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)	$1,\quad 100$	(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) $3mn+5$

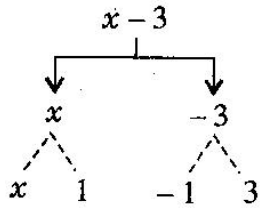
   (vii) $10-yz$ (viii) $ab-(a+b)$

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

   Expression

   Terms

   Factors

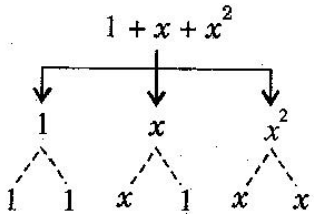


   (b) $1+x+x^2$

   Expression

   Terms

   Factors

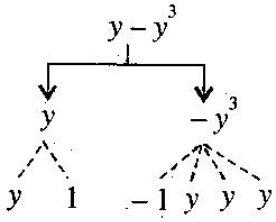


   (c) $y-y^3$

   Expression

   Terms

   Factors

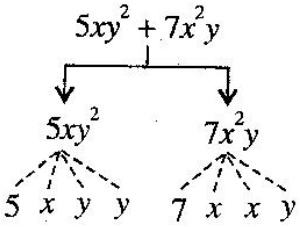


   (d) $5xy^2+7x^2y$

   Expression

   Terms

   Factors

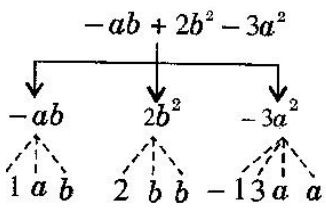


   (e) $-ab+2b^2-3a^2$

   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) $-z^2+13z^2-5z+7z^3-15z=7z^3+\left(-z^2+13z^2\right)-\left(5z+15z\right)$

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

(iii) $p-\left(p-q\right)-q-\left(q-p\right)=p-p+q-q-q+p$

$= p-p+p+q-q-q = p-q$

(iv) $3a-2b-ab-\left(a-b+ab\right)+3ab+b-a=3a-2b-ab-a+b-ab+3ab+b-a$

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

$= \left(3a-a-a\right)-\left(2b-b-b\right)-\left(ab+ab-3ab\right)$

$= a-0-\left(-ab\right)$

$= a+ab$

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

$= \left(5x^2y+3x^2y\right)+8xy^2-\left(5x^2-x^2\right)-\left(3y^2+y^2+3y^2\right)$

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

(vi) $\left(3y^2+5y-4\right)-\left(8y-y^2-4\right)=3y^2+5y-4-8y+y^2+4$

$= \left(3y^2+y^2\right)+\left(5y-8y\right)-\left(4-4\right)$

$= 4y^2-3y-0 = 4y^2-3y$

2. (i) $3mn,-5mn,8mn,-4mn=3mn+\left(-5mn\right)+8mn+\left(-4mn\right)$

$= \left(3-5+8-4\right)mn = 2mn$

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

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

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

$= 0-5tz+0 = -5tz$

(iii) $-7mn+5,12mn+2,9mn-8,-2mn-3=-7mn+5+12mn+2+9mn-8+\left(-2mn\right)-3$

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

$= \left(-7+12+9-2\right)mn+7-11$

$= 12mn-4$

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

$= \left(a-a+a\right)+\left(b+b-b\right)-3+3+3$

$= a+b+3$

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

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

$= 7x+0y+0xy+5 = 7x+5$

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

$= 5m-4m+2m-7n+3n-3mn+2-5$

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

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

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

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

$= 9x^2y-8xy^2$

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

$= 3p^2q^2-10p^2q^2+7p^2q^2+4pq+9pq+5+15$

$= (3-10+7)p^2q^2+(-4+9)pq+20$

$= 0p^2q^2+5pq+20 = 5pq+20$

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

$= -4a+4a+4b-4b+ab-ab$

$= 0+0+0=0$

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

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

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

$= -x^2-y^2-1$

3. (i) $y^2-(-5y^2) = y^2+5y^2 = 6y^2$

(ii) $-12xy-(6xy) = -12xy-6xy = -18xy$

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

(iv) $b(5-a)-a(b-5) = 5b-ab-ab+5a = 5b-2ab+5a = 5a+5b-2ab$

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

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

$= 10ab-7a^2-7b^2$

$= -7a^2-7b^2+10ab$

(viii) $5p^2+3q^2-pq-(4pq-5q^2-3p^2) = 5p^2+3q^2-pq-4pq+5q^2+3p^2$

$= 5p^2+3p^2+3q^2+5q^2-pq-4pq$

$= 8p^2+8q^2-5pq$

4. (a) Let p should be added.

Then according to question,

$x^2+xy+y^2+p=2x^2+3xy \quad \Rightarrow \quad p=2x^2+3xy-\left(x^2+xy+y^2\right)$

$\Rightarrow \quad p=2x^2+3xy-x^2-xy-y^2 \quad \Rightarrow \quad p=2x^2-x^2-y^2+3xy-xy$

$\Rightarrow \quad p=x^2-y^2+2xy$

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

(b) Let q should be subtracted.

Then according to question,

$2a+8b+10-q=-3a+7b+16 \quad \Rightarrow \quad -q=-3a+7b+16-\left(2a+8b+10\right)$

$\Rightarrow \quad -q=-3a+7b+16-2a-8b-10 \quad \Rightarrow \quad -q=-3a-2a+7b-8b+16-10$

$\Rightarrow \quad -q=-5a-b+6 \quad \Rightarrow \quad q=-\left(-5a-b+6\right)$

$\Rightarrow \quad q=5a+b-6$

5. Let q should be subtracted.

Then according to question,

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

$\Rightarrow \quad q=3x^2-4y^2+5xy+20-\left(-x^2-y^2+6xy+20\right)$

$\Rightarrow \quad q=3x^2-4y^2+5xy+20+x^2+y^2-6xy-20$

$\Rightarrow \quad q=3x^2+x^2-4y^2+y^2+5xy-6xy+20-20$

$\Rightarrow \quad q=4x^2-3y^2-xy+0$

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

6. (a) According to question,

$\left(3x-y+11\right)+\left(-y-11\right)-\left(3x-y-11\right) = 3x-y+11-y-11-3x+y+11$

$= 3x-3x-y-y+y+11-11+11$

$= \left(3-3\right)x-\left(1+1-1\right)y+11+11-11$

$= 0x-y+11 = -y+11$

(b) According to question,

$\left[\left(4+3x\right)+\left(5-4x+2x^2\right)\right]-\left[\left(3x^2-5x\right)+\left(-x^2+2x+5\right)\right]$

$= \left[4+3x+5-4x+2x^2\right]-\left[3x^2-5x-x^2+2x+5\right]$

$= \left[2x^2+3x-4x+5+4\right]-\left[3x^2-x^2+2x-5x+5\right]$

$= \left[2x^2-x+9\right]-\left[2x^2-3x+5\right]$

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

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

$= 2x+4$

Class –VII Mathematics (Ex. 12.3)
Questions

1. If $m = 2,$ find the value of:
   (i) $m-2$ (ii) $3m-5$ (iii) $9-5m$ (iv) $3m^2-2m-7$
   (v) $\frac{5m}{2}-4$
2. If $p=-2,$ find the value of:
   (i) $4p+7$ (ii) $-3p^2+4p+7$ (iii) $-2p^3-3p^2+4p+7$
3. Find the value of the following expressions, when $x=-1$:
   (i) $2x-7$ (ii) $-x+2$ (iii) x^2+2x+1 (iv) $2x^2-x-2$
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
5. When $a=0, b=-1,$ find the value of the given expressions:
   (i) $2a+2b$ (ii) $2a^2+b^2+1$
   (iii) $2a^2b+2ab^2+ab$ (iv) a^2+ab+2
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) $4(2x-1)+3x+11$
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) $2a-2b-4-5+a$
8. (i) If $z=10,$ find the value of $z^3-3(z-10).$
   (ii) If $p=-10,$ find the value of $p^2-2p-100.$
9. What should be the value of a if the value of $2x^2+x-a$ equals to 5, when $x=0$?
10. Simplify the expression and find its value when $a=5$ and $b=-3$: $2(a^2+ab)+3-ab$

Class –VII Mathematics (Ex. 12.3)

Answers

1. (i) $m-2 = 2-2$ [Putting $m=2$]

$= 0$

(ii) $3m-5 = 3\times2-5$ [Putting $m=2$]

$= 6 - 5 = 1$

(iii) $9-5m = 9 - 5 \text{ x } 2$ [Putting $m=2$]

$= 9 - 10 = -1$

(iv) $3m^2-2m-7 = 3(2)^2-2(2)-7$ [Putting $m=2$]

$= 3 \text{ x } 4 - 2 \text{ x } 2 - 7 = 12 - 4 - 7$

$= 12 - 11 = 1$

(v) $\frac{5m}{2}-4 = \frac{5\times2}{2}-4$ [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 $p=-2$]

$= -3\times4-8+7 = -12-8+7$

$= -20+7 = -13$

(iii) $-2p^3-3p^2+4p+7 = -2(-2)^3-3(-2)^2+4(-2)+7$ [Putting $p=-2$]

$= = -2\times(-8)-3\times4-8+7 = 16-12-8+7$

$= -20+23 = 3$

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 $x=-1$]

$= 2 \text{ x } 1 + 1 - 2 = 2 + 1 - 2$

$= 3 - 2$

$= 1$

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 $a=0, b=-1$]

$= 2 \text{ x } 0 + 1 + 1 = 0 + 2 = 2$

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

$= 8x-1 = 8 \text{ x } 2 - 1$ [Putting $x=-1$]

$= 16 - 1 = 15$

(iii) $6x+5(x-2) = 6x+5x-10 = 11x-10$

$= 11 \text{ x } 2 - 10$ [Putting $x=-1$]

$= 22 - 10 = 12$

(iv) $4(2x-1)+3x+11 = 8x-4+3x+11 = 8x+3x-4+11$

$= 11x+7 = 11 \text{ x } 2 + 7$ [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 $x=3$]

$= -12+6 = -12$

(iii) $3a+5-8a+1 = 3a-8a+5+1 = -5a+6$

$= -5(-1)+6$ [Putting $a=-1$]

$= 5 + 6 = 11$

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

$= -8(-2)+6$ [Putting $b=-2$]

$= 16 + 6 = 22$

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

$= 3a-2b-9 = 3(-1)-2(-2)-9$ [Putting $a=-1$, $b=-2$]

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

8. (i) $z^3-3(z-10) = (10)^3-3(10-10)$ [Putting $z=10$]

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

(ii) $p^2-2p-100 = (-10)^2-2(-10)-100$ [Putting $p=-10$]

$= 100+20-100 = 20$

9. Given: $2x^2+x-a=5$

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

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

Hence, the value of a is -5.

10. Given: $2(a^2+ab)+3-ab$

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

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

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

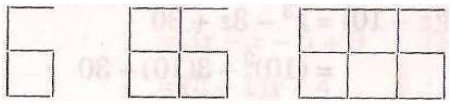
$\Rightarrow$ $2 \times 25 - 15 + 3$

$\Rightarrow$ $50 - 15 + 3$

$\Rightarrow$ 38

Class –VII Mathematics (Ex. 12.4)
Questions

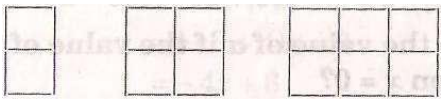
1. Observe the patterns of digits made from line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.

(a)  ... ...

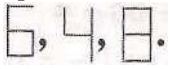
6 11 16 21... $(5n+1)$...

(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									
		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	---	---	---	---	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 x 5 + 1 = 25 + 1 = 26

Putting $n=10,$ 5 x 10 + 1 = 50 + 1 = 51

Putting $n=100,$ 5 x 100 + 1 = 500 + 1 = 501

(ii) $3n+1$

Putting $n=5,$ 3 x 5 + 1 = 15 + 1 = 16

Putting $n=10,$ 3 x 10 + 1 = 30 + 1 = 31

Putting $n=100,$ 3 x 100 + 1 = 300 + 1 = 301

(iii) $5n+2$

Putting $n=5,$ 5 x 5 + 2 = 25 + 2 = 27

Putting $n=10,$ 5 x 10 + 2 = 50 + 2 = 52

Putting $n=100,$ 5 x 100 + 2 = 500 + 2 = 502

2. (i) $2n-1$

Putting $n=100,$ 2 x 100 – 1 = 200 – 1 = 199

(ii) $3n+2$

Putting $n=5,$ 3 x 5 + 2 = 15 + 2 = 17

Putting $n=10,$ 3 x 10 + 2 = 30 + 2 = 32

Putting $n=100,$ 3 x 100 + 2 = 300 + 2 = 302

(iii) $4n+1$

Putting $n=5,$ 4 x 5 + 1 = 20 + 1 = 21

Putting $n=10,$ 4 x 10 + 1 = 40 + 1 = 41

Putting $n=100,$ 4 x 100 + 1 = 400 + 1 = 401

(iv) $7n+20$

Putting $n = 5,$ 7 x 5 + 20 = 25 + 20 = 55

Putting $n = 10,$ 7 x 10 + 20 = 70 + 20 = 90

Putting $n = 100,$ 7 x 100 + 20 = 700 + 20 = 720

(v) $n^2 + 1$

Putting $n = 5,$ 5 x 5 + 1 = 25 + 1 = 26

Putting $n = 10,$ 10 x 10 + 1 = 100 + 1 = 101

Putting $n = 100,$ 100 x 100 + 1 = 10000 + 1 = 10001

Now complete table is,

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**	---	10001	---