

1. (i) $8x + 5x$

$$\begin{aligned} &= (8+5)x \\ &= 13x \end{aligned}$$

(ii) $8x - 5x$

$$\begin{aligned} &= (8-5)x \\ &= 3x \end{aligned}$$

(iii) $6xy^2 + 9xy^2$

$$\begin{aligned} &= (6+9)xy^2 \\ &= 15xy^2 \end{aligned}$$

(iv) $6xy^2 - 9xy^2$

$$\begin{aligned} &= (6-9)xy^2 \\ &= -3xy^2 \end{aligned}$$

(v) $8a + 6a + 5b$

$$\begin{aligned} &= (8+6)a + 5b \\ &= 14a + 5b \end{aligned}$$

(vi) $5 + 7xy + 6 + 3xy$

$$\begin{aligned} &= (5+6) + (7+3)xy \\ &= 11 + 10xy \end{aligned}$$

(vii) $4a + 3b - 7a + 4b$

$$\begin{aligned} &= 4a - 7a + 3b + 4b \\ &= -3a + 7b \end{aligned}$$

(viii) $-15x + 13x + 8$

$$\begin{aligned} &= (-15+13)x + 8 \\ &= -2x + 8 \end{aligned}$$

(ix) $6x^2y + 13xy^2 - 4x^2y + 2xy^2$

$$\begin{aligned} &= (6-4)x^2y + (13+2)xy^2 \\ &= 2x^2y + 15xy^2 \end{aligned}$$

(x) $16x^2 - 9x^2$

$$\begin{aligned} &= (16-9)x^2 \\ &= 7x^2 \end{aligned}$$

$25xy^2 - 17xy^2$

$$\begin{aligned} &= (25-17)xy^2 \\ &= 8xy^2 \end{aligned}$$

2. (i) $-9x + 3x + 4x$

$$\begin{aligned} &= (-9+3+4)x \\ &= -2x \end{aligned}$$

(ii) $23y^2 + 8y^2 - 12y^2$

$$23y^2 + 8y^2 + (-12y^2)$$

$$= 23y^2 + 8y^2 - 12y^2$$

$$= (23+8-12)y^2$$

$$= (23+(-12))y^2$$

$$= 9y^2 + 19y^2$$

(iii) $18pq + (-15pq) + 3pq$

$$= 18pq - 15pq + 3pq$$

$$= (18-15+3)pq$$

$$= 6pq$$

3. (i) $3m + 12m - 5m$

$$= (3+12-5)m$$

$$= 10m$$

$$(ii) 7n^2 - 9n^2 + 3n^2$$

$$= (7 - 9 + 3)n^2$$

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

$$= n^2$$

$$(iii) 25xy - 8xy - 6xy$$

$$= (25 - 8 - 6)xy$$

$$= 11xy$$

$$(iv) -5ax^2 + 7ax^2 - 12ax^2$$

$$= [(-5) + 7 - 12]ax^2$$

$$= -10ax^2$$

$$(v) -16am + 4mx + 4am - 15mx + 5am$$

$$(16)am$$

$$= [(-16) + 4 + 5]am + [4 - 15]mx$$

$$= [(-16) + 9]am + [4 - 15]mx$$

$$= [-7]am + [-11]mx$$

$$= -7am - 11mx$$

$$4(i) a + b + 2a + 3b$$

$$= (2a + a) + (3b + b)$$

$$= 3a + 4b$$

$$(i) 2x + y + 3x - 4y$$

$$= 2x + 3x + y - 4y$$

$$= 5x + (-3)y$$

$$= 5x - 3y$$

$$(ii) -3a + 2b + 3a + b$$

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

$$= 2b + b$$

$$= 3b$$

$$(iv) 4 + x + 5 - 2x + 6x$$

$$= 4 + 5 - 2x + 6x + x$$

$$= 9 + 5x$$

$$(iv) 4 + x + 5 - 2x + 6x$$

$$= 4 + 5 - 2x + 6x + x$$

$$= 4 + 5 - 2x + 7x$$

$$= 4 + 5 = 9$$

$$= 9 + 5x$$

$$(iv) 4 + x + 5 - 2x + 6x$$

$$= 4 + 5 + x + 6x - 2x$$

$$= 4 + 5 + (1 + 6 - 2)x$$

$$= 4 + 5 + 5x$$

$$= 9 + 5x$$

$$\begin{array}{r} \text{(X)} \quad 4x^3 + 2x^2 - 1x + 1 \\ \quad 2x^3 - 5x^2 - 3x + 6 \\ \quad 5x^3 + 1x^2 - 7x + 8 \\ \quad 11x^3 - 2x^2 - 11x + 15 \end{array}$$

$$6 \cdot (i) \quad x + 3y$$

$$(ii) \quad -2a + 5$$

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

$$= 3a$$

$$(iii) \quad -7x^2 + 7x$$

$$(iv) \quad 4a + -7b = 4a - 7b$$

$$(v) \quad x^3 + 3x^2y + 2y^2$$

$$(vi) \quad ~~2~~ 11 + (-6y) = 11 - 6y$$

$$7. \text{ sides of a triangle} = (2x + 3y), (x + 5y), (7x - 2y)$$

$$\text{so, perimeter} = (2x + 1x) + (3y + 5y - 2y)$$

$$= 3x + 6y$$

$$= 10x + 6y$$

$$8. \text{ one side of a triangle} = 6a + 9b$$

$$\text{second side of a triangle} = 8a - 4b$$

$$\text{perimeter} = (6a + 9b) + (8a - 4b)$$

=

$$8. \begin{array}{l} \text{1st side of a triangle} = 6a + 9b \\ \text{2nd side of a triangle} = 6a + 9b \\ \text{3rd side of the triangle} = 8a - 4b \end{array}$$

$$\text{perimeter} =$$

$$6a + 9b$$

$$6a + 9b$$

$$8a - 4b$$

$$20a + 14b$$

$$9. (i) (a + b) - (2a + b)$$

$$= -a$$

$$8. \begin{array}{l} \text{1st side of a rectangle} = 6a + 9b \\ \text{2nd side of the rectangle} = 8a - 4b \\ \text{3rd side of the triangle} = 6a + 9b \\ \text{4th side of the triangle} = 8a - 4b \end{array}$$

$$\text{perimeter} = 2 \times (l + b)$$

$$= 2 \times [(6a + 9b) + (8a - 4b)]$$

$$= 2 \times [(6a + 8a) + (9b - 4b)]$$

$$= 2 \times (14a + 5b)$$

$$= 28a + 10b$$

$$9. (ii) (a + b) - (2a + b) = -a$$

$$a + b$$

$$2a + b$$

$$(-) \quad (-)$$

$$-a + 0$$

(i) ~~$b + 3c - (-2b) + 2c$~~

$$\begin{array}{r} b + 3c \\ -2b + 2c \\ \hline (+) \quad (-) \\ -a + 4c \end{array}$$

~~(ii)~~

9.11

$$\begin{array}{r} 2a + b \\ a + b \\ \hline (-) \quad (-) \\ a + 0 \end{array}$$

(ii) $-2b + 2c$
 $b + 3c$
 $\hline (-) \quad (-)$
 $-3b - 4c$

(iii) $5a + b$ $5a + b$
 $-6b + 2a$ $2a - 6b$
 $\hline (+) \quad \quad \quad (-) \quad (+)$
 $3a + 7b$

(iv) $a^3 - 1 + a$
 $\quad \quad + 3a - 2a^2$
 $\hline (-) \quad (+)$
 $a^3 - 1 - 2a + 2a^2$

(i) $p + 2$
 $+ 1$
 $\hline (-)$
 $p + 1$

(v) $x + 2y + z$
 $-x - y - 3z$
 $\hline (+) \quad (+) \quad (+)$
 $2x + 3y + 4z$

(vi) $3a^2 - 8ab - 2b^2$
 $3a^2 - 4ab + 6b^2$
 $\hline (-) \quad (+) \quad (-)$
 $0 - 4ab - 8b^2$

(vii) $4pq - 6p^2 - 2q^2$
 $+ 9p^2$
 $\hline (-)$
 $4pq - 15p^2 - 2q^2$

(ix) $10abc$
 $2abc + 2a^2 - 4b^2$
 $\hline (-) \quad \quad \quad (-) \quad (+)$
 $8abc - 2a^2 + 4b^2$

(x) $a^2 + ab + c^2$
 $a^2 \quad \quad \quad -d^2$
 $\hline (-) \quad \quad \quad (+)$
 $0 + ab + c^2 + d^2$

$$\begin{array}{r}
 10(i) \quad 8 - x \\
 \quad \quad 4x \\
 \quad \quad (-) \\
 \hline
 \quad \quad 8 - 5x
 \end{array}$$

$$\begin{array}{r}
 (ii) \quad c + 3d \\
 \quad \quad -3c \\
 \quad \quad (+) \\
 \hline
 \quad \quad 1c + 3d
 \end{array}$$

$$\begin{array}{r}
 (iii) \quad ~~2b~~ \quad 2b + 6c \\
 \quad \quad -2b \quad \quad -5a \\
 \quad \quad (+) \quad \quad (+) \\
 \hline
 \quad \quad 3b + 6c + 5a
 \end{array}$$

$$\begin{array}{r}
 (iv) \quad 4p + p^2 \\
 \quad \quad -8p + 3p^2 \\
 \quad \quad (+) \quad (-) \\
 \hline
 \quad \quad 2p - 2p^2
 \end{array}$$

$$\begin{array}{r}
 (v) \quad ~~5a - 3b + 2~~ \quad 4a - b - 2c \\
 \quad \quad \quad \quad \quad 5a - 3b + 2c \\
 \quad \quad \quad \quad \quad (-) \quad (+) \quad (-) \\
 \hline
 \quad \quad \quad \quad \quad -a + 2b - 4c
 \end{array}$$

$$\begin{array}{r}
 (vi) \quad ~~xy + yz + zx~~ \quad xy - yz + zx \\
 \quad \quad \quad \quad \quad -xy + yz - zx \\
 \quad \quad \quad \quad \quad (+) \quad (-) \quad (+) \\
 \hline
 \quad \quad \quad \quad \quad 2xy - 2yz + 2zx \\
 \\
 \quad \quad \quad \quad \quad = 2x(xy - yz + zx)
 \end{array}$$

(VII)
$$\begin{array}{r} 2x^2 - 7xy - y^2 \\ 3x^2 - 5xy + 3y^2 \\ \hline 2x^2 - 7xy - y^2 \\ \hline (-) \quad (+) \quad (+) \\ 1x^2 + 2xy + 4y^2 \end{array}$$

(VIII)
$$\begin{array}{r} 2b^2 - a^2 + 2ab \\ -6b^2 + a^2 - 3ab \\ \hline (+) \quad (-) \quad (+) \\ \hline 8b^2 - 2a^2 + 5ab \end{array}$$

(IX)
$$\begin{array}{r} -3y^2 + 5xy^2 - 7x^2 - 9x^2y \\ + y^2 \quad \quad \quad + 4x^2 - 5x^2y \\ \hline (-) \quad \quad \quad (-) \quad (+) \\ \hline -4y^2 + 5x^2y^2 - 11x^2 - 4x^2y \end{array}$$

(X)
$$\begin{array}{r} 4x^2 - 5 \quad 3m^3 + 4 \\ 6m^3 - 3 + 4m^2 + 7m \\ \hline (-) \quad (+) \quad (-) \quad (-) \\ \hline -3m^3 + 7 - 4m^2 - 7m \end{array}$$