Operations On Algebraic Expressions
Ex 6A

Q1

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise, we get:

$$\begin{array}{r} 8ab \\ -5ab \\ 3ab \\ -ab \\ \hline 5ab \end{array}$$

Q2

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise, we get:

$$\begin{array}{r} 7x \\ -3x \\ 5x \\ -x \\ -2x \\ \hline 6x \end{array}$$

Q3

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise, we get:

$$\begin{array}{r} 3a - 4b + 4c \\ 2a + 3b - 8c \\ a - 6b + c \\ \hline 6a - 7b - 3c \end{array}$$

Q4

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise, we get:

$$\begin{array}{r} 5x-8y+2z \\ -2x-4y+3z \\ -x+6y-z \\ 3x-3y-2z \\ \hline 5x-9y+2z \end{array}$$

Q5

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise, we get:

$$\begin{array}{r} 6ax-2by+3cz \\ -11ax+6by-cz \\ -2ax-3by+10cz \\ \hline -7ax+by+12cz \end{array}$$

Q6

Answer :

On arranging the terms of the given expressions in the descending powers of x and adding column-wise:

$$\begin{array}{r} 2x^3-9x^2+0x+8 \\ 0x^3+3x^2-6x-5 \\ 7x^3+0x^2-10x+1 \\ -4x^3-5x^2+2x+3 \\ \hline 5x^3-11x^2-14x+7 \end{array}$$

Q7

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and adding column-wise:

$$\begin{array}{r} 6p+4q-r+3 \\ -5p+0q+2r-6 \\ -7p+11q+2r-1 \\ 0p+2q-3r+4 \\ \hline -6p+17q+0r+0 \\ =-6p+17q \end{array}$$

Q8

Answer :

On arranging the terms of the given expressions in the descending powers of x and adding column-wise:

$$\begin{array}{r} 4x^2+4y^2-7xy-3 \\ x^2+6y^2-8xy+0 \\ 2x^2-5y^2-2xy+6 \\ \hline 7x^2+5y^2-17xy+3 \end{array}$$

Q9

Answer :

On arranging the terms of the given expressions in the descending powers of x and subtracting:

$$\begin{array}{r} -5a^2b \\ 3a^2b \\ - \\ \hline -8a^2b \end{array}$$

Q10

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} 6pq \\ -8pq \\ + \\ \hline 14pq \end{array}$$

Q11

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} -8abc \\ -2abc \\ + \\ \hline -6abc \end{array}$$

Q12

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} -11p \\ -16p \\ + \\ \hline 5p \end{array}$$

Q13

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} 3a-4b-c+6 \\ 2a-5b+2c-9 \\ - \quad + \quad - \quad + \\ \hline a+b-3c+15 \end{array}$$

Q14

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} p-2q-5r-8 \\ -6p+q+3r+8 \\ + \quad - \quad - \quad - \\ \hline 7p-3q-8r-16 \end{array}$$

Q15

Answer :

On arranging the terms of the given expressions in the descending powers of x and subtracting column-wise:

$$\begin{array}{r} 3x^3 - x^2 + 2x - 4 \\ x^3 + 3x^2 - 5x + 4 \\ - \quad - \quad + \quad - \\ \hline 2x^3 - 4x^2 + 7x - 8 \end{array}$$

Q16

Answer :

Arranging the terms of the given expressions in the descending powers of x and subtracting column-wise:

$$\begin{array}{r} 4y^4 - 2y^3 - 6y^2 - y + 5 \\ 5y^4 - 3y^3 + 2y^2 + y - 1 \\ - \quad + \quad - \quad - \quad + \\ \hline -y^4 + y^3 - 8y^2 - 2y + 6 \end{array}$$

Q17

Answer :

Writing the terms of the given expressions (in the same order) in the form of rows with like terms below each other and subtracting column-wise:

$$\begin{array}{r} 3p^2 - 4q^2 - 5r^2 - 6 \\ 4p^2 + 5q^2 - 6r^2 + 7 \\ - \quad - \quad + \quad - \\ \hline -p^2 - 9q^2 + r^2 - 13 \end{array}$$

Q18

Answer :

Let the required number be x.

$$\left(3a^2 - 6ab - 3b^2 - 1\right) - x = 4a^2 - 7ab - 4b^2 + 1$$

$$\left(3a^2 - 6ab - 3b^2 - 1\right) - \left(4a^2 - 7ab - 4b^2 + 1\right) = x$$

$$\begin{array}{r} 3a^2 - 6ab - 3b^2 - 1 \\ 4a^2 - 7ab - 4b^2 + 1 \\ - \quad + \quad + \quad - \\ \hline -a^2 + ab + b^2 - 2 \end{array}$$

∴ Required number = $-a^2 + ab + b^2 - 2$

Q19

Answer :

Sides of the rectangle are l and b.

$l = 5x^2 - 3y^2$

$b = x^2 + 2xy$

Perimeter of the rectangle is $(2l + 2b)$.

$$\text{Perimeter} = 2\left(5x^2 - 3y^2\right) + 2\left(x^2 + 2xy\right)$$

$$= 10x^2 - 6y^2 + 2x^2 + 4xy$$

$$\begin{array}{r} 10x^2 - 6y^2 \\ 2x^2 \quad + 4xy \\ \hline 12x^2 - 6y^2 + 4xy \end{array}$$

Hence, the perimeter of the rectangle is $12x^2 - 6y^2 + 4xy$.

Q20

Answer :

Let a, b *and* c be the three sides of the triangle.

∴ Perimeter of the triangle $=(a+b+c)$

Given perimeter of the triangle = $6p^2-4p+9$
One side (a) = p^2-2p+1
Other side (b) = $3p^2-5p+3$
Perimeter = $(a+b+c)$

$$(6p^2-4p+9)=(p^2-2p+1)+(3p^2-5p+3)+c$$
$$6p^2-4p+9-p^2+2p-1-3p^2+5p-3=c$$
$$(6p^2-p^2-3p^2)+(-4p+2p+5p)+(9-1-3)=c$$
$$2p^2+3p+5\ =\ c$$

Thus, the third side is $2p^2+3p+5$.