac{8}{240}$

$= \frac{1}{30}$

∴ No. of days to B to complete work is 30 days.

3.10 If a train runs at 40 kmph it reaches its destination late by 11 minutes. But if it runs at 50 kmph it runs at 50 kmph it it late by 5 minutes only. Find the distance to be covered by train.

M T W T F S

Date: / / Page No.

Ans. Suppose distance is reached is x km.

Time taken to travel x km with speed x.

From given, $40 \text{ km/hr} = \frac{x}{40} \text{ hr}$

Time taken to travel 'x' km with speed $50 \text{ km/hr} = \frac{x}{50} \text{ hr}$

According to given,
difference between times

$= 11 - 5$

$= 6 \text{ min}$

$= \frac{6}{60} \text{ hr}$ $(1 \text{ hr} = 60 \text{ min})$

$= \frac{1}{10} \text{ hr}$

$\therefore \frac{x}{40} - \frac{x}{50} = \frac{1}{10}$

$\frac{50x - 40x}{50 \times 40} = \frac{1}{10}$

$\frac{10x}{2000} = \frac{1}{10}$

M T W T F S

Date: / / Page No.

$10x \times 10 = 2000$

$100x = 2000$

$x = \frac{2000}{100}$

$x = 20$

∴ The distance travelled by train is 20 kms.

Q.11. One fouth of a herd of deer has gone to the forest. one third of total number is grazing in a field & remaining 15 are drinking water on bank of a river. Find the total no. of deer.

Ans.:- No. of deer = x

No. of deer gone to forest

$= \frac{1}{4} \times x = \frac{x}{4}$

No. of deer grazing in field

$= \frac{1}{3} \times x = \frac{x}{3}$

No. of remaining deer = 15

According to given,

$$x - \left(\frac{x}{4} + \frac{x}{3}\right) = 15$$

$$x - \left(\frac{3x + 4x}{4 \times 3}\right) = 15$$

$$x - \frac{7x}{12} = 15$$

$$\frac{12x - 7x}{12} = 15$$

$$5x = 12 \times 15$$

$$x = \frac{12 \times 15}{5}$$

$$x = 36$$

Q.12 By selling price of radio for ₹ 903, a shop keeper gains 5 %. Find the cost price of radio.

Ans: The selling price of a radio is ₹ 903

Profit = 5 %

C.P = ?

$$C.P = \frac{S.P \times 100}{(100 + P)}$$

$$= \frac{903 \times 100}{100 + 5}$$

$$= \frac{903 \times 100}{105}$$

$$= \frac{903 \times 20}{21}$$

$$= 43 \times 20$$

$$= 860$$

∴ The cost price of radio is ₹ 860.

13. Sekhar gives a quarter of his sweets to Reny & then gives 5 sweets to Raji. He has 7 sweets left. How many did he have to start with?

Ans. No. of sweets of sekhar is x

No. of sweets given to Reny

$$= \frac{1}{4} \times x = \frac{x}{4}$$

No. of sweets given to Raji = 5

7 sweets remaining.

From given,

$$x - \left(\frac{x}{4} + 5\right) = 7$$

$$x - \frac{x}{4} - 5 = 7$$

$$\frac{4x - x}{4} = 7 + 5$$

$$\frac{3x}{4} = 12$$

$$3x = 12 \times 4$$

$$3x = 48$$

$$x = \frac{48}{3}$$

$$x = \underline{16}$$

∴ Number of sweets with sekhar is 16.