ss-VII

Class-VII

Chapter-11 / Simple Interest

Notation of the signs:-

1. P = Principal
2. R = Rate of interest
3. $S.I$ = Simple Interest
4. T = Time Period.
5. A = Total amount paid along with the interest.

Formula:

1. $S.I = \dfrac{P \times R \times T}{100}$
2. $P = \dfrac{100 \times S.I}{R \times T}$
3. $R = \dfrac{100 \times S.I}{P \times T}$
4. $T = \dfrac{100 \times S.I}{P \times R}$
5. $A = S.I + P$
6. $S.I = A - P$
7. $P = A - S.I$

Exercise - 11 A

1. (iii) Given: $P = Rs\ 9275$

$T = 2$ years

$R = 7\frac{1}{2}\%$ p.a $= \frac{15}{2}\%$ p.a

To find: S.I and A.

$$S.I = \frac{P \times R \times T}{100} = \frac{9275 \times 15 \times \cancel{2}}{\cancel{2} \times 100} = Rs\ 1391.25$$

Rough

$$\begin{array}{r} 9275 \\ \times\ 15 \\ \hline 46375 \\ 9275\times \\ \hline 139125 \end{array}$$

Now, $A = P + S.I$

$= 9275 + 1391.25$

$= Rs\ 10666.25$

2. Given: $P = Rs\ 7500$

$A = Rs\ 8625$

$R = 7\frac{1}{2}\%\ p.a = \frac{15}{2}\%\ p.a$

To find: Time (T)

Sol^n

We have, $S.I = A - P$

$$\Rightarrow \frac{P \times R \times T}{100} = 8625 - 7500$$

$$\Rightarrow \frac{75\cancel{00} \times 15 \times T}{2 \times 1\cancel{00}} = 1125$$

$$\Rightarrow T = \frac{1125 \times 2}{75 \times 15} = 2 \text{ years.}$$

Rough

$$\frac{\overset{225}{\cancel{1125}} \times 2}{\underset{}{\overset{75}{\cancel{75}}} \times \cancel{15}_{3}}$$

Q.4. Given: $P = Rs\ 6300$

$S.I = Rs\ 2100$

$T = 4$ years.

To find: R%

Sol^n:- We know, $S.I = \frac{P \times R \times T}{100}$

$$\Rightarrow 2100 = \frac{63\cancel{00} \times R \times 4}{1\cancel{00}}$$

$$\Rightarrow \frac{\overset{100\ 25}{\cancel{2100}}}{\underset{3}{\cancel{63}} \times \cancel{4}} = R$$

$$\Rightarrow \frac{25}{3} = R$$

$$\Rightarrow 8\frac{1}{3}\ \cancel{\%} = R$$

So, Rate % $= 8\frac{1}{3}\%$.

6. Let sum (P) = Rs x

So, ATQ, $S.I = \frac{3}{5}x$

$T = 5$ yrs.

To find : R%.

<u>Solⁿ</u>:- We know, $S.I = \frac{PRT}{100}$

$\Rightarrow \frac{3\cancel{x}}{5} = \frac{\cancel{x} \times R \times 5}{100}$

$\Rightarrow \frac{3 \times \cancel{100}^{4}}{\cancel{5} \times 5} = R$

$\Rightarrow 12 = R$

So, R% = 12% p.a

Q.8. Given: S.I = Rs 7840

$T = 2$ yrs

$R = 6\frac{1}{4}\%$ p.a $= \frac{25}{4}\%$ p.a

To find : P

<u>Solⁿ</u>:- We have, $S.I = \frac{PRT}{100}$

$\Rightarrow 7840 = \frac{P \times 25 \times 2}{4 \times 100}$

$\Rightarrow \frac{7840 \times 4 \times \cancel{100}^{\cancel{4}\,2}}{\cancel{25} \times \cancel{2}} = P$

$\Rightarrow 7840 \times 8 = P$

$\Rightarrow P = 62720$

So, P = Rs 62720.

**

Q.9. Let $P = x$

So, ATQ, A = treble of P

$= 3x$

$T = 16$ yrs.

To find: $R\%$.

Soln:- We have,

$$S.I = A - P$$

$$\Rightarrow \frac{PRT}{100} = 3x - x$$

$$\Rightarrow \frac{\cancel{x} \times R \times \cancel{16}}{100} = 2\cancel{x}$$

$$\Rightarrow R = \frac{\cancel{2} \times 100}{\cancel{16}\,8} = 12\frac{4}{8}$$

$$= 12\frac{1}{2}$$

So, $R\% = 12\frac{1}{2}\%$ p.a.

Q.10. Given: $R\% = 6\%$

A = Rs 4130

$T = 3$ yrs.

To find: P

Soln:- We know, $S.I = A - P$

$$\Rightarrow \frac{P \times R \times T}{100} = 4130 - P$$

$$\Rightarrow \frac{P \times 6 \times 3}{100} = 4130 - P$$

$$\Rightarrow 18P = (4130 - P) \times 100.$$

$$\Rightarrow 18P = 413000 - 100P.$$

$$\Rightarrow 118P = 413000$$

$$\Rightarrow P = \frac{413000}{118} = \frac{413 \times 1000}{118}$$

$$= \frac{7 \times \cancel{59} \times \cancel{1000}^{500}}{\cancel{2} \times \cancel{59}} = 3500$$

Rough

$2 \overline{)118}$ 59

$7 \overline{)413}$ 59

12. <u>For 1st case</u>

$A = Rs\ 10160$
$T = 3\ yrs$
$R = 9\%$

So, let $P = x$.

We know, $S.I = A - P$.

$\Rightarrow \frac{PRT}{100} = 10160 - x$

$\Rightarrow \frac{x \times 9 \times 3}{100} = 10160 - x$

$\Rightarrow 27x = (10160 - x) \times 100$.

$\Rightarrow 27x = 10160 \times 100 - 100x$

$\Rightarrow 127x = 10160 \times 100$

$\Rightarrow x = \frac{10160 \times 100}{127}$

$= \frac{1016 \times 1000}{127}$

$= \frac{2 \times 2 \times 2 \times \cancel{127} \times 1000}{\cancel{127}}$

$= 8 \times 1000 = Rs.\ 8000$

Rough

$$\begin{array}{r|l} 2 & 1016 \\ \hline 2 & 508 \\ \hline 2 & 254 \\ \hline & 127 \end{array}$$

<u>2nd case</u>

When, $P = Rs\ 8000$
$T = 2\ yrs.$
$R\% = 8\%\ p.a.$

$\therefore S.I = \frac{PRT}{100} = \frac{80\cancel{00} \times 8 \times 2}{1\cancel{00}} = 1280$

$\therefore A = P + S.I$
$= 8000 + 1280$
$= Rs\ 9280$

4sus

Chapter - 13 / Algebraic Expressions

(1) An algebraic Expression,

$$3x + 4y - 2xy.$$

Here, 3, 4 and 2 are the constants or numbers

x and y are the variables or Literals.

(2) Terms of an algebraic expression are always seperated by either addition or subtraction.

Eg. $3x + 4y - 2xy$, here, this Alg. Exp. has 3 terms, seperated by + & −.

Types of Algebraic Expressions :-

(1) **Monomial** :- The algebraic Expression having only one term is known as monomial.

Eg. $5x$, $\frac{-2xy}{z}$, -35, $\frac{43}{6}$ etc.

(2) **Binomial** :- Algebraic Expression having two terms, Eg. $5x + 3$, $2xy - \frac{3}{5}z$ etc.

(3) **Trinomial** :- Algebraic Expression having three terms, Eg. $x + 2y - 3z$

$z^2 - \frac{2x}{y} - 27$ etc.

(4) **Multinomial** :- Algebraic expression having more than one term.

So, binomial, Trinomial, - - - . are all multinomial.

Eg. $x^4 + x^3y + \frac{xy}{3} + \frac{x^2}{z} + 3$.

7. Factors of a term :-

Eg. (i) $3ab$, Here the factors of monomial $3ab$ are, $3, a, b, 3a, 3b, 3ab, ab$

Here, 3 is the numerical factor and a, b, ab are the literal factors.

(ii) $-9a^2b$,

The Numerical factor $= -9$

The literal factors are $= a, a^2, b, ab, a^2b$

All the factors are $= -9, a, a^2, ab, a^2b, -9a, -9a^2, 9b, 9a^2b$.

Constant term:- This is the numerical portion of an Algebraic Expression.

Eg. $3x - 4y + 2$, here, the constant term is 2.

Coefficient:- $-2xyz^2$

{ Here, Numerical coefficient $= -2$

And the literal coefficient $= xyz^2$ }

Here, the coef. of $x = -2yz^2$

" " " $y = -2xz^2$

" " " $z^2 = -2xy$ etc.

" " " $xyz = -2z$

...... etc.

Like Terms:- Terms having the same literal coefficients.

Eg. (i) $3xy$, $-5xy$, $\frac{5}{6}xy$ are like terms

(ii) $2a^2b$, $4ab^2$, $\frac{-2}{5}ab$ are unlike terms

Polynomial :-

An algebraic expression in which the variables involved have the non-negative integral powers, is called ~~an~~ a polynomial.

Eg. $2x^3 - 3x^2 + 5x + 6$ is a polynomial

But $2x^3 - \frac{3}{x^2} + 5x + 6$ is not a polynomial.

$\Rightarrow 2x^3 - 3x^{-2} + 5x + 6$

Polynomial of one variable :-

Eg. (1) $3x + 7 \longrightarrow$ only variable is x

(2) $2y^2 - 5y + 7 \rightarrow$ variable is y

(3) $2a^3 - \frac{5}{3}a + 6 \rightarrow$ variable is a.

Polynomial of Two ~~no~~ or more variables

(1) $x + y + xy \cdot (x, y)$

(2) $x^2 + y^2 + xyz \cdot (x, y, z)$

(3) $x^2 + xy^2 + x^2yz^2 + p \quad (x, y, z, p)$

Exercise - 13A

1\. (iv) $\frac{3a + 2b - 5c}{7}$

$= \frac{3a}{7} + \frac{2}{7}b - \frac{5}{7}c \rightarrow$ Trinomial

(v) $xy + yz - zx \rightarrow$ Trinomial

(iii) $3x^2 \div p = \frac{3x^2}{p} \rightarrow$ Monomial

(vi) $ax^2 + bx \times y^2 = ax^2 + bxy^2 \rightarrow$ binomial

Q.2. (v) $\frac{2ab}{c}$ Ex-13 A

Numerical coefficient = 2
Literal coefficient = $\frac{ab}{c}$

(vi) $-\frac{2x^2}{yz}$.

Numerical coefficient = -2
Literal coefficient = $\frac{x^2}{yz}$.

Q.3. given: $-5p^2q^3r^4$

(i) coefficient of $p^2 = -5q^3r^4$
(v) coefficient of $-pq^2r^3 = 5pqr$
(vi) coeffient of $5q^3r = -p^2r^3$

Q.4. given: (iii) $-2xy^2, x^2y, 5y^2x, x^2z$

The like terms are: $-2xy^2, 5y^2x$

(iv) given: $abc, ab^2c, acb^2, c^2ab, b^2ac, a^2bc, cab^2$

The like terms are: $ab^2c, acb^2, b^2ac, cab^2$

Q.5. (ii) The quotient of x by 8 is multiplied by y.

$\Rightarrow \frac{x}{8} \times y$

(iv) One-third of x multiplied by the sum of p and q.

$\Rightarrow \frac{1}{3}x \times (p+q)$

(vi) From a rod $(p+q)$ units in length, n equal pieces are cut. Find the length of each piece.

$\Rightarrow \frac{p+q}{n}$

Ex-13 A

(viii) The number obtained when m times the difference of x and y is subtracted from n-times the sum of x and y.

$\Rightarrow \quad n(x+y) - m(x-y)$

(x) The product of three numbers a, b and c subtracted from the sum of x and y.

$\Rightarrow \quad (x+y) - abc$

Degree of a polynomial

The highest power of the variable in a polynomial is called its degree.

Eg. (1) $2y^2 - 5y + 1$, degree $= 2$.

(2) $2x^2y - 5xy + x$, degree $= 3$.

Q.6. (ii) $8x^2 - 3x + 6\sqrt{x} + 1$, its not a polynomial.

(iii) $5x^2 - \frac{2}{x} + 7$, its not a polynomial

(iv) $9\underline{x^2y^2} - 3xy^2 + 5x^2y - 6x$, it is a polynomial. its degree $= 4$

(v) $6p^4 - \underline{p^3p^2} + pq^3 + q^4$, it is a polynomial. its degree $= 5$

Exercise - 13 B

1. (iii) $2x+9y-7z,\ 3y+z-3x,\ 2z-4y-x$

1st method (Row wise)

$2x+9y-7z+3y+z-3x+2z-4y-x$

$=(2x-3x-x)+(9y+3y-4y)+(-7z+z+2z)$

$=-2x+8y-4z$

2nd method (Column-wise)

$$\begin{array}{rrrr} & 2x & +9y & -7z \\ & -3x & +3y & +z \\ (+) & -x & -4y & +2z \\ \hline & -2x & +8y & -4z \end{array}$$

(v) $3x^3+2x^2-6x+3,\ 2x^3-3x^2-x-4,\ 1+2x-3x^2-4x^3$

$=3x^3+2x^2-6x+3+2x^3-3x^2-x-4+1+2x-3x^2-4x^3$

$=(3x^3+2x^3-4x^3)+(2x^2-3x^2-3x^2)+(-6x-x+2x)$
$+(3-4+1)$

$=x^3-4x^2-5x+0$

$=x^3-4x^2-5x$

(vii) $3z^3-z^2+5,\ 1-2z+z^2,\ 3+2z-z^3$

$=3z^3-z^2+5+1-2z+z^2+3+2z-z^3$

$=(3z^3-z^3)+(-z^2+z^2)+(-2z+2z)+(5+1+3)$

$=2z^3+0+0+9$

$=2z^3+9.$

Ex-13B

Q.2: Simplify:-

(iii) $4x^3 - 2x^2 + 5x - 1 + 8x + x^2 - 6x^3 + 7 - 6x + 3 - 3x^2 - x^3$

$= (4x^3 - 6x^3 - 3x^2) + (-2x^2 + x^2 - 3x^2) + (5x + 8x - 6x) + (-1 + 7 + 3)$

$= -5x^3 - 4x^2 + 7x + 9$

(iv) $2 - 3z^2 + 5yz + 7y^2 - 8 + z^2 - 6yz - 9y^2 + 1 - 2z^2 - 2yz - y^2$

$= (-3z^2 + z^2 - 2z^2) + (7y^2 - 9y^2 - y^2) + (5yz - 6yz - 2yz) + (2 - 8 + 1)$

$= -4z^2 - 3y^2 - 3yz - 5$

(v) $2m - 3n + 5p + 2m + n - 2p - 3m - 4n + p$

$= (2m + 2m - 3m) + (-3n + n - 4n) + (5p - 2p + p)$

$= m - 6n + 4p$

Q.3. Given: The two adjacent sides of a rectangle,

let, $l = 3a - b$

$b = 6b - a.$

$\therefore$ Perimeter $= 2(l + b)$

$= 2(3a - b + 6b - a)$

$= 2(2a + 5b)$

$= 4a + 10b.$

4. Given: The three sides of a triangle are,

$2y+3z,\ z-y,\ 4y-2z$

$\therefore$ Perimeter = sum of three sides of a $\triangle$le.

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

$= (2y-y+4y)+(3z+z-2z)$

$= 5y+2z.$

5. <u>Subtract</u>:-

(ii) $5x^2-3xy-7y^2$ from $3x^2-xy-2y^2$

So, the difference is,

$3x^2-xy-2y^2-(5x^2-3xy-7y^2)$

$= 3x^2-xy-2y^2-5x^2+3xy+7y^2$

$= (3x^2-5x^2)+(-xy+3xy)+(-2y^2+7y^2)$

$= -2x^2+2xy+5y^2$

(iv) $ab-bc-ca$ from $3ab+2bc-4ca$

$\Rightarrow 3ab+2bc-4ca-(ab-bc-ca)$

$= 3ab+2bc-4ca-ab+bc+ca$

$= (3ab-ab)+(2bc+bc)+(-4ca+ca)$

$= 2ab+3bc-3ca$

(vi) $2abc-a^2-b^2$ from b^2+a^2-2abc

$\Rightarrow b^2+a^2-2abc-(2abc-a^2-b^2)$

$= b^2+a^2-2abc-2abc+a^2+b^2$

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

$= 2a^2+2b^2-4abc$

Q.6. (i) 1st method

$(x+2x^2-3x^3+2-x^2+6x-x^3)-(6x^3-5x^2+4x-3)$

$= x+2x^2-3x^3+2-x^2+6x-x^3-6x^3+5x^2-4x+3$

$= (-3x^3-x^3-6x^3)+(2x^2-x^2+5x^2)+(x+6x-4x)+(2+3)$

$= -10x^3+6x^2+3x+5$

2nd method OR

1st case

The sum: $x+2x^2-3x^3+2-x^2+6x-x^3$

$= (-3x^3-x^3)+(2x^2-x^2)+(x+6x)+2$

$= -4x^3+x^2+7x+2.$

2nd case

$-4x^3+x^2+7x+2-(6x^3-5x^2+4x-3)$

$= -4x^3+x^2+7x+2-6x^3+5x^2-4x+3$

$= (-4x^3-6x^3)+(x^2+5x^2)+(7x-4x)+(2+3)$

$= -10x^3+6x^2+3x+5$

(14)

(iii) ATQ, (According to question)

$(6x^2 - 8xy - y^2 + 2xy - 2y^2 - x^2) - (x^2 - 5xy + 2y^2 + y^2 - 2xy - 3x^2)$

$= 6x^2 - 8xy - y^2 + 2xy - 2y^2 - x^2 - x^2 + 5xy - 2y^2 - y^2 + 2xy + 3x^2$

$= (6x^2 - x^2 - x^2 + 3x^2) + (-y^2 - 2y^2 - 2y^2 - y^2) + (-8xy + 2xy + 5xy + 2xy)$

$= 7x^2 - 6y^2 + xy$

Q.7. (ii) ATQ, (According to question).

$2x^2 - y^2 + 4z^2 - (x^2 + y^2 - z^2)$

$= 2x^2 - y^2 + 4z^2 - x^2 - y^2 + z^2$

$= (2x^2 - x^2) + (-y^2 - y^2) + (4z^2 + z^2)$

$= x^2 - 2y^2 + 5z^2$

8. (iii) ATQ,

$n^2 + mn - m^2 - (m^2 - 2mn + 5n^2)$

$= n^2 + mn - m^2 - m^2 + 2mn - 5n^2$

$= (n^2 - 5n^2) + (mn + 2mn) + (-m^2 - m^2)$

$= -4n^2 + 3mn - 2m^2$

10. ATQ,

$3x^3 - 5x^2 + 2x - 3 - (2x^3 - 3x^2 + x + 1)$

$= 3x^3 - 5x^2 + 2x - 3 - 2x^3 + 3x^2 - x - 1$

$= (3x^3 - 2x^3) + (-5x^2 + 3x^2) + (2x - x) + (-3 - 1)$

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

12. ATQ,

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

13. Given:

$$x = 2a^2 + 3b^2 - 5ab$$
$$y = b^2 - 3a^2 + 7ab$$
$$z = 6a^2 - b^2 + ab$$

(i) $x + y - z$

$$= (2a^2 + 3b^2 - 5ab) + (b^2 - 3a^2 + 7ab) - (6a^2 - b^2 + ab)$$
$$= 2a^2 + 3b^2 - 5ab + b^2 - 3a^2 + 7ab - 6a^2 + b^2 - ab$$
$$= (2a^2 - 3a^2 - 6a^2) + (3b^2 + b^2 + b^2) + (-5ab + 7ab - ab)$$
$$= -7a^2 + 5b^2 + ab$$

15. Given: Perimeter of a rectangle $= 16x^3 - 6x^2 + 12x + 4$

Let, One side $= 8x^2 + 3x = l$

To find the other side $= b$

We know,

Perimeter $= 2(l + b)$

$$16x^3 - 6x^2 + 12x + 4 = 2(8x^2 + 3x + b)$$
$$\Rightarrow 16x^3 - 6x^2 + 12x + 4 = 16x^2 + 6x + 2b$$
$$\Rightarrow 16x^3 - 6x^2 + 12x + 4 - (16x^2 + 6x) = 2b$$
$$\Rightarrow 16x^3 - 6x^2 + 12x + 4 - 16x^2 - 6x = 2b$$
$$\Rightarrow (16x^3) + (-6x^2 - 16x^2) + (12x - 6x) + (4) = 2b$$

$\Rightarrow 16x^3 - 22x^2 + 6x + 4 = 2b$

$\Rightarrow \frac{1}{2}(16x^3 - 22x^2 + 6x + 4) = b$

$\Rightarrow 8x^3 - 11x^2 + 3x + 2 = b$

So the breadth $= 8x^3 - 11x^2 + 3x + 2$.