MATHS -7 (CH-12-ALGEBRAIC EXPRESSIONS)

MATHS -7 (CH-12-12.1-ALGEBRAIC EXPRESSIONS)

Question 1:

Get the algebraicexpressions in the following cases using variables, constants and arithmetic operations.
(i) Subtraction of *z* from *y*.
(ii) One-half of the sum of numbers *x* and *y*.
(iii) The number *z* multiplied by itself.
(iv) One-fourth of the product of numbers *p* and *q*.
(v) Numbers *x* and *y* both squared and added.
(vi) Number 5 added to three times the product of number *m* and *n*.
(vii) Product of numbers *y* and *z* subtracted from 10.
(viii)Sum of numbers *a* and *b* subtracted from their product.

Answer 1:

(i) $y - z$
(ii) $\frac{1}{2}(x+y)$
(iii) z^2
(iv) $\frac{1}{4}(pq)$
(v) $x^2 + y^2$
(vi) $5 + 3\,(mn)$
(vii) $10 - yz$
(viii) $ab - (a + b)$

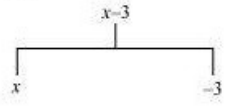
Question 2:

(i) Identify the terms and their factors in the following expressions
Show the terms and factors by tree diagrams.
(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 and factors in the expressions given below:
(a) $-4x + 5$ (b) $-4x + 5y$ (c) $5y + 3y^2$
(d) $xy + 2x^2y^2$ (e) $pq + q$
(f) $1.2\,ab - 2.4\,b + 3.6\,a$ (g) $\frac{3}{4}x + \frac{1}{4}$
(h) $0.1p^2 + 0.2\,q^2$

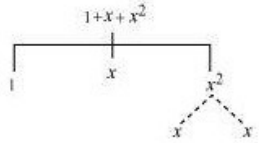
Answer 2:

(i)

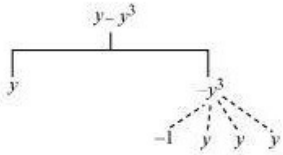
(a)



(b)



(c)



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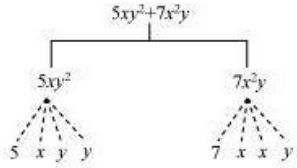

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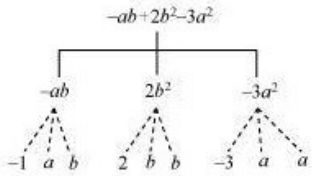


(ii)

Row	Expression	Terms	Factors
(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)	$xy+2x^2y^2$	xy $2x^2y^2$	x, y $2, x, x, y, y$
(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)	$0.1p^2 + 0.2q^2$	$0.1p^2$ $0.2q^2$	$0.1, p, p$ $0.2, q, q$

Question 3:

Identify the numerical coefficients of terms (other than constants) in the following expressions:
(i) $5 - 3t^2$ (ii) $1 + t + t^2 + t^3$ (iii) $x + 2xy + 3y$
(iv) $100m + 1000n$ (v) $-p^2q^2 + 7pq$ (vi) $1.2a + 0.8b$
(vii) $3.14\ r^2$ (viii) $2\ (l + b)$ (ix) $0.1y + 0.01\ y^2$

Answer 3:

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

Question 4:

(a) Identify terms which contain x and give the coefficient of x.
(i) $y^2x + y$ (ii) $13y^2 - 8yx$ (iii) $x + y + 2$
(iv) $5 + z + zx$ (v) $1 + x + xy$ (vi) $12xy^2 + 25$
(vii) $7x + xy^2$
(b) Identify terms which contain y^2 and give the coefficient of y^2.
(i) $8 - xy^2$ (ii) $5y^2 + 7x$ (iii) $2x^2y - 15xy^2 + 7y^2$

Answer 4:

(a)

Row	Expression	Terms with x	Coefficient of x
(i)	$y^2x + y$	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)

Row	Expression	Terms with y^2	Coefficient of y^2
(i)	$8 - xy^2$	$-xy^2$	$-x$
(ii)	$5y^2 + 7x$	$5y^2$	5
(iii)	$2x^2y + 7y^2$ $-15xy^2$	$7y^2$ $-15xy^2$	7 $-15x$

Question 5:

Classify into monomials, binomials and trinomials.
(i) $4y - 7z$ (ii) y^2 (iii) $x + y - xy$
(iv) 100 (v) $ab - a - b$ (vi) $5 - 3t$
(vii) $4p^2q - 4pq^2$ (viii) $7mn$ (ix) $z^2 - 3z + 8$
(x) $a^2 + b^2$ (xi) $z^2 + z$ (xii) $1 + x + x^2$

Answer 5:

The monomials, binomials, and trinomials have 1, 2, and 3 unlike terms in it respectively.

(i) $4y - 7z$
Binomial
(ii) y^2
Monomial
(iii) $x + y - xy$
Trinomial
(iv) 100
Monomial
(v) $ab - a - b$
Trinomial

(vi) $5 - 3t$
Binomial
(vii) $4p^2q - 4pq^2$
Binomial
(viii) $7mn$
Monomial
(ix) $z^2 - 3z + 8$
Trinomial

(x) $a^2 + b^2$
Binomial
(xi) $z^2 + z$
Binomial
(xii) $1 + x + x^2$
Trinomial

Question 6:

State whether a given pair of terms is of like or unlike terms.

(i) 1, 100 (ii) $-7x, \frac{5}{2}x$ (iii) $-29x, -29y$

(iv) $14xy, 42yx$ (v) $4m^2p, 4mp^2$ (vi) $12xz, 12\ x^2z^2$

Answer 6:

The terms which have the same algebraic factors are called like terms. However, when the terms have different algebraic factors, these are called unlike terms.

(i) 1, 100

Like

(ii) $-7x, \frac{5}{2}x$

Like

(iii) $-29x, -29y$

Unlike

(iv) $14xy, 42yx$

Like

(v) $4m^2p, 4mp^2$

Unlike

(vi) $12xz, 12x^2z^2$

Unlike

Question 7:

Identify like terms in the following:

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

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

Answer 7:

(a) $-xy^2, 2xy^2$

$-4yx^2, 20x^2y$

$8x^2, -11x^2, -6x^2$

$7y, y$

$-100x, 3x$

$-11xy, 2xy$

(b) $10pq, -7qp, 78qp$

$7p, 2405p$

$8q, -100q$

$-p^2q^2, 12p^2q^2$

$-23, 41$

$-5p^2, 701p^2$

$13p^2q, qp^2$

MATHS -7 (CH-12-12.2-ALGEBRAIC EXPRESSIONS)

Question 1:

Simplify combining like terms:

(i) $21b - 32 + 7b - 20b$

(ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z$

(iii) $p - (p - q) - q - (q - p)$

(iv) $3a - 2b - ab - (a - b + ab) + 3ab + b - a$

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

(vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

Answer 1:

(i) $21b - 32 + 7b - 20b = 21b + 7b - 20b - 32$

$= b(21 + 7 - 20) - 32$

$= 8b - 32$

(ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z = 7z^3 - z^2 + 13z^2 - 5z - 15z$

$= 7z^3 + z^2(-1 + 13) + z(-5 - 15)$

$= 7z^3 + 12z^2 - 20z$

(iii) $p - (p - q) - q - (q - p) = p - p + q - q - q + p$

$= p - q$

(iv) $3a - 2b - ab - (a - b + ab) + 3ba + b - a$

$= 3a - 2b - ab - a + b - ab + 3ab + b - a$

$= 3a - a - a - 2b + b + b - ab - ab + 3ab$

$= a(3 - 1 - 1) + b(-2 + 1 + 1) + ab(-1 - 1 + 3)$

$= a + ab$

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

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

$= x^2y(5 + 3) + x^2(-5 + 1) + y^2(-3 - 1 - 3) + 8xy^2$

$= 8x^2y - 4x^2 - 7y^2 + 8xy^2$

(vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

$= 3y^2 + 5y - 4 - 8y + y^2 + 4$

$= 3y^2 + y^2 + 5y - 8y - 4 + 4$

$= y^2(3 + 1) + y(5 - 8) + 4(1 - 1)$

$= 4y^2 - 3y$

Question 2:

Add:

(i) $3mn, -5mn, 8mn, -4mn$

(ii) $t - 8tz, 3tz - z, z - t$

(iii) $-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3$

(iv) $a + b - 3, b - a + 3, a - b + 3$

(v) $14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy$

(vi) $5m - 7n, 3n - 4m + 2, 2m - 3mn - 5$

(vii) $4x^2y, -3xy^2, -5xy^2, 5x^2y$

(viii) $3p^2q^2 - 4pq + 5, -10p^2q^2, 15 + 9pq + 7p^2q^2$

(ix) $ab - 4a, 4b - ab, 4a - 4b$

(x) $x^2 - y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2$

Answer 2:

(i) $3mn + (-5mn) + 8mn + (-4mn) = mn(3 - 5 + 8 - 4)$

$= 2mn$

(ii) $(t - 8tz) + (3tz - z) + (z - t) = t - 8tz + 3tz - z + z - t$

$= t - t - 8tz + 3tz - z + z$

$= t(1 - 1) + tz(-8 + 3) + z(-1 + 1)$

$= -5tz$

(iii) $(-7mn + 5) + (12mn + 2) + (9mn - 8) + (-2mn - 3)$

$= -7mn + 5 + 12mn + 2 + 9mn - 8 - 2mn - 3$

$= -7mn + 12mn + 9mn - 2mn + 5 + 2 - 8 - 3$

$= mn(-7 + 12 + 9 - 2) + (5 + 2 - 8 - 3)$

$= 12mn - 4$

(iv) $(a + b - 3) + (b - a + 3) + (a - b + 3)$

$= a + b - 3 + b - a + 3 + a - b + 3$

$= a - a + a + b + b - b - 3 + 3 + 3$

$= a(1 - 1 + 1) + b(1 + 1 - 1) + 3(-1 + 1 + 1)$

$= a + b + 3$

(v) $(14x + 10y - 12xy - 13) + (18 - 7x - 10y + 8yx) + 4xy$

$= 14x + 10y - 12xy - 13 + 18 - 7x - 10y + 8yx + 4xy$

$= 14x - 7x + 10y - 10y - 12xy + 8yx + 4xy - 13 + 18$

$= x(14 - 7) + y(10 - 10) + xy(-12 + 8 + 4) - 13 + 18$

$= 7x + 5$

(vi) $(5m - 7n) + (3n - 4m + 2) + (2m - 3mn - 5)$
$= 5m - 7n + 3n - 4m + 2 + 2m - 3mn - 5$
$= 5m - 4m + 2m - 7n + 3n - 3mn + 2 - 5$
$= m(5 - 4 + 2) + n(-7 + 3) - 3mn + 2 - 5$
$= 3m - 4n - 3mn - 3$
(vii) $4x^2y - 3xy^2 - 5xy^2 + 5x^2y = 4x^2y + 5x^2y - 3xy^2 - 5xy^2$
$= x^2y(4 + 5) + xy^2(-3 - 5)$
$= 9x^2y - 8xy^2$

(viii) $(3p^2q^2 - 4pq + 5) + (-10p^2q^2) + (15 + 9pq + 7p^2q^2)$
$= 3p^2q^2 - 4pq + 5 - 10p^2q^2 + 15 + 9pq + 7p^2q^2$
$= 3p^2q^2 - 10p^2q^2 + 7p^2q^2 - 4pq + 9pq + 5 + 15$
$= p^2q^2(3 - 10 + 7) + pq(-4 + 9) + 5 + 15$
$= 5pq + 20$
(ix) $(ab - 4a) + (4b - ab) + (4a - 4b)$
$= ab - 4a + 4b - ab + 4a - 4b$
$= ab - ab - 4a + 4a + 4b - 4b$
$= ab(1 - 1) + a(-4 + 4) + b(4 - 4)$
$= 0$

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

Question 3:

Subtract:
(i) $-5y^2$ from y^2
(ii) $6xy$ from $-12xy$
(iii) $(a - b)$ from $(a + b)$
(iv) $a(b - 5)$ from $b(5 - a)$
(v) $-m^2 + 5mn$ from $4m^2 - 3mn + 8$
(vi) $-x^2 + 10x - 5$ from $5x - 10$
(vii) $5a^2 - 7ab + 5b^2$ from $3ab - 2a^2 - 2b^2$
(viii) $4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$

Answer 3:

(i) $y^2 - (-5y^2) = y^2 + 5y^2 = 6y^2$
(ii) $-12xy - (6xy) = -18xy$
(iii) $(a + b) - (a - b) = a + b - a + b = 2b$
(iv) $b(5 - a) - a(b - 5) = 5b - ab - ab + 5a$
$= 5a + 5b - 2ab$
(v) $(4m^2 - 3mn + 8) - (-m^2 + 5mn) = 4m^2 - 3mn + 8 + m^2 - 5mn$
$= 4m^2 + m^2 - 3mn - 5mn + 8$
$= 5m^2 - 8mn + 8$
(vi) $(5x - 10) - (-x^2 + 10x - 5) = 5x - 10 + x^2 - 10x + 5$
$= x^2 + 5x - 10x - 10 + 5$
$= x^2 - 5x - 5$

(vii) $(3ab - 2a^2 - 2b^2) - (5a^2 - 7ab + 5b^2)$
$= 3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2$
$= 3ab + 7ab - 2a^2 - 5a^2 - 2b^2 - 5b^2$
$= 10ab - 7a^2 - 7b^2$
(viii) $4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$
$(5p^2 + 3q^2 - pq) - (4pq - 5q^2 - 3p^2)$
$= 5p^2 + 3q^2 - pq - 4pq + 5q^2 + 3p^2$
$= 5p^2 + 3p^2 + 3q^2 + 5q^2 - pq - 4pq$
$= 8p^2 + 8q^2 - 5pq$

Question 4:

(a) What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?
(b) What should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?

Answer 4:

(a) Let a be the required term.
$a + (x^2 + y^2 + xy) = 2x^2 + 3xy$
$a = 2x^2 + 3xy - (x^2 + y^2 + xy)$
$a = 2x^2 + 3xy - x^2 - y^2 - xy$
$a = 2x^2 - x^2 - y^2 + 3xy - xy$
$= x^2 - y^2 + 2xy$

(b) Let p be the required term.

$(2a + 8b + 10) - p = -3a + 7b + 16$

$p = 2a + 8b + 10 - (-3a + 7b + 16)$

$= 2a + 8b + 10 + 3a - 7b - 16$

$= 2a + 3a + 8b - 7b + 10 - 16$

$= 5a + b - 6$

Question 5:

What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?

Answer 5:

Let p be the required term.

$(3x^2 - 4y^2 + 5xy + 20) - p = -x^2 - y^2 + 6xy + 20$

$p = (3x^2 - 4y^2 + 5xy + 20) - (-x^2 - y^2 + 6xy + 20)$

$= 3x^2 - 4y^2 + 5xy + 20 + x^2 + y^2 - 6xy - 20$

$= 3x^2 + x^2 - 4y^2 + y^2 + 5xy - 6xy + 20 - 20$

$= 4x^2 - 3y^2 - xy$

Question 6:

(a) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$.
(b) From the sum of $4 + 3x$ and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$.

Answer 6:

(a) $(3x - y + 11) + (-y - 11)$
$= 3x - y + 11 - y - 11$
$= 3x - y - y + 11 - 11$
$= 3x - 2y$
$(3x - 2y) - (3x - y - 11)$
$= 3x - 2y - 3x + y + 11$
$= 3x - 3x - 2y + y + 11$
$= -y + 11$

(b) $(4 + 3x) + (5 - 4x + 2x^2) = 4 + 3x + 5 - 4x + 2x^2$
$= 3x - 4x + 2x^2 + 4 + 5$
$= -x + 2x^2 + 9$
$(3x^2 - 5x) + (-x^2 + 2x + 5) = 3x^2 - 5x - x^2 + 2x + 5$
$= 3x^2 - x^2 - 5x + 2x + 5$
$= 2x^2 - 3x + 5$
$(-x + 2x^2 + 9) - (2x^2 - 3x + 5)$
$= -x + 2x^2 + 9 - 2x^2 + 3x - 5$
$= -x + 3x + 2x^2 - 2x^2 + 9 - 5$
$= 2x + 4$

Question 1:

If $m = 2$, find the value of:
(i) $m - 2$ (ii) $3m - 5$ (iii) $9 - 5m$
(iv) $3m^2 - 2m - 7$ (v) $\frac{5m}{2} - 4$

Answer 1:

(i) $m - 2 = 2 - 2 = 0$
(ii) $3m - 5 = (3 \times 2) - 5 = 6 - 5 = 1$
(iii) $9 - 5m = 9 - (5 \times 2) = 9 - 10 = -1$
(iv) $3m^2 - 2m - 7 = 3 \times (2 \times 2) - (2 \times 2) - 7$
$= 12 - 4 - 7 = 1$
(v) $\frac{5m}{2} - 4 = \left(\frac{5 \times 2}{2}\right) - 4 = 1$

Question 2:

If $p = -2$, find the value of:
(i) $4p + 7$
(ii) $-3p^2 + 4p + 7$
(iii) $-2p^3 - 3p^2 + 4p + 7$

Answer 2:

(i) $4p + 7 = 4 \times (-2) + 7 = -8 + 7 = -1$
(ii) $-3p^2 + 4p + 7 = -3(-2) \times (-2) + 4 \times (-2) + 7$
$= -12 - 8 + 7 = -13$
(iii) $-2p^3 - 3p^2 + 4p + 7$
$= -2(-2) \times (-2) \times (-2) - 3(-2) \times (-2) + 4 \times (-2) + 7$
$= 16 - 12 - 8 + 7 = 3$

Question 3:

Find the value of the following expressions, when $x = -1$:
(i) $2x - 7$ (ii) $-x + 2$ (iii) $x^2 + 2x + 1$
(iv) $2x^2 - x - 2$

Answer 3:

(i) $2x - 7$
$= 2 \times (-1) - 7 = -9$
(ii) $-x + 2 = -(-1) + 2 = 1 + 2 = 3$
(iii) $x^2 + 2x + 1 = (-1) \times (-1) + 2 \times (-1) + 1$
$= 1 - 2 + 1 = 0$
(iv) $2x^2 - x - 2 = 2(-1) \times (-1) - (-1) - 2$
$= 2 + 1 - 2 = 1$

Question 4:

If $a = 2$, $b = -2$, find the value of:
(i) $a^2 + b^2$ (ii) $a^2 + ab + b^2$ (iii) $a^2 - b^2$

Answer 4:

(i) $a^2 + b^2$
$= (2)^2 + (-2)^2 = 4 + 4 = 8$
(ii) $a^2 + ab + b^2$
$= (2 \times 2) + 2 \times (-2) + (-2) \times (-2)$
$= 4 - 4 + 4 = 4$
(iii) $a^2 - b^2$
$= (2)^2 - (-2)^2 = 4 - 4 = 0$

Question 5:

When $a = 0$, $b = -1$, find the value of the given expressions:
(i) $2a + 2b$ (ii) $2a^2 + b^2 + 1$
(iii) $2a^2 b + 2ab^2 + ab$ (iv) $a^2 + ab + 2$

Answer 5:

(i) $2a + 2b = 2 \times (0) + 2 \times (-1) = 0 - 2 = -2$
(ii) $2a^2 + b^2 + 1$
$= 2 \times (0)^2 + (-1) \times (-1) + 1$
$= 0 + 1 + 1 = 2$
(iii) $2a^2b + 2ab^2 + ab$
$= 2 \times (0)^2 \times (-1) + 2 \times (0) \times (-1) \times (-1) + 0 \times (-1)$
$= 0 + 0 + 0 = 0$
(iv) $a^2 + ab + 2$
$= (0)^2 + 0 \times (-1) + 2$
$= 0 + 0 + 2 = 2$

Question 6:

Simplify the expressions and find the value if x is equal to 2
(i) $x + 7 + 4\ (x - 5)$ (ii) $3\ (x + 2) + 5x - 7$
(iii) $6x + 5\ (x - 2)$ (iv) $4\ (2x - 1) + 3x + 11$

Answer 6:

(i) $x + 7 + 4\ (x - 5) = x + 7 + 4x - 20$
$= x + 4x + 7 - 20$
$= 5x - 13$
$= (5 \times 2) - 13$
$= 10 - 13 = -3$
(ii) $3\ (x + 2) + 5x - 7 = 3x + 6 + 5x - 7$
$= 3x + 5x + 6 - 7 = 8x - 1$
$= (8 \times 2) - 1 = 16 - 1 = 15$

(iii) $6x + 5\ (x - 2) = 6x + 5x - 10$
$= 11x - 10$
$= (11 \times 2) - 10 = 22 - 10 = 12$
(iv) $4\ (2x - 1) + 3x + 11 = 8x - 4 + 3x + 11$
$= 11x + 7$
$= (11 \times 2) + 7$
$= 22 + 7 = 29$

Question 7:

Simplify these expressions and find their values if $x = 3$, $a = -1$, $b = -2$.
(i) $3x - 5 - x + 9$ (ii) $2 - 8x + 4x + 4$
(iii) $3a + 5 - 8a + 1$ (iv) $10 - 3b - 4 - 5b$
(v) $2a - 2b - 4 - 5 + a$

Answer 7:

(i) $3x - 5 - x + 9 = 3x - x - 5 + 9$
$= 2x + 4 = (2 \times 3) + 4 = 10$
(ii) $2 - 8x + 4x + 4 = 2 + 4 - 8x + 4x$
$= 6 - 4x = 6 - (4 \times 3) = 6 - 12 = -6$
(iii) $3a + 5 - 8a + 1 = 3a - 8a + 5 + 1$
$= -5a + 6 = -5 \times (-1) + 6$
$= 5 + 6 = 11$

(iv) $10 - 3b - 4 - 5b = 10 - 4 - 3b - 5b$
$= 6 - 8b = 6 - 8 \times (-2)$
$= 6 + 16 = 22$
(v) $2a - 2b - 4 - 5 + a = 2a + a - 2b - 4 - 5$
$= 3a - 2b - 9s$
$= 3 \times (-1) - 2(-2) - 9$
$= -3 + 4 - 9 = -8$

Question 8:

(i) If $z = 10$, find the value of $z^3 - 3(z - 10)$.
(ii) If $p = -10$, find the value of $p^2 - 2p - 100$

Answer 8:

(i) $z^3 - 3(z - 10) = z^3 - 3z + 30$
$= (10 \times 10 \times 10) - (3 \times 10) + 30$
$= 1000 - 30 + 30 = 1000$
(ii) $p^2 - 2p - 100$
$= (-10) \times (-10) - 2(-10) - 100$
$= 100 + 20 - 100 = 20$

Question 9:

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

Answer 9:

$2x^2 + x - a = 5$, when $x = 0$
$(2 \times 0) + 0 - a = 5$
$0 - a = 5$
$a = -5$

Question 10:

Simplify the expression and find its value when $a = 5$ and $b = -3$.
$2(a^2 + ab) + 3 - ab$

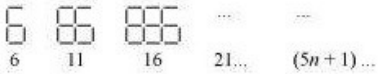
Answer 10:

$2(a^2 + ab) + 3 - ab = 2a^2 + 2ab + 3 - ab$
$= 2a^2 + 2ab - ab + 3$
$= 2a^2 + ab + 3$
$= 2 \times (5 \times 5) + 5 \times (-3) + 3$
$= 50 - 15 + 3 = 38$

Question 1:

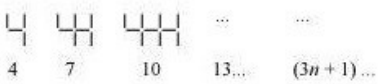
Observe the patterns of digits made from line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.

(a)



6 11 16 21... $(5n+1)$...

(b)



4 7 10 13... $(3n+1)$...

(c)

7 12 17 22... $(5n+2)$...

If the number of digits formed is taken to be n, the number of segments required to form n digits is given by the algebraic expression appearing on the right of each pattern.

How many segments are required to form 5, 10, 100 digits of the kind –

Answer 1:

(a) It is given that the number of segments required to form n digits of the kind  is $(5n + 1)$.

Number of segments required to form 5 digits = $(5 \times 5 + 1)$

$= 25 + 1 = 26$

Number of segments required to form 10 digits = $(5 \times 10 + 1)$

$= 50 + 1 = 51$

Number of segments required to form 100 digits = $(5 \times 100 + 1)$

$= 500 + 1 = 501$

(b) It is given that the number of segments required to form n digits of the kind  is $(3n + 1)$.

Number of segments required to form 5 digits = $(3 \times 5 + 1)$

$= 15 + 1 = 16$

Number of segments required to form 10 digits = $(3 \times 10 + 1)$

$= 30 + 1 = 31$

Number of segments required to form 100 digits = $(3 \times 100 + 1)$

$= 300 + 1 = 301$

(c)It is given that the number of segments required to form n digits of the kind is $(5n + 2)$.
Number of segments required to form 5 digits = $(5 \times 5 + 2)$
$= 25 + 2 = 27$
Number of segments required to form 10 digits = $(5 \times 10 + 2)$
$= 50 + 2 = 52$
Number of segments required to form 100 digits = $(5 \times 100 + 2)$
$= 500 + 2 = 502$

Question 2:

Use the given algebraic expression to complete the table of number patterns.

S. No	Expression	Terms									
		1st	2nd	3rd	4th	5th	...	10th	...	100th	...
(i)	$2n - 1$	1	3	5	7	9	-	19	-	-	-
(ii)	$3n + 2$	2	5	8	11	-	-	-	-	-	-
(iii)	$4n + 1$	5	9	13	17	-	-	-	-	-	-
(iv)	$7n + 20$	27	34	41	48	-	-	-	-	-	-
(v)	$n^2 + 1$	2	5	10	17	-	-	-	-	10, 001	-

Answer 2:

The given table can be completed as follows.

S.No.	Expression	Terms									
		1st	2nd	3rd	4th	5th	...	10th	...	100th	...
(i)	$2n - 1$	1	3	5	7	9	-	19	-	199	-
(ii)	$3n + 2$	2	5	8	11	17	-	32	-	302	-
(iii)	$4n + 1$	5	9	13	17	21	-	41	-	401	-
(iv)	$7n + 20$	27	34	41	48	55	-	90	-	720	-
(v)	$n^2 + 1$	2	5	10	17	26	-	101	-	10,001-	-