

EXERCISE 12.1

Get the algebraic expressions in the following cases using variables, constants & arithmetic operations.

subtraction of z from y .
→ $y - z$

one-half of the sum of numbers x and y .
→ $\frac{1}{2}(x+y)$

The number z multiplied by itself.
→ z^2

one-fourth of the product of number p and q .
→ $\frac{1}{4}(pq)$

Numbers x and y both squared and added.
→ $x^2 + y^2$

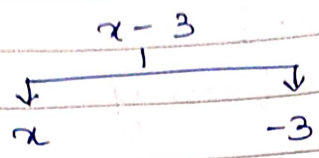
Number 5 added to three times the product of numbers m and n .
→ $5 + 3(mn)$

product of numbers y and z subtracted from 10.
→ $10 - yz$

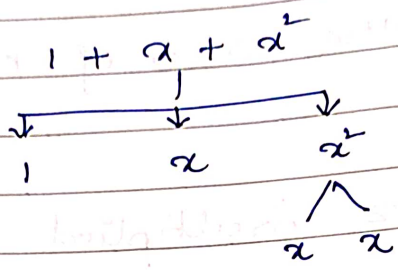
Sum of numbers a and b subtracted from their product.
→ $ab - (a+b)$

Q2. (i) Identify the terms & their factors in the following expressions. Show the terms & factors by tree diagram.

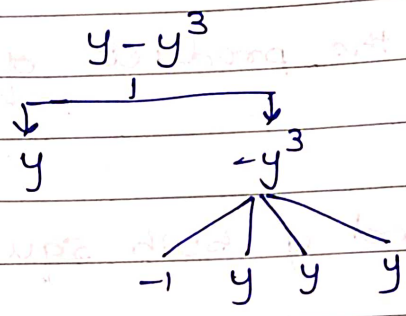
(a) $x - 3$



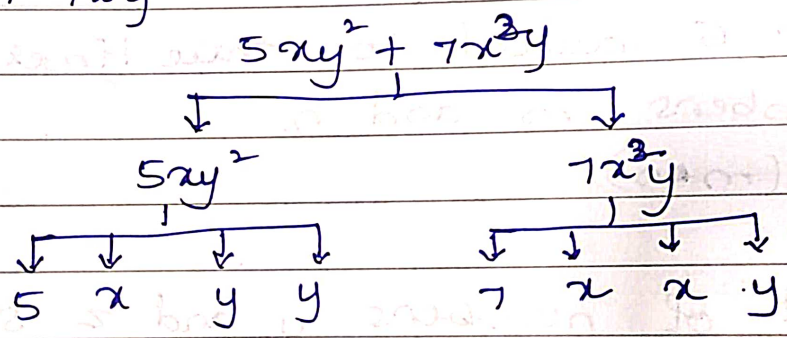
(b) $1 + x + x^2$



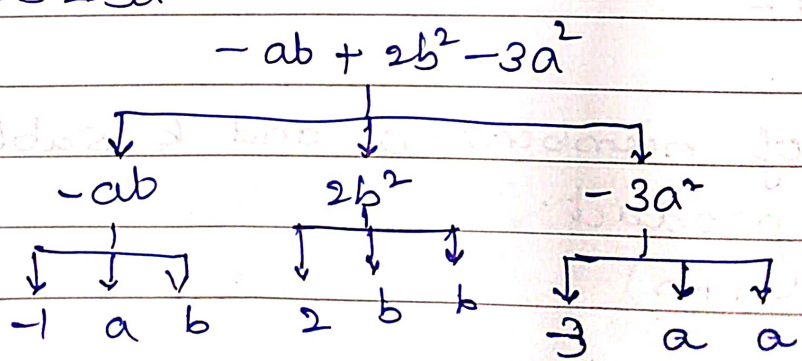
(c) $y - y^3$



(d) $5xy^2 + 7x^2y$



(e) $-ab + 2b^2 - 3a^2$



(ii) Identify terms & factors in the expressions given below:

(a)	$-4x + 5$	$-4x, 5$	$-4, x, 5$
(b)	$-4x + 5y$	$-4x, 5y$	$-4, x, 5, y$
(c)	$5y + 3y^2$	$5y, 3y^2$	$5, y, 3, y, y$
(d)	$xy + 2xy^2$	$xy, 2xy^2$	$x, y, 2, x, y, y$
(e)	$pq + q$	pq, q	p, q, q
(f)	$1.2ab - 2.4b + 3.6a$	$1.2ab, -2.4b, 3.6a$	$1.2, a, b, 2.4, b, 3.6, a$
(g)	$\frac{3}{4}x + \frac{1}{4}$	$\frac{3}{4}x, \frac{1}{4}$	$\frac{3}{4}, x, \frac{1}{4}$
(h)	$0.1p^2 + 0.2q^2$	$0.1p^2, 0.2q^2$	$0.1, p, p, 0.2, q, q$

Q3. Identify the numerical coefficients of terms (other than constants) in the following expressions:

	Terms	coefficients
(i)	$5 - 3t^2$	-3
(ii)	$1 + t + t^2 + t^3$	1 1 1
(iii)	$x + 2xy + 3y$	1 2 3
(iv)	$100m + 1000n$	100 1000
(v)	$-p^2q^2 + 7pq$	-1 $+7$
(vi)	$1.2a + 0.8b$	1.2 0.8
(vii)	$3.14r^2$	3.14
(viii)	$2(l+b)$	2 2
(ix)	$0.1y + 0.01y^2$	0.1 0.01

Q4 (a) Identify terms which contains x & give the coefficient of x .

Expression	Terms containing x	Coefficient
(i) $y^2x + 4$	y^2x	y^2
(ii) $13y^2 - 8yx$	$-8yx$	$-8y$
(iii) $x + y + 2$	x	1
(iv) $5 + z + zx$	zx	z
(v) $1 + x + xy$	x xy	1 y
(vi) $12xy^2 + 25$	$12xy^2$	$12y^2$
(vii) $7x + xy^2$	$7x$ xy^2	7 y^2

(b) Identify terms which contains y^2 and give the coefficient of y^2 .

Expression	Term containing y^2	Coefficient
(i) $8 - xy^2$	$-xy^2$	$-x$
(ii) $5y^2 + 7x$	$5y^2$	5
(iii) $2xy - 15xy^2 + 7y^2$	$-15xy^2$ $7y^2$	$-15x$ 7

Q5. classify into monomial, binomial & trinomial.

- (i) $4y - 7x \rightarrow$ binomial
 (ii) $y^2 \rightarrow$ monomial
 (iii) $x + y - xy \rightarrow$ Trinomial
 (iv) $100 \rightarrow$ monomial.
 (v) $ab - a - b \rightarrow$ Trinomial
 (vi) $5 - 3t \rightarrow$ Binomial
 (vii) $4pq - 4pq^2 \rightarrow$ Binomial
 (viii) $7m \cdot n \rightarrow$ Monomial
 (ix) $z^2 - 3z + 8 \rightarrow$ Trinomial
 (x) $a^2 + b^2 \rightarrow$ Binomial
 (xi) $z^2 + z \rightarrow$ Binomial
 (xii) $1 + x + x^2 \rightarrow$ Trinomial.

Q6. state whether a given pair of terms is of like or unlike terms:

- (i) $1, 100 \rightarrow$ unlike terms
 (ii) $-7x, \frac{5}{2}x \rightarrow$ Like terms
 (iii) $-29x, -29y \rightarrow$ unlike terms
 (iv) $14xy, 4xyx \rightarrow$ Like terms
 (v) $4m^2p; 4mp^2 \rightarrow$ unlike terms
 (vi) $12xz, 12x^2z^2 \rightarrow$ unlike terms.

Q7. Identify like terms in the following:

- (a) $-xy^2, -4yx^2, 8x^2, 2xy^2, 7y, -11x^2, -100x,$
 $-11yx, 20xy, -6x^2, y, 2xy, 3x$

\rightarrow Like terms are:

$$-xy^2, 2xy^2; \quad -4yx^2, 20xy^2;$$

$$8x^2, -11x^2, -6x^2; \quad 7y, y;$$

$$-100x, 3x; \quad -11yx, 20xy$$

$$(b) \quad 10pq, 7p, 8q, -p^2q^2, -7qp, -100q, -23, \\ 12q^2p^2, -5p^2, 41, 2405p, 78qp, 13p^2q, \\ qp^2, 701p^2$$

→ Like terms are:

$$10pq, -7qp, 78qp; \quad 7p, 2405p; \\ 8q, -100q; \quad -p^2q^2, 12q^2p^2; \quad -5p^2, 701p^2; \\ 13p^2q; qp^2; \quad -23, 41;$$

EXERCISE 12.3

Q1. If $m=2$, find the value of:

(i) $m-2$

For $m=2$; $2-2=0$

(ii) $3m-5$

$$3(2)-5 = 6-5 = 1$$

(iii) $9-5m = 9-5(2) = 9-10 = -1$

(iv) $3m^2 - 2m - 7 = 3(2)^2 - 2(2) - 7$

$$= 3 \times 4 - 4 - 7$$

$$= 12 - 4 - 7$$

$$= 1$$

(v) $\frac{5m}{2} + 4 = \frac{5 \times 2}{2} + 4 = \frac{5 \times 2}{2} + 4$

$$= \frac{10}{2} + 4 = \frac{10}{2} + 4$$

$$= 5 + 4 = 9$$

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Q2. If $p = -2$, find the value of:

(i) $4p + 7 = 4(-2) + 7 = -8 + 7 = -1$

(ii) $-3p^2 + 4p + 7 = -3(-2)^2 + 4(-2) + 7$
 $= -3 \times 4 + (-8) + 7$
 $= -12 - 8 + 7$
 $= -13$

(iii) $-2p^3 - 3p^2 + 4p + 7$
 $= -2(-2)^3 - 3(-2)^2 + 4(-2) + 7$
 $= -2 \times (-8) - 3(4) + (-8) + 7$
 $= 16 - 12 - 8 + 7$
 $= 3$

Q3. Find the value of the following expressions, when $x = -1$;

(i) $2x - 7 = 2(-1) - 7 = -2 - 7 = -9$

(ii) $-x + 2 = -(-1) + 2 = 1 + 2 = 3$

(iii) $x^2 + 2x + 1 = (-1)^2 + 2(-1) + 1$
 $= 1 - 2 + 1 = 0$

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

Q4. If $a = 2$, $b = -2$, find the value of:

(i) $a^2 + b^2 = (2)^2 + (-2)^2 = 4 + 4 = 8$

(ii) $a^2 + ab + b^2 = (2)^2 + (2)(-2) + (-2)^2$
 $= 4 - 4 + 4$
 $= 4$

$$(iii) \quad a^2 - b^2 = (2)^2 - (-2)^2 = 4 - 4 = 0$$

Q5. When $a=0$, $b=-1$, find the value of the given expressions:

$$(i) \quad 2a + 2b = 2(0) + 2(-1) = 0 - 2 = -2$$

$$(ii) \quad 2a^2 + b^2 + 1 = 2(0)^2 + (-1)^2 + 1 = 0 + 1 + 1 = 2$$

$$(iii) \quad 2a^2b + 2ab^2 + ab = 2(0)^2(-1) + 2(0)(-1)^2 + (0)(-1) \\ = 0 + 0 + 0 \\ = 0$$

$$(iv) \quad a^2 + ab + 2 = (0)^2 + (0)(-1) + 2 = 2$$

Q6. Simplify the expressions & find the value if x is equal to 2.

$$(i) \quad x + 7 + 4(x - 5) \\ = x + 7 + 4x - 20 \\ = 5x - 13 \\ = 5(2) - 13 \\ = 10 - 13 = -3$$

$$(ii) \quad 3(x + 2) + 5x - 7 \\ = 3x + 6 + 5x - 7 \\ = 8x - 1 \\ = 8(2) - 1 \\ = 16 - 1 = 15$$

$$(iii) \quad 6x + 5(x - 2) \\ = 6x + 5x - 10 \\ = 11x - 10 \\ = 11(2) - 10 = 22 - 10 = 12$$

$$\begin{aligned}
 \text{(iv)} & 4(2x-1) + 3x + 11 \\
 &= 8x - 4 + 3x + 11 \\
 &= 11x + 7 \\
 &= 11(2) + 7 \\
 &= 22 + 7 = 29
 \end{aligned}$$

Q7. Simplify the expressions & find their values if $x=3$, $a=-1$, $b=-2$

$$\begin{aligned}
 \text{(i)} & 3x - 5 - x + 9 \\
 &= 2x + 4 \\
 &= 2(3) + 4 = 6 + 4 = 10
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} & 2 - 8x + 4x + 4 \\
 &= -4x + 6 \\
 &= -4(3) + 6 = -12 + 6 = -6
 \end{aligned}$$

$$\begin{aligned}
 \text{(iii)} & 3a + 5 - 8a + 1 \\
 &= -5a + 6 \\
 &= -5(-1) + 6 = 5 + 6 = 11
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} & 10 - 3b - 4 - 5b \\
 &= 6 - 8b \\
 &= 6 - 8(-2) = 6 + 16 = 22
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} & 2a - 2b - 4 - 5 + a \\
 &= 3a - 2b - 9 \\
 &= 3(-1) - 2(-2) - 9 \\
 &= -3 + 4 - 9 \\
 &= -8
 \end{aligned}$$

Q8. (i) If $z=10$, find the value of $z^3 - 3(z-10)$

$$\begin{aligned} &\rightarrow z^3 - 3(z-10) \\ &= z^3 - 3z + 30 \\ &= (10)^3 - 3(10) + 30 \\ &= 1000 - 30 + 30 \\ &= 980 + 30 \\ &= 1000 \end{aligned}$$

(ii) If $p = -10$, find the value of $p^2 - 2p - 100$

$$\begin{aligned} &\rightarrow p^2 - 2p - 100 \\ &= (-10)^2 - 2(-10) - 100 \\ &= 100 + 20 - 100 \\ &= 20 \end{aligned}$$

Q9. What should be the value of a if the value of $2x^2 + x - a$ equals to 5, when $x=0$?

Given: $2x^2 + x - a = 5$ when $x=0$

$$\begin{aligned} 2(0) + 0 - a &= 5 \\ a &= -5 \end{aligned}$$

Q10. Simplify the expression & find its value when $a=5$ and $b=-3$.

$$\begin{aligned} &\rightarrow \text{Given: } 2(a^2 + ab) + 3 - ab \\ &= 2(a^2 + 2ab + 3 - ab) \\ &= 2a^2 + ab - 3 \\ &= 2(5)^2 + (5)(-3) - 3 \\ &= (2 \times 25) + 15 - 3 \\ &= 50 - 15 - 3 \\ &= 38 \end{aligned}$$