

CH-12 ALGEBRAIC EXPRESSIONS

ALGEBRAIC EXPRESSION :

1. CONSTANT :- A term that has fixed value is called a constant.
for eg: 3, 5, 0, -7 etc
2. VARIABLE :- A term which does not have a fixed value. Letters of english alphabets are used for variables
for eg: x, y, z, s, t etc
3. TERM :- A term is a number (constant), a variable or a combination (product or quotient) of numbers and variables.
for eg: 7, y, 5b, xy, $\frac{-3x}{2y}$ etc
4. ALGEBRAIC EXPRESSION :-
A combination of one or more terms, which are separated by addition, subtraction is called an algebraic expression.
for eg: $4 + 10x$, $5x - 7y$ etc

FACTORS :- Terms are made of the product of factors
for eg: the term $2xy$ of the expression $2xy + 7z$ has three factors $2, x$ and y .

COEFFICIENT :- Any of the factors of a term is called the coefficient of the product of remaining factors.
In particular the constant is called "numerical coefficient" and the remaining part is called "literal coefficient".

for eg: Consider the expression $3x^2y + 7xy - 8$

In the term $3x^2y$

Numerical coefficient	=	3
literal coefficient	=	x^2y
coefficient of x^2	=	$3y$
coefficient of x	=	$3xy$
coefficient of y	=	$3x^2$

EXERCISE - 12.1

Q-1 Generate algebraic expressions for the following

(i) The sum of a and b

(i) $a + b$

(ii) The number z multiplied by itself

(ii) $z \times z = z^2$

(iii) The product of x and y added to the product of m and n

(iii) $= (x \times y) + (m \times n)$
 $= xy + mn$

(iv) The quotient of p by 5 is multiplied by q

(iv) $\frac{p}{5} \times q = \frac{pq}{5}$

(v) One half of z added to twice the number t

(v) $\frac{z}{2} + 2t$

(vi) Sum of squares of the numbers x and z

(vi) $x^2 + z^2$

(vii) Sum of numbers x and z is subtracted from their product

(vii) $xy - (x + y)$

Q-2. Separate constant terms and variable terms from the following.

$$7, xy, \frac{3}{2}x^2, \frac{72}{3}z, \frac{-8}{3x^2}z$$

Q-2 Out of the above terms

constant terms = 7

Variable terms = $xy, \frac{3}{2}x^2, \frac{72}{3}z, \frac{-8}{3x^2}z$

Q-3 Write the terms and factors for each of the following algebraic expressions

(a) $2x^2 + 3yz$

(a) algebraic expression = $2x^2 + 3yz$
 Terms = $2x^2, 3yz$
 factors = $(2, x, x), (3, y, z)$

(b) $15x^2y + 3xy^2$

(b) algebraic expression = $15x^2y + 3xy^2$
 Terms = $15x^2y, 3xy^2$
 Factors = $(15, x, x, y), (3, x, y, y)$

(c) $-7xyz^2$

(c) algebraic expression = $-7xyz^2$
 Term = $-7xyz^2$
 Factors = $(-7, x, y, z, z)$

(d) $100pq + 10p^2q^2$

(d) algebraic expression = $100pq + 10p^2q^2$
 Terms = $100pq, 10p^2q^2$
 Factors = $(100, p, q), (10, p, p, q, q)$

(e) $xy + 3x^2y^2$

(e) algebraic expression = $xy + 3x^2y^2$
 Terms = $xy, 3x^2y^2$
 Factors = $(x, y), (3, x, x, y, y)$

(f) $-7x^2yz + 3xy^2z + 2xyz^2$

(f) algebraic expression = $-7x^2yz + 3xy^2z + 2xyz^2$
 Terms = $-7x^2yz, 3xy^2z, 2xyz^2$
 Factors = $(-7, x, x, y, z), (3, x, y, y, z), (2, x, y, z, z)$

Q-4 Classify the following algebraic expression into monomial, binomial and trinomial

(a) $7x + 3y$
 It has two terms
 $\therefore$ It is a binomial

(b) $5 + 2x^2y^2z^2$
 It has two terms
 $\therefore$ It is a binomial

(c) $ax + by^2 + cz^2$

It has three terms

$\therefore$ It is a trinomial

(d) $3x^2y^2$

It has only one term

$\therefore$ It is a monomial

(e) $1 + x$

It has two terms

$\therefore$ It is a binomial

(f) 10

It has only one term

$\therefore$ It is a monomial

(g) $\frac{3}{2}p + \frac{7}{6}q$

It has two terms

$\therefore$ It is a binomial

Q-5 Write numerical coefficient of each of the following algebraic expression

(a) $2x$

(a) 2

(b) $\frac{-3}{2}xyz$

(b) $\frac{-3}{2}$

(c) $\frac{7}{2}x^2p$

(c) $\frac{7}{2}$

(d) $-p^2q^2$

(d) -1

(e) $-5mn^2$

(e) -5

Q-6 State whether the given pairs of terms is of like or unlike terms

Ans-6 (a) $-3y, \frac{7}{8}y$

(a) variable coefficient of $-3y = y$
variable coefficient of $\frac{7}{8}y = y$

$\therefore -3y$ and $\frac{7}{8}y$ are like terms

(b) $-32, -32x$

(a) variable coefficient of $-32 = x^0$
variable coefficient of $-32x = x$

$\therefore -32$ and $-32x$ are unlike terms

(c) $3x^2y$, $3xy^2$

(c) variable coefficient of $3x^2y = x^2y$
variable coefficient of $3xy^2 = xy^2$

$\therefore 3x^2y$ and $3xy^2$ are unlike terms

(d) $14mn^2$, $14mn^2q$

(d) variable coefficient of $14mn^2 = mn^2$
variable coefficient of $14mn^2q = mn^2q$

$\therefore 14mn^2$ and $14mn^2q$ are unlike terms

(e) $8pq$, $32pq^2$

(e) variable coefficient of $8pq = pq$
variable coefficient of $32pq^2 = pq^2$

$\therefore 8pq$ and $32pq^2$ are unlike terms

(f) 10, 15

Since 10 and 15 both are constants
So we can say that they are like terms

Q-7 In the following algebraic expressions
write the coefficient of

(a) x in x^2y

(a) coefficient of x in $x^2y = xy$

(b) xyz in $15x^2yz$

(b) coefficient of xyz in $15x^2yz = 15x$

(c) $3pq^2$ in $3p^2q^2x^2$

(c) coefficient of $3pq^2$ in $3p^2q^2x^2 = px^2$

(d) m^2 in m^2+n^2

(d) coefficient of m^2 in $m^2+n^2 = 1$

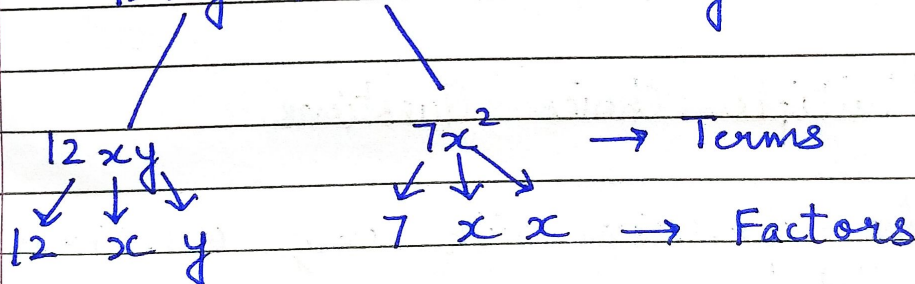
(e) xy in x^2y^2+2x+3

(e) coefficient of xy in $x^2y^2+2x+3 = xy$

Q-8 Identify the terms and their factors in the following algebraic expressions by tree diagrams.

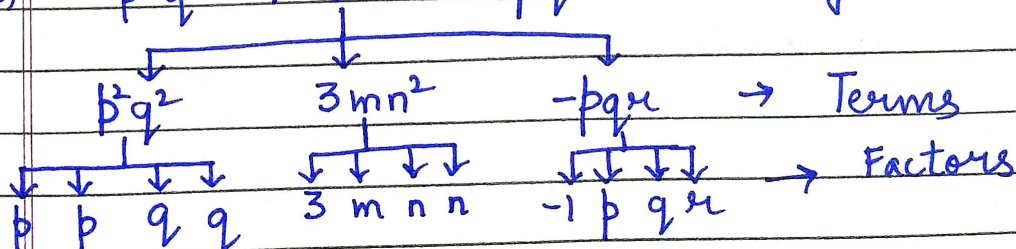
(a) $12xy + 7x^2$

(b) $12xy + 7x^2 \rightarrow$ algebraic expression



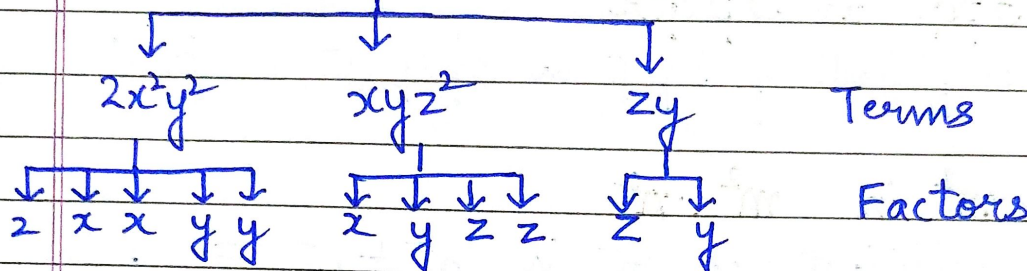
(c) $p^2q^2 + 3mn^2 - pqr$

(c) $p^2q^2 + 3mn^2 - pqr \rightarrow$ algebraic expression



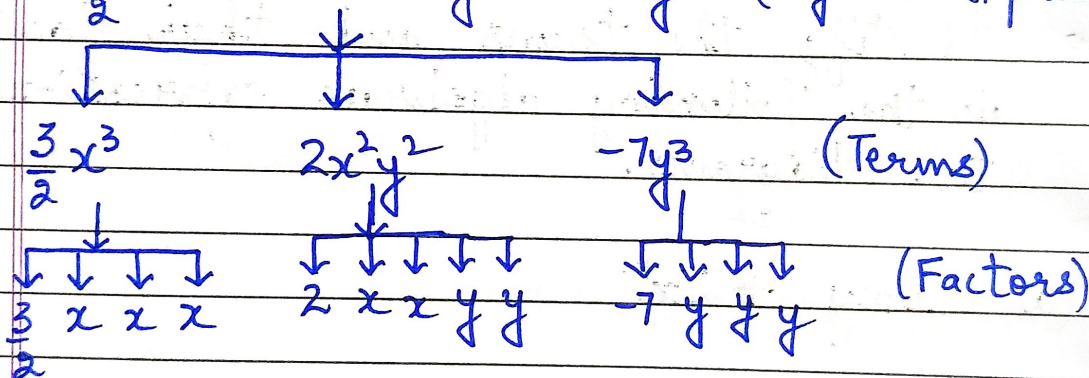
(c) $2x^2y^2 + xyz^2 + zy$

(c) $2x^2y^2 + xyz^2 + zy \rightarrow$ algebraic expression



(d) $\frac{3}{2}x^3 + 2x^2y^2 - 7y^3$

(d) $\frac{3}{2}x^3 + 2x^2y^2 - 7y^3$ (algebraic expression)



Q-9 Multiple Choice Questions

(i) An expression with only one term is called a

(a) Monomial

(b) Binomial

(c) Trinomial

(d) None of these

(i) (a) Monomial

(ii) The coefficient of x in $8-x+y$ is

(a) -1

(b) 1

(c) 8

(d) 0

(ii) (a) -1

(iii) Which of the following are like Terms?

(a) $7x, 12y$

(b) $15x, 12x$

(c) $3xy, 3x$

(d) $2y, -2yx$

(iii) (b) $15x, 12x$

(iv) Terms are added to form

(a) Expressions

(b) Variables

(c) Constants

(d) Factors

(iv) (a) Expressions

EXERCISE - 12.2

Q-1 Fill in the blanks :-

(i) $5y + 7y = 12y$

(ii) $3xy + 2xy = 5xy$

(iii) $12a^2 - 7a^2 = 5a^2$

(iv) $8mn^2 - 3mn^2 = 5mn^2$

Q-2 Add the following algebraic expressions

(a) $3x^2y^2, 7x^2y^2$

$$= 3x^2y^2 + 7x^2y^2$$

$$= (3+7)x^2y^2$$

$$= 10x^2y^2 \quad \text{Ans}$$

(b) $7x, -3x, 2x$

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

$$= 7x - 3x + 2x$$

$$= 4x + 2x = 6x$$

Ans

(c) $12p^2q, 3p^2q, -5p^2q$

$$= (12p^2q) + (3p^2q) + (-5p^2q)$$

$$= 12p^2q + 3p^2q - 5p^2q$$

$$= 15p^2q - 5p^2q$$

$$= 10p^2q \quad \text{Ans}$$

(d) $3x^2, -8x^2, -5x^2, 13x^2$

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

$$= 3x^2 - 8x^2 - 5x^2 + 13x^2$$

$$= -5x^2 - 5x^2 + 13x^2$$

$$= -10x^2 + 13x^2$$

$$= 3x^2 \quad \text{Ans}$$

Q-3 Add the following algebraic expressions

(a) $x+y$ and $2x-3y$

$$(a) (x+y) + (2x-3y)$$

$$= x+y+2x-3y$$

$$= x+2x+y-3y$$

$$= 3x-2y \quad \text{Ans}$$

(b) $5a+7b$ and $3a-2b$

$$(b) (5a+7b) + (3a-2b)$$

$$= 5a+7b+3a-2b$$

$$= 5a+3a+7b-2b$$

$$= 8a+5b \quad \text{Ans}$$

(c) $3m+2n, 7m-8n, 2m-n$

$$(c) (3m+2n) + (7m-8n) + (2m-n)$$

$$= 3m+2n+7m-8n+2m-n$$

$$= 3m+7m+2m+2n-8n-n$$

$$= 12m-7n \quad \text{Ans}$$

(d) $3x^2 + 2x - 7$ and $5x^2 - 7x + 8$

(d) $(3x^2 + 2x - 7) + (5x^2 - 7x + 8)$

$$= 3x^2 + 2x - 7 + 5x^2 - 7x + 8$$

$$= 3x^2 + 5x^2 + 2x - 7x - 7 + 8$$

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

$$= 8x^2 - 5x + 1 \quad \text{Ans}$$

(e) $m^2 + 2n^2 - p^2$, $-3m^2 + n^2 + 2p^2$ and $4m^2 - 3n^2 + 5p^2$

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

$$= m^2 + 2n^2 - p^2 - 3m^2 + n^2 + 2p^2 + 4m^2 - 3n^2 + 5p^2$$

$$= m^2 - 3m^2 + 4m^2 + 2n^2 + n^2 - 3n^2 - p^2 + 2p^2 + 5p^2$$

$$= (1-3+4)m^2 + (2+1-3)n^2 + (-1+2+5)p^2$$

$$= 2m^2 + 0n^2 + 6p^2$$

$$= 2m^2 + 6p^2 \quad \text{Ans}$$

(f) $3xy + 7x^2 - 2y^2$, $2xy + y^2$ and $2x^2 + y^2$

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

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

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

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

$$= 5xy + 9x^2 \quad \text{Ans}$$

Q-4 Simplify the following algebraic expressions by combining like terms.

(a) $-5ax + 3xy + 2xy - 8ax$

(a) $-5ax + 3xy + 2xy - 8ax$

Now grouping the like terms

$$= (-5ax - 8ax) + (3xy + 2xy)$$

$$= -13ax + 5xy \quad \text{Ans}$$

$$(b) \quad 3m - 2n + 5m - 3m + 8n$$

$$(b) \quad 3m - 2n + 5m - 3m + 8n$$

Now grouping the like terms

$$= (3m + 5m - 3m) + (-2n + 8n)$$

$$= 5m + 6n \quad \text{Ans}$$

$$(c) \quad 3pq - 15x^2 - 3l^2m^2 + 2x^2 + 2l^2m^2 - 5pq$$

$$(c) \quad 3pq - 15x^2 - 3l^2m^2 + 2x^2 + 2l^2m^2 - 5pq$$

Now grouping the like terms

$$= (3pq - 5pq) + (-15x^2 + 2x^2) + (-3l^2m^2 + 2l^2m^2)$$

$$= -2pq - 13x^2 - l^2m^2 \quad \text{Ans}$$

$$(d) \quad 4x^3 + 7x^2 - 3x + 2 - 2x^3 - 2x^2 + 7x - 3$$

$$(d) \quad 4x^3 + 7x^2 - 3x + 2 - 2x^3 - 2x^2 + 7x - 3$$

Now grouping the like terms

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

$$= 2x^3 + 5x^2 + 4x - 1 \quad \text{Ans}$$

Q-5 Subtract the algebraic expressions

$$(a) \quad -3x^2 \text{ from } 7x^2$$

$$(a) \quad (7x^2) - (-3x^2)$$

$$= 7x^2 + 3x^2$$

$$= 10x^2 \quad \text{Ans}$$

$$(b) \quad -3ab \text{ from } 10ab$$

$$(b) \quad (10ab) - (-3ab)$$

$$= 10ab + 3ab$$

$$= 13ab \quad \text{Ans}$$

(c) $a+b$ from $a-b$

$$(c) (a-b) - (a+b)$$

$$= a-b-a-b$$

$$= -b-b$$

$$= -2b \text{ Ans}$$

(d) $15m+10n$ from $2m-16n$

$$(d) (2m-16n) - (15m+10n)$$

$$= 2m-16n-15m-10n$$

$$= 2m-15m-16n-10n$$

$$= -13m-26n \text{ Ans}$$

(e) $2x+8y-3z$ from $-3x+2y+z$

$$(e) (-3x+2y+z) - (2x+8y-3z)$$

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

$$= (-3x-2x) + (2y-8y) + (z+3z)$$

$$= -5x-6y+4z \text{ Ans}$$

(f) $18m^2+3n^2-2mn-7$ from $3m^2-2n^2+8mn-8m+4$

$$(f) (3m^2-2n^2+8mn-8m+4) - (18m^2+3n^2-2mn-7)$$

$$= 3m^2-2n^2+8mn-8m+4-18m^2-3n^2+2mn+7$$

$$= 3m^2-18m^2-2n^2-3n^2+8mn+2mn-8m+4+7$$

$$= -15m^2-5n^2+10mn-8m+4+7 \text{ Ans}$$

$$= -15m^2-5n^2+10mn-8m+11$$

Q-6 What should be subtracted from $l-2m+5n$ to get $2l-3m+4n$

Let A be subtracted from $l-2m+5n$ to get $2l-3m+4n$

$$\begin{aligned}(l-2m+5n) - A &= 2l-3m+4n \\(l-2m+5n) - (2l-3m+4n) &= A \\l-2m+5n-2l+3m-4n &= A \\l-2l-2m+3m+5n-4n &= A \\-l+m+n &= A\end{aligned}$$

So $(-l+m+n)$ should be subtracted from $l-2m+5n$ to get $2l-3m+4n$

Q-7 what should be added to $3x^2+2xy-y^2$ to obtain $x^2-7xy+3y^2$

Let A be added to $3x^2+2xy-y^2$ to obtain $x^2-7xy+3y^2$

$$\begin{aligned}A + (3x^2+2xy-y^2) &= x^2-7xy+3y^2 \\A &= (x^2-7xy+3y^2) - (3x^2+2xy-y^2) \\&= x^2-7xy+3y^2-3x^2-2xy+y^2 \\&= x^2-3x^2-7xy-2xy+3y^2+y^2 \\&= -2x^2-9xy+4y^2 \quad \text{Ans}\end{aligned}$$

Q-8 Subtract $3a^2+2b^2-8ab+8$ from the sum of $a^2-b^2+7ab+3$ and $2a^2+4b^2-18ab+7$

$$\begin{aligned}\text{Sol: } &(a^2-b^2+7ab+3) + (2a^2+4b^2-18ab+7) - (3a^2+2b^2-8ab+8) \\&= a^2-b^2+7ab+3+2a^2+4b^2-18ab+7-3a^2-2b^2+8ab-8 \\&= a^2+2a^2-3a^2-b^2+4b^2-2b^2+7ab-18ab+8ab+3+7-8 \\&= 3a^2-3a^2+4b^2-3b^2+15ab-18ab+10ab+10-8 \\&= b^2-3ab+2 \quad \text{Ans}\end{aligned}$$

Q-9. How much $x^2 + 3xy + y^2$ is less than $2x^2 + 5xy - y^2$?

Sol: For this we have to subtract $x^2 + 3xy + y^2$ from $2x^2 + 5xy - y^2$

$$\begin{aligned} & (2x^2 + 5xy - y^2) - (x^2 + 3xy + y^2) \\ &= 2x^2 + 5xy - y^2 - x^2 - 3xy - y^2 \\ &= 2x^2 - x^2 + 5xy - 3xy - y^2 - y^2 \\ &= x^2 + 2xy - 2y^2 \quad \text{Ans} \end{aligned}$$

Q-10. Multiple choice questions

(i) The algebraic expression for "Number 5 added to three times the product of numbers m and n " is

- (a) $5 + 3mn$ (b) $3 + 5mn$
(c) $(5+3)mn$ (d)

(i) (a) $5 + 3mn$

(ii) The sum of algebraic expressions $3x+11$ and $2x-7$ is

- (a) $5x+4$ (b) $x+4$
(c) $5x-18$

(ii) (a) $5x+4$

(iii) Subtraction of $a+b$ from $2a+3b$

- (a) $a+2b$ (b) $-a-2b$
(c) $3a+4b$ (d) $a+b$

(iii) (a) $a+2b$

EXERCISE -12.3

Q-1) Fill in the table by substituting the values in the given expressions.

(i) $3x+7$

$x=1$

$= 3(1)+7$

$= 3+7$

$= 10$

$x=2$

$= 3(2)+7$

$= -6+7$

$= 1$

$x=3$

$= 3(3)+7$

$= 9+7$

$= 16$

$x=10$

$= 3(10)+7$

$= 30+7$

$= 37$

(ii) x^2-2x+3

$x=1$

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

$= 1-2+3$

$= -1+3$

$= 2$

$x=2$

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

$= 4+4+3$

$= 8+3$

$= 11$

$x=3$

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

$= 9-6+3$

$= 3+3$

$= 6$

$x=10$

$= (10)^2-2(10)+3$

$= 100-20+3$

$= 80+3$

$= 83$

(iii) $8x^3-3x^2$

$x=1$

$= 8(1)^3-3(1)^2$

$= 8-3$

$= 5$

$x=2$

$= 8(2)^3-3(2)^2$

$= 8(8)-3(4)$

$= -64-12$

$= -76$

$x=3$

$= 8(3)^3-3(3)^2$

$= 8(27)-3(9)$

$= 216-27$

$= 189$

$x=10$

$= 8(10)^3-3(10)^2$

$= 8(1000)-3(100)$

$= 8000-300$

$= 7700$ Ans

$$(iv) -10x^2 + 20x$$

$$x = 1$$

$$= -10(1)^2 + 20(1)$$

$$= -10 + 20$$

$$= 10 \quad \text{Ans}$$

$$x = 2$$

$$= -10(2)^2 + 20(2)$$

$$= -10(4) + 40$$

$$= -40 + 40$$

$$= -80 \quad \text{Ans}$$

$$x = 3$$

$$= -10(3)^2 + 20(3)$$

$$= -10(9) + 60$$

$$= -90 + 60$$

$$= -30 \quad \text{Ans}$$

$$x = 10$$

$$= -10(10)^2 + 20(10)$$

$$= -10(100) + 200$$

$$= -1000 + 200$$

$$= -800 \quad \text{Ans}$$

Q-2 If $a=1$, $b=-2$ find the value of given expressions

$$(i) a^2 - b^2$$

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

$$= 1 - 4$$

$$= -3 \quad \text{Ans}$$

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

$$= (1)^2 + 2(1)(-2) - (-2)^2$$

$$= 1 - 4 - 4$$

$$= 1 - 8$$

$$= -7 \quad \text{Ans}$$

$$(iii) ab + 2ab^2 + 5$$

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

$$= -2 + 2(4) + 5$$

$$= -2 + 8 + 5$$

$$= -2 + 13$$

$$= 11 \quad \text{Ans}$$

Q-3 Simplify the following expressions and find their values for $m=1$, $n=2$, $p=-1$

$$\begin{aligned} \text{(i)} \quad & 2m + 3n - p + 7m - 2n \\ &= 2(1) + 3(2) - (-1) + 7(1) - 2(2) \\ &= 2 + 6 + 1 + 7 - 4 \\ &= 16 - 4 \\ &= 12 \quad \text{Ans} \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad & 3p + n - m + 2n \\ &= 3(-1) + (2) - 1 + 2(2) \\ &= -3 + 2 - 1 + 4 \\ &= -1 + 2 + 1 \\ &= 2 \quad \text{Ans} \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad & m + p - 2p + 3m \\ &= (1) + (-1) - 2(-1) + 3(1) \\ &= 1 - 1 + 2 + 3 \\ &= 5 \quad \text{Ans} \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad & 3n + 2m - 5p - 3m - 2n + p \\ &= 3(2) + 2(1) - 5(-1) - 3(1) - 2(2) + (-1) \\ &= 6 + 2 + 5 - 3 - 4 - 1 \\ &= 13 - 8 \\ &= 5 \quad \text{Ans} \end{aligned}$$

Q-4. What should be the value of a if the value of $2a^2 + b^2 = 10$ when $b = 2$?

Sol.

$$\begin{aligned} 2a^2 + b^2 &= 10 \\ 2(a)^2 + (2)^2 &= 10 \\ 2(a)^2 + 4 &= 10 \\ 2(a)^2 &= 10 - 4 \\ 2(a)^2 &= 6 \\ a^2 &= \frac{6}{2} \end{aligned}$$

$$\begin{aligned} a^2 &= 3 \\ a &= \pm\sqrt{3} \end{aligned} \quad \text{Ans}$$

Q-5 Find the value of x if $-3x + 7y^2 = 1$ when $y = 1$?

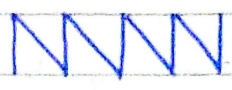
$$\begin{aligned} -3x + 7y^2 &= 1 \\ -3x + 7(1)^2 &= 1 \\ -3x + 7 &= 1 \\ -3x &= 1 - 7 \\ +3x &= +6 \\ x &= \frac{6}{3} = 2 \end{aligned}$$

$$x = 2 \quad \text{Ans}$$

Q-6 Observe the pattern of shapes of letters formed from line segment of equal lengths

(i) 

If n shapes of letters are formed, then write the algebraic expression for the number of line segment required for making these n shapes in each case.

(i) 

It consists of repetition of the shapes N made from 3 line segment.
So number of shapes and no. of line segments required are as below

No. of shapes formed	No. of line segments required
1	3
2	5
3	7
4	9

So algebraic expression for no. of line segment required is $2n+1$

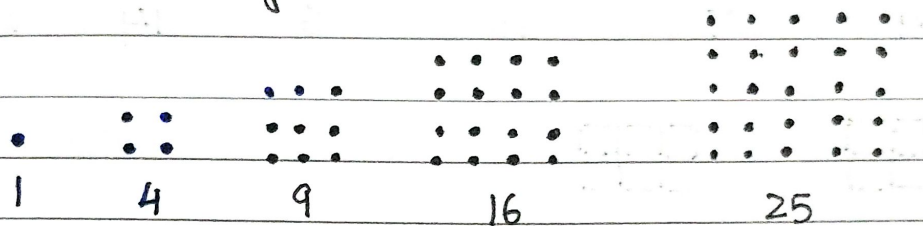
(ii) 

It consists of repetition of the shapes  made from 6 line segment. So number of shapes and no. of line segments required are as below

No. of shapes formed	No. of line segments required
1	6
2	11
3	16
4	21

So, algebraic expression for no. of line segment required is $4n+2$

Q-7 observe the following pattern of squares made using dots



If n is taken as the number of dots in each row then find the algebraic expression for number of dots in n^{th} figure. Also find number of dots

(i) $n=3$

Acc to the given pattern, the algebraic expression for no. of dots is n^2

so if $n=3$ $n^2 = 3^2 = 3 \times 3 = 9$

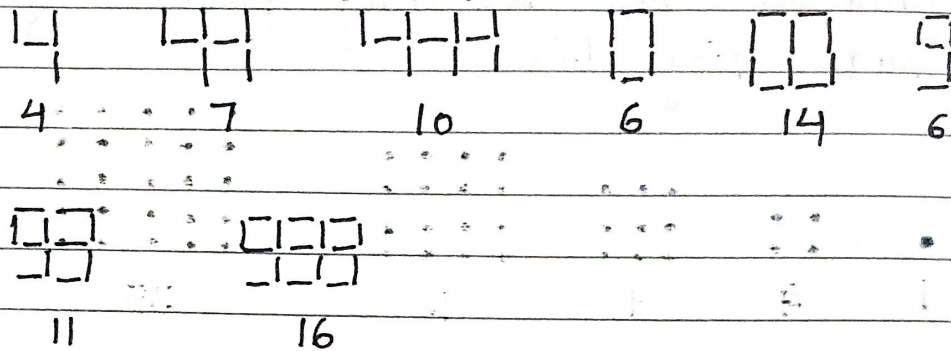
(ii) $n=7$

$$\begin{aligned}
 & n^2 \\
 &= (7)^2 \\
 &= 49
 \end{aligned}$$

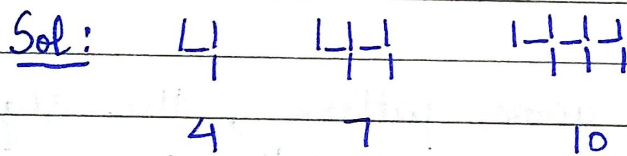
(iii) $n=10$

$$\begin{aligned}
 & n^2 \\
 &= (10)^2 \\
 &= 100
 \end{aligned}$$

Q-8 observe the pattern of shapes of digits formed from line segment of equal lengths



If n shapes of digits are formed then write the algebraic expression for the numbers of line segment required to make n shapes



It consists of repetition of the shape  made from 4 line segments
so, algebraic expression would be $3n+1$



It consists of repetition of the shape  made from 6 line segments,
so algebraic expression would be $4n+2$



6



11



16

It consists of repetition of the shape  made from 6 line segments, so algebraic expression would be $5n+1$

Q-9. Multiple Choice Questions

(i) If l is the length of the side of the regular pentagon of a regular pentagon is

(a) $3l$

(b) $4l$

(c) $5l$

(d) $8l$

(i) (c) $5l$

(ii) The value of the expression $5n-2$ when $n=2$ is

(a) 12

(b) -12

(c) 8

(d) 3

(ii) (c) 8

(iii) The value of $3x^2 - 5x + 6$ when $x=1$

(a) 3

(b) 4

(c) -8

(d) 14

(iii) (b) 4

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