
Class -VII Mathematics (Ex. 12.1)

Questions

1. Get the algebraic expressions 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 m and n .
 - (vii) Product of numbers y and z subtracted from 10.
 - (viii) Sum of numbers a and b subtracted from their product.
2. (i) Identify the terms and their factors in the following expressions, show the terms and 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 the 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) $1.2ab-2.4b+3.6a$
 - (g) $\frac{3}{4}x+\frac{1}{4}$
 - (h) $0.1p^2+0.2q^2$
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) $3.14r^2$
 - (viii) $2(l+b)$
 - (ix) $0.1y+0.01y^2$
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) $2x^2y-15xy^2+7y^2$
5. Classify into monomials, binomials and trinomials:
-

-
-
- | | | |
|-----------------------|------------------|---------------------|
| (i) $4y - 7x$ | (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) $1 + x + x^2$ |

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) $12xz, 12x^2z^2$ |

7. Identify like terms in the following:

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

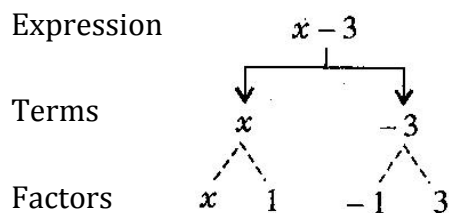
(b) $10pq, 7p, 8q, -p^2q^2, -7qp, -100q, -23, 12q^2p^2, -5p^2, 41, 2405p, 78qp, 13p^2q, qp^2, 701p^2$

Class -VII Mathematics (Ex. 12.1)

Answers

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

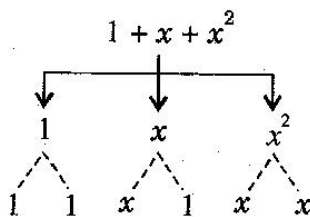
2. (i) (a) $x - 3$
Expression



Terms

Factors

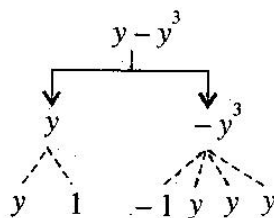
(b) $1 + x + x^2$
Expression



Terms

Factors

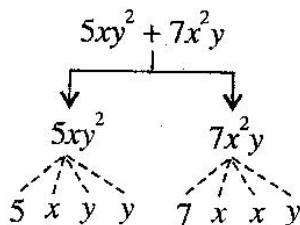
(c) $y - y^3$
Expression



Terms

Factors

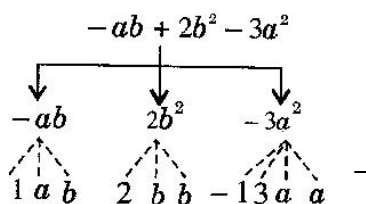
(d) $5xy^2 + 7x^2y$
Expression



Terms

Factors

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



Terms

Factors

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

3. Sol.

S.No.	Expression	Terms	Numerical Coefficient
(i)	$5-3t^2$	$-3t^2$	-3
(ii)	$1+t+t^2+t^3$	t	1
		t^2	1
		t^3	1
(iii)	$x+2xy+3y$	x	1
		$2xy$	2
		$3y$	3
(iv)	$100m+1000n$	$100m$	100
		$1000n$	1000
(v)	$-p^2q^2+7pq$	$-p^2q^2$	-1
		$7pq$	7
(vi)	$1.2a+0.8b$	$1.2a$	1.2
		$0.8b$	0.8
(vii)	$3.14r^2$	$3.14r^2$	3.14
(viii)	$2(l+b)=2l+2b$	$2l$	2
		$2b$	2
(ix)	$0.1y+0.01y^2$	$0.1y$	0.1
		$0.01y^2$	0.01

4. (a) Sol.

S.No.	Expression	Term with factor 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	1
		xy	y
(vi)	$12xy^2 + 25$	$12xy^2$	$12y^2$
(vii)	$7x + xy^2$	xy^2	y^2
		$7x$	7

(b) Sol.

S.No.	Expression	Term contains y^2	Coefficient of y^2
(i)	$8 - xy^2$	$-xy^2$	$-x$
(ii)	$5y^2 + 7x$	$5y^2$	5
(iii)	$2x^2y - 15xy^2 + 7y^2$	$-15xy^2$	$-15x$
		$7y^2$	7

5. Sol.

S.No.	Expression	Type of Polynomial
(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

6. Sol.

S.No.	Pair of terms	Like / Unlike terms
(i)	$1, 100$	Like terms
(ii)	$-7x, \frac{5}{2}x$	Like terms
(iii)	$-29x, -29y$	Unlike terms
(iv)	$14xy, 42yx$	Like terms

(v)	$4m^2p, 4mp^2$	Unlike terms
(vi)	$12xz, 12x^2z^2$	Unlike terms

7. (a) Like terms are:

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

(ii) $-4yx^2, 20x^2y$

(iii) $8x^2, -11x^2, -6x^2$

(iv) $7y, y$

(v) $-100x, 3x$

(vi) $-11yx, 2xy$

(b) Like terms are:

(i) $10pq, -7pq, 78pq$

(ii) $7p, 2405p$

(iii) $8q, -100q$

(iv) $-p^2q^2, 12p^2q^2$

(v) $-12, 41$

(vi) $-5p^2, 701p^2$

(vii) $13p^2q, qp^2$

Class -VII Mathematics (Ex. 12.2)

Questions

1. Simplify combining like terms:

- (i) $21b - 32 + 7b - 20b$
- (ii) $-z^2 + 13z^2 - 5x + 7z^3 - 15z$
- (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) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

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

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 $5p^2 + 3q^2 - pq$

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 $-3a + 7b + 16$?

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

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

Class -VII Mathematics (Ex. 12.2)**Answers**

1. (i) $21b - 32 + 7b - 20b = 21b + 7b - 20b - 32$
 $= 28b - 20b - 32 = 8b - 32$
- (ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z = 7z^3 + (-z^2 + 13z^2) - (5z + 15z)$
 $= 7z^3 + 12z^2 - 20z$
- (iii) $p - (p - q) - q - (q - p) = p - p + q - q - q + p$
 $= p - p + p + q - q - q = p - q$
- (iv) $3a - 2b - ab - (a - b + ab) + 3ab + b - a = 3a - 2b - ab - a + b - ab + 3ab + b - a$
 $= 3a - a - a - 2b + b + b - ab - ab + 3ab$
 $= (3a - a - a) - (2b - b - b) - (ab + ab - 3ab)$
 $= a - 0 - (-ab)$
 $= a + ab$
- (v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2 = 5x^2y + 3yx^2 + 8xy^2 - 5x^2 + x^2 - 3y^2 - y^2 - 3y^2$
 $= (5x^2y + 3x^2y) + 8xy^2 - (5x^2 - x^2) - (3y^2 + y^2 + 3y^2)$
 $= 8x^2y + 8xy^2 - 4x^2 - 7y^2$
- (vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4) = 3y^2 + 5y - 4 - 8y + y^2 + 4$
 $= (3y^2 + y^2) + (5y - 8y) - (4 - 4)$
 $= 4y^2 - 3y - 0 = 4y^2 - 3y$
2. (i) $3mn, -5mn, 8mn, -4mn = 3mn + (-5mn) + 8mn + (-4mn)$
 $= (3 - 5 + 8 - 4)mn = 2mn$
- (ii) $t - 8tz, 3tz - z, z - t = t - 8tz + 3tz - z + z - t$
 $= t - t - 8tz + 3tz - z + z$
 $= (1 - 1)t + (-8 + 3)tz + (-1 + 1)z$
 $= 0 - 5tz + 0 = -5tz$
- (iii) $-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3 = -7mn + 5 + 12mn + 2 + 9mn - 8 + (-2mn) - 3$
 $= -7mn + 12mn + 9mn - 2mn + 5 + 2 - 8 - 3$
 $= (-7 + 12 + 9 - 2)mn + 7 - 11$
 $= 12mn - 4$
- (iv) $a + b - 3, b - a + 3, a - b + 3 = a + b - 3 + b - a + 3 + a - b + 3$
 $= (a - a + a) + (b + b - b) - 3 + 3 + 3$
 $= a + b + 3$
- (v) $14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy = 14x + 10y - 12xy - 13 + 18 - 7x - 10y + 8xy + 4xy$
 $= 14x - 7x + 10y - 10y - 12xy + 8xy + 4xy - 13 + 18$
 $= 7x + 0y + 0xy + 5 = 7x + 5$

$$\begin{aligned}
 \text{(vi)} \quad 5m - 7n, 3n - 4m + 2, 2m - 3mn - 5 &= 5m - 7n + 3n - 4m + 2 + 2m - 3mn - 5 \\
 &= 5m - 4m + 2m - 7n + 3n - 3mn + 2 - 5 \\
 &= (5 - 4 + 2)m + (-7 + 3)n - 3mn - 3 \\
 &= 3m - 4n + 3mn - 3
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad 4x^2y, -3xy^2, -5xy^2, 5x^2y &= 4x^2y + (-3xy^2) + (-5xy^2) + 5x^2y \\
 &= 4x^2y + 5x^2y - 3xy^2 - 5xy^2 \\
 &= 9x^2y - 8xy^2
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad 3p^2q^2 - 4pq + 5, -10p^2q^2, 15 + 9pq + 7p^2q^2 &= 3p^2q^2 - 4pq + 5 + (-10p^2q^2) + 15 + 9pq + 7p^2q^2 \\
 &= 3p^2q^2 - 10p^2q^2 + 7p^2q^2 + 4pq + 9pq + 5 + 15 \\
 &= (3 - 10 + 7)p^2q^2 + (-4 + 9)pq + 20 \\
 &= 0p^2q^2 + 5pq + 20 = 5pq + 20
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix)} \quad ab - 4a, 4b - ab, 4a - ab &= ab - 4a + 4b - ab + 4a - ab \\
 &= -4a + 4a + 4b - 4b + ab - ab \\
 &= 0 + 0 + 0 = 0
 \end{aligned}$$

$$\begin{aligned}
 \text{(x)} \quad x^2 - y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2 &= x^2 - y^2 - 1 + y^2 - 1 - x^2 + 1 - x^2 - y^2 \\
 &= x^2 - x^2 - x^2 - y^2 + y^2 - y^2 - 1 - 1 + 1 \\
 &= (1 - 1 - 1)x^2 + (-1 + 1 - 1)y^2 - 1 - 1 + 1 \\
 &= -x^2 - y^2 - 1
 \end{aligned}$$

$$3. \text{ (i)} \quad y^2 - (-5y^2) = y^2 + 5y^2 = 6y^2$$

$$\text{(ii)} \quad -12xy - (6xy) = -12xy - 6xy = -18xy$$

$$\text{(iii)} \quad (a + b) - (a - b) = a + b - a + b = a - a + b + b = 2b$$

$$\text{(iv)} \quad b(5 - a) - a(b - 5) = 5b - ab - ab + 5a = 5b - 2ab + 5a = 5a + 5b - 2ab$$

$$\begin{aligned}
 \text{(v)} \quad 4m^2 - 3mn + 8 - (-m^2 + 5mn) &= 4m^2 - 3mn + 8 + m^2 - 5mn \\
 &= 4m^2 + m^2 - 3mn - 5mn + 8 \\
 &= 5m^2 - 8mn + 8
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad 5x - 10 - (-x^2 + 10x - 5) &= 5x - 10 + x^2 - 10x + 5 \\
 &= x^2 + 5x - 10x - 10 + 5 = x^2 - 5x - 5
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad 3ab - 2a^2 - 2b^2 - (5a^2 - 7ab + 5b^2) &= 3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2 \\
 &= 3ab + 7ab - 2a^2 - 5a^2 - 2b^2 - 5b^2 \\
 &= 10ab - 7a^2 - 7b^2 \\
 &= -7a^2 - 7b^2 + 10ab
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad 5p^2 + 3q^2 - pq - (4pq - 5q^2 - 3p^2) &= 5p^2 + 3q^2 - pq - 4pq + 5q^2 + 3p^2 \\
 &= 5p^2 + 3p^2 + 3q^2 + 5q^2 - pq - 4pq \\
 &= 8p^2 + 8q^2 - 5pq
 \end{aligned}$$

4. (a) Let p should be added.

Then according to question,

$$\begin{aligned}x^2 + xy + y^2 + p &= 2x^2 + 3xy &\Rightarrow & p = 2x^2 + 3xy - (x^2 + xy + y^2) \\ \Rightarrow p &= 2x^2 + 3xy - x^2 - xy - y^2 &\Rightarrow & p = 2x^2 - x^2 - y^2 + 3xy - xy \\ \Rightarrow p &= x^2 - y^2 + 2xy\end{aligned}$$

Hence, $x^2 - y^2 + 2xy$ should be added.

(b) Let q should be subtracted.

Then according to question,

$$\begin{aligned}2a + 8b + 10 - q &= -3a + 7b + 16 &\Rightarrow & -q = -3a + 7b + 16 - (2a + 8b + 10) \\ \Rightarrow -q &= -3a + 7b + 16 - 2a - 8b - 10 &\Rightarrow & -q = -3a - 2a + 7b - 8b + 16 - 10 \\ \Rightarrow -q &= -5a - b + 6 &\Rightarrow & q = -(-5a - b + 6) \\ \Rightarrow q &= 5a + b - 6\end{aligned}$$

5. Let q should be subtracted.

Then according to question,

$$\begin{aligned}3x^2 - 4y^2 + 5xy + 20 - q &= -x^2 - y^2 + 6xy + 20 \\ \Rightarrow q &= 3x^2 - 4y^2 + 5xy + 20 - (-x^2 - y^2 + 6xy + 20) \\ \Rightarrow q &= 3x^2 - 4y^2 + 5xy + 20 + x^2 + y^2 - 6xy - 20 \\ \Rightarrow q &= 3x^2 + x^2 - 4y^2 + y^2 + 5xy - 6xy + 20 - 20 \\ \Rightarrow q &= 4x^2 - 3y^2 - xy + 0\end{aligned}$$

Hence, $4x^2 - 3y^2 - xy$ should be subtracted.

6. (a) According to question,

$$\begin{aligned}(3x - y + 11) + (-y - 11) - (3x - y - 11) &= 3x - y + 11 - y - 11 - 3x + y + 11 \\ &= 3x - 3x - y - y + y + 11 - 11 + 11 \\ &= (3 - 3)x - (1 + 1 - 1)y + 11 + 11 - 11 \\ &= 0x - y + 11 = -y + 11\end{aligned}$$

(b) According to question,

$$\begin{aligned}& \left[(4 + 3x) + (5 - 4x + 2x^2) \right] - \left[(3x^2 - 5x) + (-x^2 + 2x + 5) \right] \\ &= \left[4 + 3x + 5 - 4x + 2x^2 \right] - \left[3x^2 - 5x - x^2 + 2x + 5 \right] \\ &= \left[2x^2 + 3x - 4x + 5 + 4 \right] - \left[3x^2 - x^2 + 2x - 5x + 5 \right] \\ &= \left[2x^2 - x + 9 \right] - \left[2x^2 - 3x + 5 \right] \\ &= 2x^2 - x + 9 - 2x^2 + 3x - 5 \\ &= 2x^2 - 2x^2 - x + 3x + 9 - 5 \\ &= 2x + 4\end{aligned}$$

Class -VII Mathematics (Ex. 12.3)

Answers

1. (i) $m - 2 = 2 - 2$ [Putting $m = 2$]
 $= 0$
- (ii) $3m - 5 = 3 \times 2 - 5$ [Putting $m = 2$]
 $= 6 - 5 = 1$
- (iii) $9 - 5m = 9 - 5 \times 2$ [Putting $m = 2$]
 $= 9 - 10 = -1$
- (iv) $3m^2 - 2m - 7 = 3(2)^2 - 2(2) - 7$ [Putting $m = 2$]
 $= 3 \times 4 - 2 \times 2 - 7 = 12 - 4 - 7$
 $= 12 - 11 = 1$
- (v) $\frac{5m}{2} - 4 = \frac{5 \times 2}{2} - 4$ [Putting $m = 2$]
 $= 5 - 4 = 1$
2. (i) $4p + 7 = 4(-2) + 7$ [Putting $p = -2$]
 $= -8 + 7 = -1$
- (ii) $-3p^2 + 4p + 7 = -3(-2)^2 + 4(-2) + 7$ [Putting $p = -2$]
 $= -3 \times 4 - 8 + 7 = -12 - 8 + 7$
 $= -20 + 7 = -13$
- (iii) $-2p^3 - 3p^2 + 4p + 7 = -2(-2)^3 - 3(-2)^2 + 4(-2) + 7$ [Putting $p = -2$]
 $= -2 \times (-8) - 3 \times 4 - 8 + 7 = 16 - 12 - 8 + 7$
 $= -20 + 23 = 3$
3. (i) $2x - 7 = 2(-1) - 7$ [Putting $x = -1$]
 $= -2 - 7 = -9$
- (ii) $-x + 2 = -(-1) + 2$ [Putting $x = -1$]
 $= 1 + 2 = 3$
- (iii) $x^2 + 2x + 1 = (-1)^2 + 2(-1) + 1$ [Putting $x = -1$]
 $= 1 - 2 + 1 = 2 - 2 = 0$
- (iv) $2x^2 - x - 2 = 2(-1)^2 - (-1) - 2$ [Putting $x = -1$]
 $= 2 \times 1 + 1 - 2 = 2 + 1 - 2$
 $= 3 - 2$
 $= 1$
-

-
4. (i) $a^2 + b^2 = (2)^2 + (-2)^2$ [Putting $a = 2, b = -2$]
 $= 4 + 4 = 8$
- (ii) $a^2 + ab + b^2 = (2)^2 + (2)(-2) + (-2)^2$ [Putting $a = 2, b = -2$]
 $= 4 - 4 + 4 = 4$
- (iii) $a^2 - b^2 = (2)^2 - (-2)^2$ [Putting $a = 2, b = -2$]
 $= 4 - 4 = 0$
5. (i) $2a + 2b = 2(0) + 2(-1)$ [Putting $a = 0, b = -1$]
 $= 0 - 2 = -2$
- (ii) $2a^2 + b^2 + 1 = 2(0)^2 + (-1)^2 + 1$ [Putting $a = 0, b = -1$]
 $= 2 \times 0 + 1 + 1 = 0 + 2 = 2$
- (iii) $2a^2b + 2ab^2 + ab = 2(0)^2(-1) + 2(0)(-1)^2 + (0)(-1)$ [Putting $a = 0, b = -1$]
 $= 0 + 0 + 0 = 0$
- (iv) $a^2 + ab + 2 = (0)^2 + (0)(-1) + 2$ [Putting $a = 0, b = -1$]
 $= 0 + 0 + 2 = 2$
6. (i) $x + 7 + 4(x - 5) = x + 7 + 4x - 20 = x + 4x + 7 - 20$
 $= 5x - 13 = 5 \times 2 - 13$ [Putting $x = 2$]
 $= 10 - 13 = -3$
- (ii) $3(x + 2) + 5x - 7 = 3x + 6 + 5x - 7 = 3x + 5x + 6 - 7$
 $= 8x - 1 = 8 \times 2 - 1$ [Putting $x = -1$]
 $= 16 - 1 = 15$
- (iii) $6x + 5(x - 2) = 6x + 5x - 10 = 11x - 10$
 $= 11 \times 2 - 10$ [Putting $x = -1$]
 $= 22 - 10 = 12$
- (iv) $4(2x - 1) + 3x + 11 = 8x - 4 + 3x + 11 = 8x + 3x - 4 + 11$
 $= 11x + 7 = 11 \times 2 + 7$ [Putting $x = -1$]
 $= 22 + 7 = 29$
7. (i) $3x - 5 - x + 9 = 3x - x - 5 + 9 = 2x + 4$
 $= 2 \times 3 + 4$ [Putting $x = 3$]
 $= 6 + 4 = 10$
- (ii) $2 - 8x + 4x + 4 = -8x + 4x + 2 + 4 = -4x + 6$
 $= -4 \times 3 + 6$ [Putting $x = 3$]
 $= -12 + 6 = -6$
- (iii) $3a + 5 - 8a + 1 = 3a - 8a + 5 + 1 = -5a + 6$
-

$$= -5(-1) + 6 \quad [\text{Putting } a = -1]$$

$$= 5 + 6 = 11$$

$$(iv) \quad 10 - 3b - 4 - 5b = -3b - 5b + 10 - 4 = -8b + 6$$

$$= -8(-2) + 6 \quad [\text{Putting } b = -2]$$

$$= 16 + 6 = 22$$

$$(v) \quad 2a - 2b - 4 - 5 + a = 2a + a - 2b - 4 - 5$$

$$= 3a - 2b - 9 = 3(-1) - 2(-2) - 9 \quad [\text{Putting } a = -1, b = -2]$$

$$= -3 + 4 - 9 = -8$$

$$8. (i) \quad z^3 - 3(z - 10) = (10)^3 - 3(10 - 10) \quad [\text{Putting } z = 10]$$

$$= 1000 - 3 \times 0 = 1000 - 0 = 1000$$

$$(ii) \quad p^2 - 2p - 100 = (-10)^2 - 2(-10) - 100 \quad [\text{Putting } p = -10]$$

$$= 100 + 20 - 100 = 20$$

$$9. \text{ Given: } 2x^2 + x - a = 5$$

$$\Rightarrow 2(0)^2 + 0 - a = 5 \quad [\text{Putting } x = 0]$$

$$\Rightarrow 0 + 0 - a = 5 \quad \Rightarrow \quad a = -5$$

Hence, the value of a is -5 .

$$10. \text{ Given: } 2(a^2 + ab) + 3 - ab$$

$$\Rightarrow 2a^2 + 2ab + 3 - ab \quad \Rightarrow \quad 2a^2 + 2ab - ab + 3$$

$$\Rightarrow 2a^2 + ab + 3$$

$$\Rightarrow 2(5)^2 + (5)(-3) + 3 \quad [\text{Putting } a = 5, b = -3]$$

$$\Rightarrow 2 \times 25 - 15 + 3$$




$$\Rightarrow 50 - 15 + 3$$

$$\Rightarrow 38$$



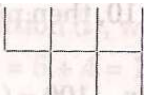
Class -VII Mathematics (Ex. 12.4)

Questions




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 .




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

S.No.	Expression	Terms									
		1 st	2 nd	3 rd	4 th	5 th	...	10 th	...	100 th	...
(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	---	---	---	---	10001	---

Class -VII Mathematics (Ex. 12.4)

Answers

1. Sol.

S. No.	Symbol	Digit's number	Pattern's Formulae	No. of Segments
(i)		5	$5n + 1$	26
		10		51
		100		501
(ii)		5	$3n + 1$	16
		10		31
		100		301
(iii)		5	$5n + 2$	27
		10		52
		100		502

(i) $5n + 1$

Putting $n = 5$, $5 \times 5 + 1 = 25 + 1 = 26$

Putting $n = 10$, $5 \times 10 + 1 = 50 + 1 = 51$

Putting $n = 100$, $5 \times 100 + 1 = 500 + 1 = 501$

(ii) $3n + 1$

Putting $n = 5$, $3 \times 5 + 1 = 15 + 1 = 16$

Putting $n = 10$, $3 \times 10 + 1 = 30 + 1 = 31$

Putting $n = 100$, $3 \times 100 + 1 = 300 + 1 = 301$

(iii) $5n + 2$

Putting $n = 5$, $5 \times 5 + 2 = 25 + 2 = 27$

Putting $n = 10$, $5 \times 10 + 2 = 50 + 2 = 52$

Putting $n = 100$, $5 \times 100 + 2 = 500 + 2 = 502$

2. (i) $2n - 1$

Putting $n = 100$, $2 \times 100 - 1 = 200 - 1 = 199$

(ii) $3n + 2$

Putting $n = 5$, $3 \times 5 + 2 = 15 + 2 = 17$

Putting $n = 10$, $3 \times 10 + 2 = 30 + 2 = 32$

Putting $n = 100$, $3 \times 100 + 2 = 300 + 2 = 302$

(iii) $4n + 1$

Putting $n = 5$, $4 \times 5 + 1 = 20 + 1 = 21$

Putting $n = 10$, $4 \times 10 + 1 = 40 + 1 = 41$

Putting $n = 100$, $4 \times 100 + 1 = 400 + 1 = 401$

(iv) $7n + 20$

-
- Putting $n = 5$, $7 \times 5 + 20 = 25 + 20 = 55$
 Putting $n = 10$, $7 \times 10 + 20 = 70 + 20 = 90$
 Putting $n = 100$, $7 \times 100 + 20 = 700 + 20 = 720$
- (v) $n^2 + 1$
 Putting $n = 5$, $5 \times 5 + 1 = 25 + 1 = 26$
 Putting $n = 10$, $10 \times 10 + 1 = 100 + 1 = 101$
 Putting $n = 100$, $100 \times 100 + 1 = 10000 + 1 = 10001$

Now complete table is,

S.No.	Expression	Terms									
		1 st	2 nd	3 rd	4 th	5 th	...	10 th	...	100 th	...
(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	---	10001	---
