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CONTENTS

LIFE MATHEMATICS 1

POINTS TO REMEMBER

- Percent means per hundred or out of a hundred. It is denoted by the symbol %. $x\%$ denotes the fraction $\frac{x}{100}$.
- Percentages are useful in comparing quantities easily.
- The amount for which an article is bought is called its *Cost Price* (C.P).
- The amount for which an article is sold is called its *Selling Price* (S.P).
- When the S.P is more than the C.P, then there is a gain or profit. *Gain/Profit = S.P – C.P.*
- When the S.P is less than the C.P, then there is a loss. Loss = C.P – S.P.
- The profit or loss is always calculated on the cost price.
- **Marked price:** In big shops and departmental stores, we see that every product is tagged with a card with a price written on it. The price marked on it is called the *Marked Price*. The rebate which is given for an article on buying is known as *discount*.
- Selling price = Marked price – discount.
- Formulae

(i) Gain or Profit % $= \left(\frac{\text{Profit}}{\text{C.P}} \times 100\right)\%$

(ii) Loss $= \left(\frac{\text{Loss}}{\text{C.P}} \times 100\right)\%$

(iii) $\text{S.P} = \frac{(100 + \text{profit}\%)}{100} \times \text{C.P}$ (or) $\text{C.P} = \frac{100}{100 + \text{profit}\%} \times \text{S.P}$

(iv) $\text{S.P} = \frac{(100 - \text{Loss}\%)}{100} \times \text{C.P}$ (or) $\text{C.P} = \frac{100}{(100 - \text{Loss}\%)} \times \text{S.P}$

2. **Divide ₹ 350 among P, Q and R such that P gets 50% of what Q gets and Q gets 50% of what R gets.**

Sol. Let R get x, Q gets 50% of what R gets

$$\therefore \quad \therefore \text{ Q gets} = \frac{50}{100}\times x = \frac{x}{2}$$

P gets 50% of what Q gets

$$\therefore \text{ P gets} = \frac{50}{100}\times\frac{x}{2} = \frac{x}{4}$$

Since 350 is divided among the three

$$\therefore 350 = x+\frac{x}{2}+\frac{x}{4}$$

$$350 = \frac{4x+2x+x}{4} = \frac{7x}{4} = 350$$

$$x = \frac{350\times 4}{7} = 200$$

$$\text{Q gets} = \frac{x}{2} = \frac{200}{2} = 100, \text{ P gets} = \frac{x}{4} = \frac{200}{4} = 50$$

$\therefore$ P = 50, Q = 100, **R = 200**

Exercise 1.1

1. **Fill in the blanks:**

(i) If 30% of x is 150, then x is _____. **[Ans: 500]**

Hint. Given 30% of x is 150

$$\text{i.e } \frac{30}{100}\times x = 150$$

$$\therefore x = \frac{\cancel{150}^{5}\times 100}{\cancel{30}}$$

$$\therefore x = 500$$

(ii) 2 minutes is _____% to an hour. **[Ans: $3\frac{1}{3}$ %]**

Hint. Let 2 min be x % of an hour

$$\text{and 1 hr} = 60 \text{ min}$$

$$x\% = \frac{2}{60}\times 100 = \frac{200}{60} = \frac{10}{3} = 3\frac{1}{3}$$

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

(iii) If x % of x =25, then x = _____. **[Ans: 50]**

Hint. Given that x % of x is 25

$$\therefore \frac{x}{100}\times x = 25$$

$$\therefore x^2 = 25\times 100 = 2500$$

$$\therefore x = \sqrt{2500} = 50$$

$$\frac{b}{g}+1 = \frac{5}{3}+1$$

$$\frac{b+g}{g} = \frac{5+3}{3} = \frac{8}{3}$$

$$\therefore g = \frac{3}{8}(b+g) \quad \text{....(3)}$$

$$\text{Similarly } b = \frac{5}{8}(b+g) \quad \text{....(4)}$$

Total pass = Pass in girls + Pass in boys

$$= (1)+(2) = \frac{84}{100}b+\frac{92}{100}g$$

$$\text{Total pass percentage} = \frac{\text{total pass}}{\text{total students}} \times 100$$

$$\text{Total pass} = \text{boys passed} + \text{girls passed} = \left(\frac{\frac{84}{100}b+\frac{92}{100}g}{b+g}\right)\times 100$$

Substituting (3) & (4) in the above, we get

$$= \left(\frac{\frac{84}{100}b+\frac{92}{100}g}{b+g}\right)\times 100$$

$$= \left[\frac{\frac{84}{100}\times\frac{5}{8}\cancel{(b+g)}}{\cancel{(b+g)}}+\frac{\frac{92}{100}\times\frac{3}{8}\cancel{(b+g)}}{\cancel{(b+g)}}\right]\times 100$$

$$= \frac{84}{100}\times\frac{5}{8}+\frac{92}{100}\times\frac{3}{8} = \left[\frac{420}{800}+\frac{276}{800}\right]\times 100$$

$$= \frac{696}{8\cancel{00}}\times 1\cancel{00} = 87\%$$

Pass percentage = 87%

Objective Type Questions

16. **12% of 250 litres is the same as _____of 150 litres**

(a) 10% (b) 15% (c) 20% (d) 30%

Hint.

$$12\% \text{ of } 250 = \frac{12}{100}\times 250 = 30 \text{ lit.}$$

$$\text{Percentage : } \frac{30}{150}\times 100 = \mathbf{20\%}$$

[*Ans:* **(c) 20%**]

17. **If three candidates A, B and C is 3 in a school election got 153, 245 and 102 votes respectively, the percentage of votes for the winner is_____.**

(a) 48% (b) 49% (c) 50% (d) 45%

[*Ans:* **(b) 49%**]

THINK

Page No. 13

A shopkeeper marks the price of a marker board 15% above the cost price and then allows a discount of 15% on the marked price. Does he gain or lose in the transaction?

Sol. Let cost price of marker board be 100

$$\begin{aligned} CP &= 100 \text{ Marks it 15\% above CP} \\ \therefore \text{Marked price} &= MP = \frac{15}{100} \times CP + CP \\ &= \frac{15}{100} \times 100 + 100 = 15 + 100 = 115 \\ \text{Discount \%} &= 15\% \\ \text{Discounted price} &= MP\left(1 - \frac{d\%}{100}\right) = 115\left(1 - \frac{15}{100}\right) = 115 \times \frac{85}{100} = 97.75 \end{aligned}$$

$\therefore$ He sells it 97.75 which is less than his cost price. Therefore he loses

$$\text{Loss} = 97.75 - 100 = -2.25$$

TRY THIS

Page No. 14

1. **By selling 5 articles, a man gains the cost price of 1 article. Find his gain percentage.**

Sol. Let cost price of article be C.P

Let S.P of 1 articles be SP by selling 5 articles at SP

he makes a gain of cost price of one article.

$$\begin{aligned} \text{Gain on 1 article} &= SP - CP; \Rightarrow \text{Gain\%} = \frac{SP - CP}{CP} \times 100 \\ \text{Gain on 2 articles} &= 2 \times (SP - CP) \\ \text{Gain on 5 articles} &= 5 \times (SP - CP) \end{aligned}$$

Given than gain on 5 articles is CP of 1 article

$$\begin{aligned} \therefore 5(SP - CP) &= CP \\ \therefore \frac{SP - CP}{CP} &= \frac{1}{5} \end{aligned}$$

$$\text{Gain percentage } \frac{SP - CP}{CP} \times 100 = \frac{1}{5} \times 100\ \% = 20\%$$

2. **By selling 8 articles, a shopkeeper gains the selling price of 3 articles. Find his gain percentage.**

Sol. Let cost price of 1 article be CP.

Let selling price of 1 article be SP.

$$\begin{aligned} \text{Gain on 1 article} &= SP - CP \\ \text{Gain on 8 articles} &= 8 \times (SP - CP) \end{aligned}$$

Given that gain on 8 articles in selling price of 3 articles

$$\begin{aligned} 8\ (SP - CP) &= 3 \times SP \\ \therefore \frac{SP - CP}{CP} &= \frac{3}{8} \\ \therefore \frac{SP}{SP - CP} &= \frac{8}{3} \end{aligned}$$

Subtracting 1 on both sides

$$\frac{SP}{SP-CP}-1 = \frac{8}{3}-1=\frac{SP-(SP-CP)}{SP-CP}=\frac{8-3}{3}$$

$$\frac{SP-SP-CP}{SP-CP} = \frac{5}{3} \Rightarrow \frac{CP}{SP-CP}=\frac{5}{3}$$

$$\frac{SP-CP}{CP} = \frac{3}{5} \text{ (taking reciprocals on both sides)}$$

$$\text{Gain \%} \ \frac{SP-CP}{CP}\times 100 = \frac{3}{5}\times 100 = 3\times 20 = 60\%$$

3. **If the C.P of 20 articles is equal to the S.P of 15 articles, find the profit or loss percentage.**

Sol.

Given CP of 20 article = SP of 15 articles

SP of 15 articles = CP of 20 articles

$$\therefore \text{SP of 1 article} = \frac{1}{15}\times \text{CP of 20 articles}$$

$$\therefore SP = \frac{1}{15}\times 20\ CP = \frac{20}{15}CP = \frac{4}{3}CP$$

$$\therefore SP = \frac{4}{3}CP \Rightarrow \text{SP is greater than CP}$$

$\therefore$ It is a profit

$$\text{Profit \%} = \frac{SP-CP}{CP}\times 100 = \frac{\frac{4}{3}CP-CP}{CP}\times 100$$

$$\frac{\frac{4}{3}CP-CP}{CP}\times 100 = \frac{\frac{4CP-3CP}{3}}{CP}\times 100$$

$$\therefore \frac{\frac{CP}{3}}{CP}\times 100 = \frac{1}{3}\times 100 = 33\frac{1}{3}\% \text{ loss}$$

Exercise 1.2

1. **Fill in the blanks:**

(i) Loss or gain percent is always calculated on the_____. [*Ans:* **Cost price**]

(ii) A mobile phone is sold for ₹ 8400 at a gain of 20%. The cost price of the mobile phone is_____. [*Ans:* **₹ 7000**]

Hint. Let cost price of mobile be ₹ x

Given that selling price is ₹ 8400 and gain is 20%

As per formula,

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

$\therefore$ by substituting we get,

$$\text{Discounted price} = \text{MP} \times \left(\frac{(100-d\%)}{100}\right) = \frac{(100-16)}{100}$$

$$\text{MP} = \frac{210\times100}{84} = 250$$

17. **The single discount which is equivalent to two successive discount of 20% and 25% is**
(a) 40% (b) 45% (c) 5% (d) 22.5%

[*Ans:* **(a) 40%**]

Hint. Let marked price be MP, after discount 1 of 20%,

$$\text{Discounted price} = \text{MP} \times \frac{(100-d_1\%)}{100} = \frac{(100-20)}{100} = \text{MP} \times \frac{80}{100}$$

After discount 2 of 25%,

$$\text{Discounted Price} = \text{Discounted price} \times \frac{(100-d_2\%)}{100}$$

$$= \text{MP} \times \frac{80}{100} \times \frac{(100-25)}{100}$$

$$= \text{MP} \times \frac{\cancel{80}^{4} \times \cancel{75}^{15}}{100 \times \cancel{100}_{2}} = \text{MP} \times \frac{60}{100}$$

$$= \text{MP} \times \frac{(100-40)}{100}$$ 60 can be written as 100 – 40

Comparing with formula, we get
∴ This is equivalent to a single discount of **40%**

TRY THESE

Page No. 23

1. **Find the principal which gives ₹ 420 as C.I @ 20% p.a compounded half yearly for one year.**

Sol.

CI = ₹ 420
Rate = ? 20% p.a
Principle = ? [required to find] Time period (n) = 1 year.

However, let us value of r to be 20% p.a so for half yearly, r is $\frac{20}{2} = 10\%$
Formula for Amount (A) when compounded half yearly is

$$\text{A} = \text{P}\left(1+\frac{r}{100}\right)^{2n}$$

$$\text{A} = \text{P} + \text{CI} = \text{P} + 420 \quad \text{[as CI is given as 410]}$$

$$\therefore \text{P} + 420 = \text{P}\left(1+\frac{10}{100}\right)^{2\times1}$$

$$\therefore \text{P} + 420 = \text{P}\left(\frac{110}{100}\right)^{2}$$

$$420 = \text{P}\left[\left(\frac{110}{100}\right)^{2} - 1\right]$$

$$420 = P\left[\left(\frac{110}{100}\right)^2 - 1\right] = \left[\frac{110^2 - 100^2}{100^2}\right]$$ [apply formula $(a^2 - b^2)$ $(a+b)(a-b)$]

$$= P\left[\frac{(110+100)(110-100)}{100^2}\right]$$

$$\therefore 420 = P\left[\frac{210 \times 10}{100^2}\right]$$

$$\therefore P = \frac{420 \times 100 \times 100}{210 \times 10}$$

$$P = 2000$$

2. **The price of a laptop depreciates @4%p.a. If its present price is ₹ 24,000, find its price after 3 years.**

Sol. Let original price of laptop be 'P', Rate of depreciation is 4% p.a,
Present price is ₹ 24,000 (D).
Formula for depreciation is

$$\text{Depreciated price (D)} = P\left(1 - \frac{d\%}{100}\right)^n$$

$$\therefore 24000 = P\left(1 - \frac{4}{100}\right)^n \quad \ldots(1)$$

Price after 3 years from now is

$$P\left(1 - \frac{4}{100}\right)^{n+3} = ? \Rightarrow P\left(1 - \frac{4}{100}\right)^n \left(1 - \frac{4}{100}\right)^3$$

From (1),

$$24{,}000 \times \left(1 - \frac{4}{100}\right)^3 = 24000 \times \frac{96}{100} \times \frac{96}{100} \times \frac{96}{100} = 21233.66$$

ACTIVITY - 1

Page No. 23

Mukunthan invests ₹ 30,000/- for 3 months in a bank which gives C.I at the rate of 12% compounded monthly. A private company offers his S.I at the rate of 12% p.a What is the difference in the interests received by Mukunthan? Do by traditional method and verify your answer by calculator.

Sol.

Principal = ₹ 30,000
Time period = 3 months
In Bank rate of interest for CI = 12% compounded monthly

$$\therefore A = \left(1 + \frac{r}{100}\right)^n = 30{,}000\left(1 + \frac{12}{100}\right)^3$$

$$30{,}000 \times \frac{112}{100} \times \frac{112}{100} \times \frac{112}{100} = 42147.84$$

$$\therefore CI = A - P = 42147.84 - 30{,}000$$

$$CI = 12147.84$$

In private company,
Rate of single Interest SI = 12% p.a

7. **Find the difference in the compound interest on ₹ 62500 for $1\frac{1}{2}$ years at 8% p.a compounded annually and when compounded half-yearly.**

Sol. **Case 1:**

$$P = ₹\ 62500$$

$$n = 1\frac{1}{2} \text{ yrs. } \left(a\frac{b}{c}\right) \text{ form}$$

$$r = 8\% \text{ Compounded annually}$$

$$CI = A - P$$

$$A = P\left(1+\frac{r}{100}\right)^{a}\left(1+\frac{\frac{b}{c}\times r}{100}\right)$$

$$= 62500\left(1+\frac{8}{100}\right)^{1}\left(1+\frac{\frac{1}{2}\times 8}{100}\right) = 62500\left(\frac{108}{100}\right)\left(1+\frac{4}{100}\right)$$

$$= 62500\left(\frac{108}{100}\right)\left(\frac{104}{100}\right) = 70200$$

$$CI = A - P = 70200 - 62500 = 7700 \quad ....(1)$$

Case 2:

$$P = ₹\ 62500$$

$$n = 1\frac{1}{2} \text{ yrs.}$$

$$r = 8\ \% \text{ p.a when compounded half yearly}$$

$$r = 4\% \text{ compounded half yearly}$$

$$A = P\left(1+\frac{r}{100}\right)^{2n} = 62500\left(1+\frac{4}{100}\right)^{\cancel{2}\times\frac{3}{\cancel{2}}}$$

$$= 62500\left(\frac{104}{100}\right)^{3} = 70304$$

$$CI = 62500\left(\frac{104}{100}\right)^{3} - 62500$$

$$= 70304 - 62500 = ₹\ 7804 \quad ....(2)$$

Difference between case 1 & case 2 is (2) – (1)

$$\therefore (2) - (1) = 7804 - 7700 = ₹104$$

CHALLENGING PROBLEMS

8. **If the first number is 20% less than the second number and the second number is 25% more than 100, then find the first number.**

Sol. Second number is 25% more than 100

$$\therefore \text{2nd number is } 100+\frac{25}{100}\times 100 = 125$$

$$\frac{P\times 10\times 3}{100} = 300$$

$$\therefore P = \frac{300\times 100}{10\times 3} = 1000$$

Compound Interest = CI = A – P

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

$$= 1000\left(1+\frac{10}{100}\right)^3 = 1000\times\left(\frac{100+10}{100}\right)^3$$

$$= 1000\times\frac{110}{100}\times\frac{110}{100}\times\frac{110}{100} = 1331$$

$\therefore$ Compound Interest (CI) = Amount – Principal

= 1331 – 1000 = 331

Compound Interest = ₹ 331

Additional Questions and Answers

1. **Fill in the blanks**

(a) Percent means _____ **[Ans: per hundred or out of hundred]**

(b) Percent is useful in _____ **[Ans: comparing quantities easily]**

(c) The formula to find the increased quantity _____ **[Ans:** $I=\left(1+\frac{x}{100}\right)A$ **]**

(d) The formula to find the decreased quantity _____ **[Ans:** $D=\left(1-\frac{x}{100}\right)A$ **]**

(e) Gain or profit % _____ **[Ans:** $\left(\frac{\text{Profit}}{\text{C.P}}\times 100\right)\%$ **]**

(f) Loss % = _____ **[Ans:** $\left(\frac{\text{Loss}}{\text{C.P}}\times 100\right)\%$ **]**

(g) S.P = _____ (if gain % is given) **[Ans:** $\left(\frac{(100+\text{Profit}\%)}{100}\times \text{C.P}\right)$ **]**

(h) C.P = _____ (if gain % is given) **[Ans:** $\frac{100}{(100+\text{Profit }\%)}\times \text{S.P}$ **]**

(i) S.P = _____ (if loss % is given) **[Ans:** $\frac{(100-\text{Loss}\%)}{100}\times \text{C.P}$ **]**

(j) C.P = _____ (if loss % is given) **[Ans:** $\text{C.P} = \frac{100}{(100-\text{Loss}\%)}\times \text{S.P}$ **]**

UNIT TEST

TIME: 45 MINUTES **MAX MARKS : 25**

I. Fill in the blanks 5 × 1 = 5

1. 2 minutes is _____% to an hour.
2. In a school of 1400 students, there are 420 girls. The percentage of boys in the school is _____.
3. 15% of 25% of 10000 =_____.
4. Loss or gain percent is always calculated on the_____.
5. The compound interest on ₹ 8000 at 10% p.a for 1 year, compounded half yearly is _____.

II. Answer the following questions. 5 × 2 = 10

6. Find the simple interest on ₹ 900 for 73 days at 8% p.a.
7. 48 is 32% of what number?
8. If selling an article for ₹ 820 causes 10% loss on the selling price, find its cost price.
9. Find the compound interest on ₹ 3200 at 2.5% p.a for 2 years, compounded annually.
10. If the first number is 20% less than the second number and the second number is 25% more than 100, then find the first number.

III. Answer the following questions. 2 × 5 = 10

11. A shopkeeper gives two successive discounts on an article whose marked price is ₹ 180 and selling price is ₹ 108. Find the first discount percent if the second discount is 25%.
12. Magesh invested ₹ 5000 at 12% p.a for one year. If the interest is compounded half yearly, find the amount he gets at the end of the year.

ANSWERS

1. $3\frac{1}{3}\%$ 2. 70 3. 375 4. Cost price 5. ₹ 820
6. Refer Recap Q.No 5
7. Refer Exercise. No. 1.1 Q.No. 3
8. Refer Exercise.No. 1.2 Q.No. 2
9. Refer Exercise.No. 1.3 Q.No. 3
10. Refer Exercise.No. 1.4, Challenging problem Q.No. 8
11. Refer Exercise.No. 1.4, Challenging problem Q.No. 9
12. Refer Exercise.No. 1.3 Q.No. 5

ALGEBRA

2

POINTS TO REMEMBER

- An equation containing only one variable with its highest power as one is called a linear equation in one variable.
- This linear equation in one variable is also known as simple equation.
- The value which replaces a variable in an equation so as to make the two sides of the equation equal is called a solution or root of the equation.
- The shifting of a number from one side of an equation to other is called transposition.
- Graphing is just a visual method for showing relationships between numbers.
- The horizontal line is named as XOX′, called the X-axis. The vertical line is named as YOY′, called the Y- axis. Both the axes are called coordinate axes. The plane containing the x axis and the y axis is known as the coordinate plane or the Cartesian plane.
- A point is denoted by a pair (a,b) of two numbers 'a' and 'b' listed in a specific order in which 'a' represents the distance along the X-axis and 'b' represents the distance along the Y axis. It is called an ordered pair (a,b) .
- The coordinate axes divide the plane of the graph into four regions called quadrants.
- The line graph for the linear equation is called a linear graph.

TRY THESE

Page No. 32

Identify which among the following are linear equations.

(i) $2 + x = 19$ - Linear as degree of the variable x is 1

(ii) $7x^2 - 5 = 3$ - not linear as highest degree of x is 2

(iii) $4p^3 = 12$ - not linear as highest degree of p is 3

(iv) $6m + 2$ - Linear, but not an equation

(v) $n = 10$ - Linear equation as degree of n is 1

(vi) $7k - 12 = 0$ - Linear equation as degree of k is 1

(vii) $\frac{6x}{8} + y = 1$ - Linear equation as degree of x & y is 1

(viii) $5 + y = 3x$ - Linear equation as degree of y & x is 1

(ix) $10p + 2q = 3$ - Linear equation as degree of p & q is 1

(x) $x^2 - 2x - 4$ - not linear equation as highest degree of x is 2

THINK

Page No. 32

(i) Is t(t – 5)=10 a linear equation? Why?

Sol.

$$\begin{aligned} t(t-5) &= 10 \\ &= t \times t - 5 \times t = 10 \\ &= t^2 - 5t = 10 \end{aligned}$$

This is not a linear equation as the highest degree of the variable 't' is 2

(ii) Is $x^2 = 2x$, a linear equation? Why?

Sol.

$$\begin{aligned} x^2 &= 2x \\ &= x^2 - 2x = 0 \end{aligned}$$

This is not a linear equations as the highest degree of the variable 'x' is 2

TRY THESE

Page No. 33

Convert the following statements into linear equations:

1. **On subtracting 8 from the product of 5 and a number, I get 32.**

Sol. Convert to linear equations:

Given that on subtracting 8 from product of 5 and a, we get 32

$$\begin{aligned} \therefore 5 \times x - 8 &= 32 \\ \therefore \mathbf{5x - 8} &= \mathbf{32} \end{aligned}$$

2. **The sum of three consecutive integers is 78.**

Sol. Sum of 3 consecutive integers is 78

Let 1st integer be 'x'

$$\begin{aligned} \therefore x + (x+1) + (x+2) &= 78 \\ \therefore x + x + 1 + x + 2 &= 78 \\ \mathbf{3x + 3} &= \mathbf{78} \end{aligned}$$

Exercise 2.1

1. **Fill in the blanks:**

(i) The value of x in the equation $x + 5 = 12$ is ---------- [Ans: 7]

Hint.

Given, $x + 5 = 12$

$x = 12 - 5 = 7$ (by transposition method)

Value of x is 7

(ii) The value of y in the equation $y - 9 = (-5) + 7$ is ---------- [Ans: 11]

Hint.

Given, $y - 9 = (-5) + 7$

$y - 9 = 7 - 5$ (re-arranging)

$y - 9 = 2$

$\therefore y = 2 + 9 = 11$ (by transposition method)

(iii) The value of m in the equation 8m=56 is---------- [Ans: 7]

Hint.

Given, $8m = 56$

Divided by 8 on both sides

$$\frac{8 \times m}{8} = \frac{56}{8}$$

$$\therefore m = 7$$

(iv) The value of p in the equation $\frac{2p}{3} = 10$ is ---------- [Ans: 15]

Hint.

Given, $\frac{2p}{3} = 10$

Multiplying by 3 on both sides,

$$\frac{2p}{\cancel{3}} \times \cancel{3} = 10 \times 3$$

Dividing by 2 on both sides

$$\frac{\cancel{2}p}{\cancel{2}} = \frac{30}{2}$$

$$\therefore p = 15$$

(v) The linear equation in one variable has ---------- solution. [Ans: one]

2. **Say True or False.**

(i) The shifting of a number from one side of an equation to other is called transposition.

[Ans: True]

(ii) Linear equation in one variable has only one variable with power 2. **[Ans: False]**

[Linear equation in one variable has only one variable with power one – correct statement]

$$\frac{45-17}{3} = 25t$$

$$\therefore 25t = \frac{28}{3}$$

$$\therefore t = \frac{28}{3\times 25} = \frac{28}{75} \text{ hr } \left(\frac{28}{75} \times 60 = 22.4 \text{ min}\right)$$

Substituting this value of 't' in eqn. (1), we get

$$d = 60t + 15$$

$$= 60 \times \frac{28}{75} + 15 = \frac{1680}{75} + 15 = 22.4 + 15$$

$$= \mathbf{37.4\ km}$$

OBJECTIVE TYPE QUESTIONS

11. **Sum of a number and its half is 30 then the number is_____**

(a) 15 (b) 20 (c) 25 (d) 40 **[*Ans:* (b) 20]**

Hint. Let number be 'x'

$\therefore$ half of number is $\frac{x}{2}$

Sum of number and it's half is given by

$$x + \frac{x}{2} = 30 \text{ [Multiplying by 2 on both sides]}$$

$$2x + x = 30 \times 2$$

$$3x = 60$$

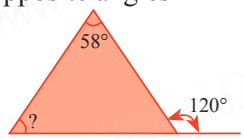
$$x = \frac{60}{3} = \mathbf{20}$$

12. **The exterior angle of a triangle is 120º and one of its interior opposite angle 58º, then the other opposite interior angle is_____**

(a) 62º (b) 72º (c) 78º (d) 68º **[*Ans:* (a) 62º]**

Hint. As per property of Δ, exterior angle is equals to sum of interior opposite angles

Let the other interior angle to be found be 'x'



$$\therefore x + 58 = 120°$$

$$\therefore x = 120 - 58 = \mathbf{62°}$$

13. **What sum of money will earn ₹ 500 as simple interest in 1 year at 5% per annum?**

(a) 50000 (b) 30000 (c) 10000 (d) 5000

[*Ans:* (c) 10000]

Hint. Let sum of money be 'P'

Time period (n) is given as 1yr.

Rate of simple interest (r) is given as 5% p.a

$\therefore$ As per formula for simple interest.

$$\text{S.I} = \frac{P \times r \times n}{100} = \frac{P \times 5 \times 1}{100} = 500$$

$$\therefore P \times 5 \times 1 = 500 \times 100$$

$$\therefore P = \frac{500 \times 100}{5} = 100 \times 100 = \mathbf{10{,}000}$$

14. **The product of LCM and HCF of two numbers is 24. If one of the number is 6, then the other number is _____**

(a) 6 (b) 2 (c) 4 (d) 8

[*Ans:* (c) 4]

Hint. Product of LCM & HCF of 2 numbers is always product of the numbers. [this is property]

Product of LCM & HCF is given as 24

$\therefore$ Product of the 2 nos. is 24

Given one number is 6. Let other number be 'x'

$$\therefore 6 \times x = 24$$

$$\therefore x = \frac{24}{6} = 4$$

THINK

Page No. 43

If instead of (4,3), we write (3,4) and try to mark it, will it represent 'M' again?

Sol. Let 3, 4 be M, when we mark, we find that it is a different point and not 'M'

TRY THESE

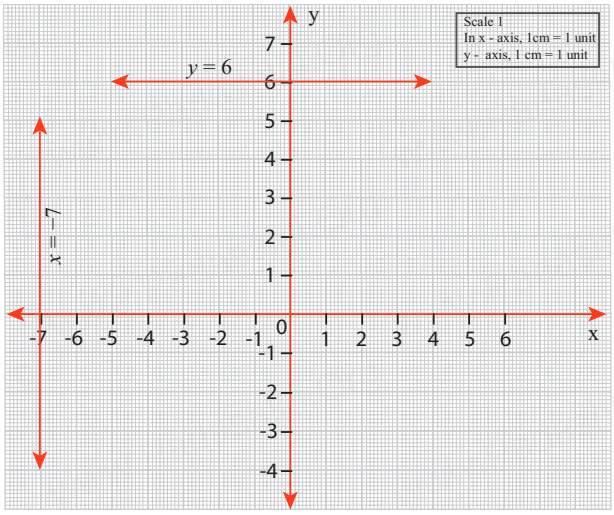
Page No. 45

1. **Complete the table given below.**

S.No	Point	Sign of X coordinate	Sign of Y coordinate	Quadrant
1.	(–7, 2)	Negative	Positive	II
2.	(10, –2)	Positive	Negative	IV
3.	(–3, –7)	Negative	Negative	III
4.	(3, 1)	Positive	Positive	I
5.	(7, 0)	Positive	Neither Positive or negative	on x axis
6.	(0, –4)	Neither Positive, or Negative	Negative	on y axis

8. **Draw the graph of the following equations : (i) $x = -7$ (ii) $y = 6$**

Sol.



9. **Draw the graph of (i) $y = -3x$ ii) $y = x - 4$**

Sol. To draw graph, we need to find out some points.

(i) for $y = -3x$, let us first substituting values & check

put $x = 0$

$y = -3 \times 0 = 0$ $\therefore (0, 0)$ is a point

put $x = 1$

$y = -3 \times 1 = -3$ $\therefore (1, -3)$ is a point

If join these 2 points, we will get the line

(ii) for $y = x - 4$

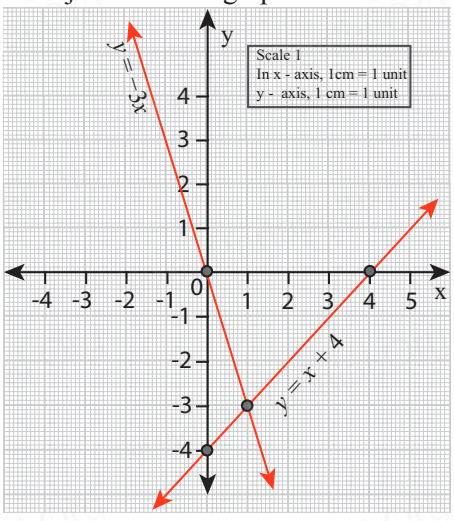
put $x = 0$

$y = 0 - 4 = -4$ $\therefore (0, -4)$ is a point

$x = 4$

$y = 4 - 4 = 0$ $\therefore (4, 0)$ is a point

Now let us plot the points & join them on graph



8. **A mobile vendor has 22 items, some which are pencils and others are ball pens. On a particular day, he is able to sell the pencils and ball pens. Pencils are sold for ₹ 15 each and ball pens are sold at ₹ 20 each. If the total sale amount with the vendor is ₹ 380, how many pencils did he sell?**

Sol. Let vendor have 'p' number of pencils & 'b' number of ball pens

Given that total number of items is 22

$$\therefore p + b = 22 \quad \ldots(1)$$

Pencils are sold for ₹ 15 each & ball pens for ₹ 20 each

$$\text{total sale amount} = 15 \times p + 20 \times b$$
$$= 15p + 20b \text{ which is given to be } 380.$$
$$\therefore 15p + 20b = 380$$

Dividing by 5 throughout,

$$\frac{15p}{5} + \frac{20b}{5} = \frac{380}{5} \Rightarrow 3p + 4b = 76 \quad \ldots(2)$$

Multiplying equation (1) by 3 we get

$$3 \times p + 3 \times b = 22 \times 3$$
$$\Rightarrow \quad 3p + 3b = 66 \quad \ldots(3)$$

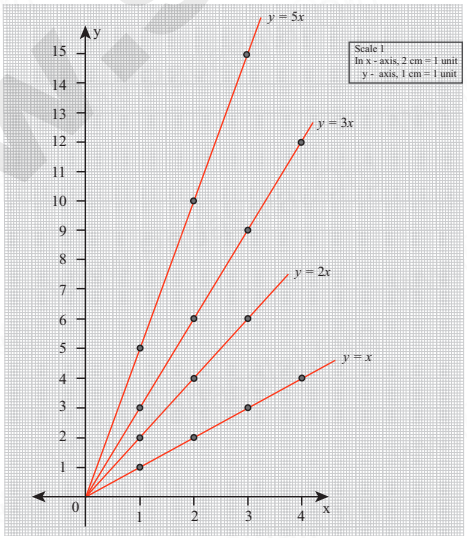
Equation (2) – (3) gives

$$\begin{array}{rcl} 3p + 4b & = & 76 \\ (-) \quad (-) & & (-) \\ 3p + 3b & = & 66 \\ \hline 0 + b & = & 10 \\ \therefore b & = & 10 \\ \therefore p & = & 12 \end{array}$$

He sold 12 pencils

9. **Draw the graph of the lines $y = x$, $y = 2x$, $y = 3x$ and $y = 5x$ on the same graph sheet. Is there anything special that you find in these graphs?**

Sol. (i) $y = x$, (ii) $y = 2x$, (iii) $y = 3x$ (iv) $y = 5x$



5. **Graph the equation $y = 4x - 1$**

Sol. Being by choosing a couple of values for x and y. It will firstly help to see

(i) What happens to y when x is zero and

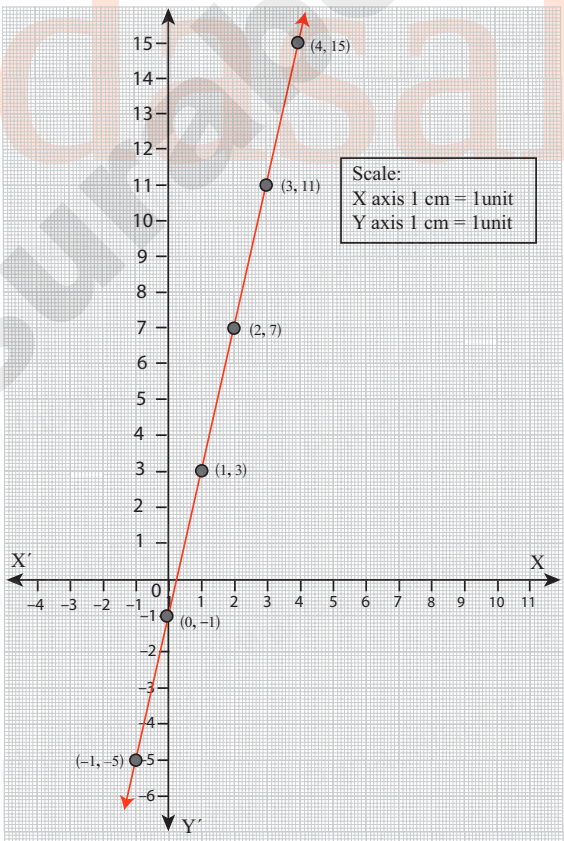
(ii) What happens to x when y is zero.

After this we can go on to find one or two more values.

Let us find at least two more ordered pairs. For easy graphing, let us avoid fractional answers. we shall make suitable guesses.

x	–1	0	1	2	3	4
y	–5	–1	3	7	11	15

x	$y = 4x - 1$
1	$y = 4 \times 1 - 1 = 3$
2	$y = 4 \times 2 - 1 = 7$
3	$y = 4 \times 3 - 1 = 11$
0	$y = 4 \times 0 - 1 = -1$
–1	$y = 4 \times -1 - 1 = -5$



$= 2(x + 19 + x) = 2(2x + 19)$

Given that, $(2(2x + 19)) = 164 \Rightarrow 4x + 38 = 164$

$4x = 164 - 38 = 126$

$x = \frac{126}{4} = 31.5$

Thus breadth of the rectangular class = 31.5 metres.

Length of the class room $= x + 19 = 31.5 + 19 = 50.5$ metres.

UNIT TEST

TIME: 45 MINUTES **MAX MARKS : 25**

I. Fill in the blanks. 5 × 1 = 5

1. The value of x in the equation $x + 5 = 12$ is _____.
2. The value of m in the equation $8m = 56$ is _____.
3. Sum of a number and its half is 30 then the number is_____.
4. X- axis and Y-axis intersect at _____.
5. The intersecting point of the line $x = 4$ and $y = -4$ is_____

II. Answer the following Questions. 5 × 2 = 10

6. Find x: (i) $\frac{2x}{3} - 4 = \frac{10}{3}$
7. One number is seven times another. If their difference is 18, find the numbers.
8. If the points P (5, 3) Q(− 3, 3) R (− 3, − 4) and S form a rectangle then find the coordinate of S.
9. Two equal sides of an isosceles triangle are $5y - 2$ and $4y + 9$ units. The third side is $2y + 5$ units. Find 'y' and the perimeter of the triangle.
10. Three consecutive integers, when taken in increasing order and multiplied by 2, 3 and 4 respectively, total up to 74. Find the three numbers.

III. Answer the following Questions. 2 × 5 = 10

11. A total of 90 currency notes, consisting only of ₹5 and ₹10 denominations, amount to ₹ 500. Find the number of notes in each denomination.
12. Draw the graph of the following equations : (i) $x = -7$ (ii) $y = 6$

ANSWERS

1. 7 2. 7 3. 20 4. Origin (0, 0) 5. 4, – 4

6. Refer Exercise 2.1, Q.No. 4
7. Refer Exercise 2.2, Q.No. 3
8. Refer Exercise 2.4, Q.No. 5
9. Refer Exercise 2.5, Q.No. 3
10. Refer Exercise 2.5, Challeging problems Q.No. 6
11. Refer Exercise 2.2, Q.No. 6
12. Refer Exercise 2.4, Q.No. 8

GEOMETRY

3

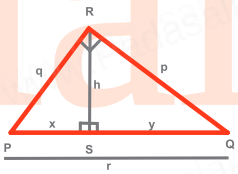
POINTS TO REMEMBER

- In a right angled triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides. This is Pythagoras theorem. ΔABC, $BC^2 = AB^2 + AC^2$
- If in a triangle the square on the greatest side is equal to the sum of squares on the other two sides, then the triangle is right angled triangle. This is converse of Pythagoras theorem.
- If an altitude is drawn to the hypotenuse of an right angled triangle, then
- (i) The two triangles are similar to the given triangle and also to each other.

  That is, $\Delta PRQ \sim \Delta PSR \sim \Delta RSQ$

  (ii) $h^2 = xy$

  (iii) $p^2 = yr$ and $q^2 = xr$, where $r = x + y$



- A trapezium is a quadrilateral in which a pair of opposite sides are parallel.
- A parallelogram is a quadrilateral in which the opposite sides are parallel.

TRY THIS

Page No. 60

How will you prove ΔABC ~ ΔDAC?

Sol. Proof: In ΔABC & ΔDAC, ∠C is common and ∠BAC = ∠ADC = 90°

Therefore ΔABC ~ ΔDAC (AA similarity)

TRY THESE

Page No. 61

Check whether the following are Pythagorean triplets.

i) 57,176,185 ii) 264, 265, 23 iii) 8, 41,40

Sol. (i). For Pythagorean triplet, the sum of the squares of 2 sides is equivalent to square of 3rd side (hypotenuse)

Let us check of

$57^2 + 176^2$ whether $= 185^2$ or not

$57^2 = 3249$

$176^2 = 30976$

$185^2 = 34225$

$57^2 + 176^2 = 3249 + 30976 = 34225 = 185^2$

∴ 57, 176 & 185 are Pythagorean triplet.

(ii) 23, 264, 265

$23^2 = 529$

$264^2 = 69696$

$23^2 + 264^2 = 70225$

$265^2 = 70225$

$\therefore 23^2 + 264^2 = 265^2$

∴ Pythagorean triplet

(iii) 8, 41, 40

$8^2 = 64$

$40^2 = 1600$

$8^2 + 40^2 = 1664$

$41^2 = 1681$

$\therefore 8^2 + 40^2 \neq 41^2 = 1$ ∴they are not Pythagorean triplet.

ACTIVITY - 1

Page No. 62

We can construct sets of Pythagorean triplets as follows. Let *m* and *n* be any two positive integers ($m > n$):

(a, b, c) is a Pythagorean triple if $a = m^2 - n^2$, $b = 2mn$ and $c = m^2 + n^2$ (Think, why?) Complete the table.

m	n	$a = m^2 - n^2$	$b = 2mn$	$c = m^2 + n^2$	Pythagorean triplet
2	1	$a^2 = 2^2 - 1^2$ $= 4 - 1$ $= 3$	$b = 2 \times 2 \times 1$ $= 4$	$c = 2^2 + 1^2$ $= 5$	(3, 4 , 5)
3	2	$a^2 = 3^2 - 2^2$ $= 9 - 4$ $= 5$	$b = 2 \times 3 \times 2$ $= 12$	$c = 3^2 + 2^2$ $= 13$	(5, 12, 13)
4	1	15	8	17	(15, 8, 17)
7	2	45	28	53	(45, 28, 53)

ACTIVITY - 2

Page No. 65

Find all integer-sided right angled triangles with hypotenuse 85

Sol.

$$(x + y)^2 - 2xy = 85^2$$

13, 84, 85
36, 77, 85
40, 75, 85
51, 68, 85

} Pythagorean triplets with hypotenuse 85.

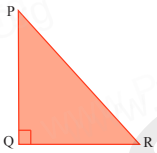
Exercise 3.1

1. **Fill in the blanks:**

(i) If in a Δ PQR, $PR^2 = PQ^2 + QR^2$, then the right angle of ΔPQR is at the vertex _____

[Ans: Q]

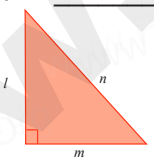
Hint.



(ii) If 'l' and 'm' are the legs and 'n' is the hypotenuse of a right angled triangle then, l^2 = _____

[Ans: $n^2 - m^2$]

Hint.



(iii) If the sides of a triangle are in the ratio 5:12:13 then, it is _____

[Ans: a right angled triangle.]

Hint.

$$13^2 = 169$$
$$5^2 = 25$$
$$12^2 = 144$$
$$169 = 25 + 144$$
$$\therefore 13^2 = 5^2 + 12^2$$

Exercise 3.2

Miscellaneous Practice Problems

1. **The sides of a triangle are 1.2 cm, 3.5 cm and 3.7cm. Is this triangle a right triangle? If so, which side is the hypotenuse?**

Sol. The sides of a triangle are

$a = 1.2$ cm
$b = 3.5$ cm
$c = 3.7$ cm

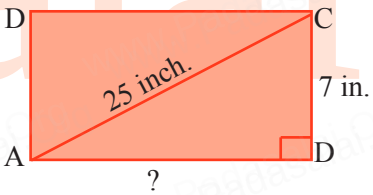
By Pythagoras theorem,

$c^2 = a^2 + b^2$
$a^2 + b^2 = 1.2^2 + 3.5^2 = 1.44 + 12.25$
$= 13.69$ ....(1)
$c^2 = 3.7^2 = 13.69$ ....(2)
(1) = (2)

Yes, it is a right angled triangle. The hypotenuse $c = 3.7$ cm

2. **Rithika buys an LED TV which has a 25 inches screen. If its height is 7 inches, how wide is the screen? Her TV cabinet is 20 inches wide. Will the TV fit into the cabinet? Why?**

Sol. Take the sides of a right angled triangle ΔABC as



$a = 7$ inches
$b = 25$ inches
$c = ?$

By Pythagoras theorem,

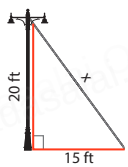
$b^2 = a^2 + c^2$
$25^2 = 7^2 + c^2$
$\Rightarrow c^2 = 25^2 - 7^2 = 625 - 49 = 576$
$\therefore c^2 = 24^2$
$\Rightarrow c = 24$ inches

$\therefore$ Width of TV cabinet is 20 inches which is lesser than the width of the screen ie.24 inches.

$\therefore$ The TV will not fit into the cabinet.

3. **Find the length of the support cable required to support the tower with the floor.**

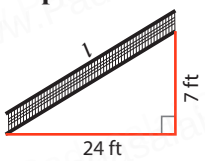
Sol. From the figure, by Pythagoras theorem,



$x^2 = 20^2 + 15^2$
$= 400 + 225 = 625$
$x^2 = 25^2 \Rightarrow x = 25$ft.

$\therefore$ **The length of the support cable required to support the tower with the floor is 25 ft.**

4. **A ramp is constructed in a hospital as shown. Find the length of the ramp.**

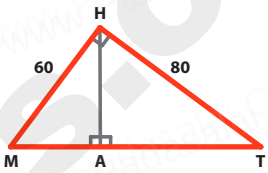


Sol. Take $a = 7$ ft.
$b = 24$ ft.

By Pythagoras theorem,

$l^2 = a^2 + b^2$
$= 7^2 + 24^2 = 49 + 576$
$= 625 = 25^2$
$l = 25$ft

5. **In the figure, find MT and AH**



Sol. By Pythagoras theorem,

$MT^2 = MH^2 + HT^2$
$= 60^2 + 80^2 = 3600 + 6400$
$= 10000 = 100^2$
$\therefore MT = 100$

By the altitude - on- hypotenuse theorem,

$MH^2 = MA \times MT$
$60^2 = MA \times 100$
$MA = \frac{3600}{100} = 36$

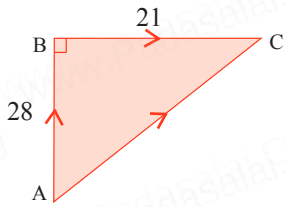
$\therefore$ In ΔMAH, by Pythagoras theorem,

$AH^2 = MH^2 - MA^2$
$= 60^2 - 36^2 = 3600 - 1296$
$= 2304 = 48^2$
$\therefore AH = 48$
$\therefore$ Ans **MT = 100**
AH = 48

CHALLENGING PROBLEMS

6. **Mayan travelled 28 km due north and then 21 km due east. What is the least distance that he could have travelled from his starting point?**

Sol. From the figure AC is to be found.



By using Pythagoras theorem,

$AC^2 = AB^2 + BC^2$
$= 28^2 + 21^2$
$= 784 + 441 = 1225 = 35^2$
$\therefore AC = 35$ km

This is the least distance that he could have travelled from his starting point.

11. **State the altitude-on-Hypotenuse theorem.**

Sol. If an altitude is drawn to the hypotenuse of an right angled triangle then (i) the two triangles are similar to the given triangle and also to each other.

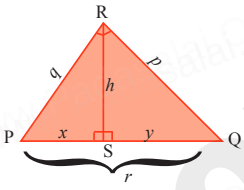
That is $\Delta PRQ \sim \Delta PSR \sim \Delta RSQ$

(i) $h^2 = xy$

(ii) $p^2 = yr$ and

(iii) $q^2 = xr$, where

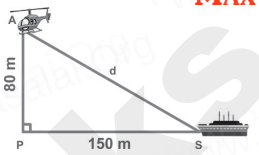
$r = x + y$



UNIT TEST

TIME: 45 MINUTES **MAX MARKS : 25**

I. Answer the question. 1 × 2 = 2



1. Find the distance between the helicopter and the ship.

II. Answer the question. 1 × 3 = 3

2. If ΔAPK is an isosceles right angled triangle, right angled at K. Prove that $AP^2 = 2AK^2$

III. Answer the question. 4 × 5 = 20

3. State and prove Pythagoras theorem
4. State the altitude-on-Pythagoras theorem
5. HERB, HE = 6 cm, $\angle EHB = 60°$ and EB = 7 cm.
6. (a) Construct the trapezium ARMY, with $\overline{AR} \parallel \overline{YM}$, AR = 7cm, RM = 6.5 cm $\angle RAY = 100°$ and $\angle ARM = 60°$

(OR)

Construct the parallelogram CAMP, CA = 6 cm, AP = 8 cm and CP = 5.5 cm

ANSWERS

1. Refer guide Exercise No. 3.1 Q.no. 8
2. Refer guide Exercise No. 3.2 Q.no. 7
3. Refer Additional Questions & Answers (1) and (3)
4. Refer Additional Questions & Answers (11)
5. Refer guide Exercise No.3.4 Q.no. 8
6. (a) Refer guide Exercise No. 3.3 Q.no. 5

(or)

(b) Refer guide Exercise No. 3.4 Q.no. 3

INFORMATION PROCESSING 4

POINTS TO REMEMBER

- Fibonacci series is given by 1, 1, 2, 3, 5, 8, 13, 21, 34.... and so on where every term is the sum of proceeding 2 terms.
- HCF (Highest Common Factor) or GCD (Greatest common Divisor) of 2 or more number is the largest possible number that perfectly divides all the numbers (ie without any remainder)
- HCF can be found using repeated division method or repeated subtraction method.
- Cryptography is defined as the science which is concerned with communication in secured form and uses encryption and decryption.
- Encryption & decryption - The process of converting the plain text to the cipher text is called encryption and the reverse process is called decryption.
- Cipher text & Cipher number - the encrypted output (converted message into code) is called Cipher text or Cipher number.
- Caesar cipher - it is a type of shifting cipher text in which each letter in the text is shifted a certain number of places down the alphabets.
- Substituting cipher - it is a type of cipher text in which each letter in a text is substituted by certain pictures and symbols.

R - Red
Y - Yellow
B - Blue
G - Green

Exercise 4.1

1. **Choose the correct answer:**

(i) What is the eleventh Fibonacci number?

(a) 55 (b) 77 (c) 89 (d) 144 **[Ans: (c) 89]**

Hint.

F(n)	1	1	2	3	5	8	13	21	34	55	89	144	233	377	610
Term	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

$\therefore 11^{th}$ Fibonacci number is 89

(ii) If F(n) is a Fibonacci number and $n = 8$, which of the following is true?

(a) F(8)=F(9)+F(10) (b) F(8)=F(7)+F(6) (c) F(8)=F(10)× F(9) (d) F(8)=F(7) – F(6)

[Ans: (b) F(8) = F(7) + F(6)]

Hint. Given F(n) is a Fibonacci number & $n = 8$

$\therefore$ F(8) = F(7) + F (6) as any term in Fibonacci series is the sum of preceding 2 terms

(iii) Every 3^{rd} number of the Fibonacci sequence is a multiple of _____

(a) 2 (b) 3 (c) 5 (d) 8 **[Ans: (a) 2]**

Hint. Every 3^{rd} number in Fibonacci sequence is a multiple of 2

(iv) Every _____ number of the Fibonacci sequence is a multiple of 8

(a) 2^{nd} (b) 4^{th} (c) 6^{th} (d) 8^{th} **[Ans: (c) 6^{th}]**

(v) The difference between the 18^{th} and 17^{th} Fibonacci number is

(a) 233 (b) 377 (c) 610 (d) 987 **[Ans: (d) 987]**

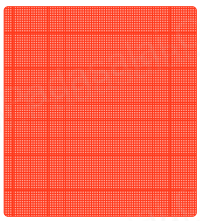
Hint.

$$F(18) = F(17) + F(16)$$

$$F(18) - F(17) = F(16) = F(15) + F(14)$$

$$= 610 + 377 = 987$$

2. **In the given graph sheet draw and colour how the Fibonacci number pattern makes a spiral in the Golden Rectangle.**



Steps: As per the instruction given, draw squares of side equal to each term of Fibonacci number - starting with 1 × 1 square, 2 × 2 square, 3 × 3 square and so on

For spiral: Starting from 1^{st} square, join opposite diagonal points in a curve in all the squares to form a spiral.

Exercise 4.4

Miscellaneous Practice Problems

1. **The rule of Fibonacci Sequence is F(n) = F(n – 2) + F(n – 1). Find the 11th to 20th Fibonacci numbers.**

Sol. Fibonacci series is given by F(n) = F(n – 2) + F(n – 1)

$$\therefore F(11) = F(11-2) + F(11-1) = F(9) + F(10)$$

Similarly

$$F(12) = F(12-2) + F(12-1) = F(11) + F(10)$$

$$F(13) = F(12) + F(11)$$

$$F(14) = F(13) + F(12)$$

$$\vdots$$

$$F(20) = F(19) + F(18)$$

The Fibonacci series given by

1	1	2	3	5	8	13	21	34	55
F(1)	F(2)	F(3)	F(4)	F(5)	F(6)	F(7)	F(8)	F(9)	F(10)
89	144	233	377	610	987	1597	2584	4181	6765
F(11)	F(12)	F(13)	F(14)	F(15)	F(16)	F(17)	F(18)	F(19)	F(20)

2. **In a library, 385 Math books, 297 Science books and 143 Tamil books are bundled equally in numbers. What is the maximum numbers of books possible in a bundle, for all types of books? (Use repeated division method)**

Sol. In library, no. of math books - 385

Science books - 297

Tamil books - 143

We need to find HCF by repeated division method.

Step 1: First let us take the bigger 2 numbers which are 385 & 297 & find their HCF using repeated division method.

```
297 ) 385 ( 1
      297
      ----
       88 ) 297 ( 3
            264
            ----
             33 ) 88 ( 2
                  66
                  ---
                  22 ) 33 ( 1
                       22
                       ---
Last divisor is the HCF ←  11 ) 22 ( 2
                                22
                                ---
                                 0
```

Step 2: Now let us find the HCF of 11 & 143

$m - n = 90 - 72 = 18$

$m - n = 72 - 18 = 54$

$n - m = 54 - 18 = 36$

$n - m = 36 - 18 = 18$

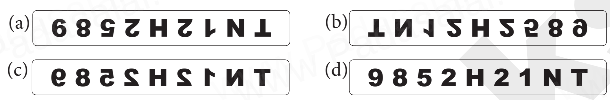
now $m = n = 18$

∴ 18 is the HCF

∴ Ans: **the number is 18**

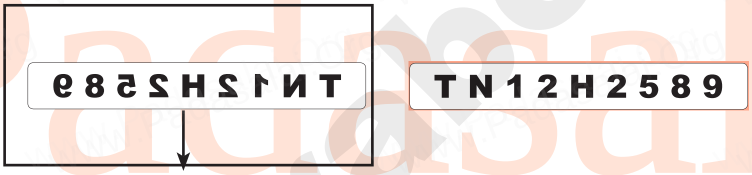
5. **Praveen recently got the registration number for his new two-wheeler. Here, the number is given in the form of mirror-image. Encode the image and find the correct registration number of praveen's two-wheeler.**

TN12H2589



Sol. The mirror image is 

When we place an imaginary mirror & visualize the image seen in the mirror, we will get the below.



Mirror image

∴ The answer is Option c

ADDITIONAL QUESTIONS AND ANSWERS

1. **Find HCF of 52 and 78 using repeated division.**

Sol.

$$52\overline{)78}\,(1$$
$$52$$
$$26\overline{)52}\,(2$$
$$52$$
$$0$$

26 is the HCF of 52 & 78

2. **Find HCF of 56 & 98 using repeated subtraction method.**

Sol. Let $m = 98$, $n = 56$

$m - n = 98 - 56 = 42$; now $m = 56$ & $n = 42$
$m - n = 56 - 42 = 14$; now $m = 42$ & $n = 14$
$m - n = 42 - 14 = 28$; now $m = 14$ & $n = 28$
$m - n = 28 - 14 = 14$; now $m = 14$ & $n = 14$

∴ **HCF of 98 & 56 is 14**.

3. **Find the first 10 terms of the Fibonacci series.**

Sol. Let us first write down the first 2 terms which are 1, 1. To find the remaining terms, we use the general formula.

$$F(n) = F(n-1) + F(n-2)$$
$$\therefore F(3) = F(2) + F(1) \qquad F(1) = 1; F(2) = 1$$
$$F(3) = 1 + 1 = 2$$
$$F(4) = F(3) + F(2)$$
$$= 2 + 1 = 3$$
$$F(5) = F(4) + F(3)$$
$$= 2 + 3 = 5$$

∴ **The first 10 terms are; 1, 1, 2, 3, 5, 8, 13, 21, 34, 55**

4. **In a particular method of decoding, the word SECRET is written as TFDSFU. What is the cipher text for PASSWORD?**

Sol. Given that SECRET is written as TFDSFU. We notice that every letter is substituted by the next letter alphabetically.

So S is substituted by T

E by F, C by D, R by S E by F, & T by U

∴ for P A S S W O R D , similarly we have to substitute
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Q B T T X P S E

∴ **The cypher is QBTTXPSE.**

Now let us find HCF of 24 & 72

$$\begin{array}{r|l} 24 & 72 \ (3 \\ \hline & 72 \\ \hline & 0 \end{array}$$

∴ 24 is the HCF of 72 & 24

∴ **The HCF of 144, 120 & 72 is 24**

9. **If the word MOBILE is written us EMJCPM, find the code for IPHONE.**

Sol. To get the code, we notice that

1st step is to swap first & last letters.

2nd step is to take alphabetically next letter

3rd step is reverse order of middle letters.

∴ M O B I L E → E [O B I L] M → E [P C J M] M → EMJCPM

∴ I P H O N E → E [P H O N] I → E Q I P O I → E O P I Q I

UNIT TEST

TIME: 45 MINUTES **MAX MARKS : 25**

I. Choose the correct answer. **5 × 1 = 5**

1. What is the eleventh Fibonacci number?
   (a) 55 (b) 77 (c) 89 (d) 144

2. Every 3rd number of the Fibonacci sequence is a multiple of _____
   (a) 2 (b) 3 (c) 5 (d) 8

3. Common prime factors of 30 and 250 are
   (a) 2 × 5 (b) 3 × 5 (c) 2 × 3 × 5 (d) 5 × 5

4. Common prime factors of 36, 60 and 72 are
   (a) 2 × 2 (b) 2 × 3 (c) 3 × 3 (d) 3 × 2 × 2

5. Two numbers are said to be co-prime numbers if their HCF is
   (a) 2 (b) 3 (c) 0 (d) 1