Algebraic Expressions and Operations on Them

PRACTICE SET 32 [PAGE 56]

Practice Set 32 | Q 1.1 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

7x

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

7x = Monomial

Practice Set 32 | Q 1.2 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

5y − 7z

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

5y − 7z = Binomial

Practice Set 32 | Q 1.3 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

$3x^3 - 5x^2 - 11$

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

$3x^3 - 5x^2 - 11$ = Trinomial

Practice Set 32 | Q 1.4 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

$1 - 8a - 7a^2 - 7a^3$

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

$1 - 8a - 7a^2 - 7a^3$ = Polynomial

Practice Set 32 | Q 1.5 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

$5m - 3$

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

$5m - 3$ = Binomial

Practice Set 32 | Q 1.6 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

a

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

a = Monomial

Practice Set 32 | Q 1.7 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

4

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

4 = Monomial

Practice Set 32 | Q 1.8 | Page 56

Classify the following algebraic expression as monomial, binomial, trinomial, or polynomial.

$3y^2 - 7y + 5$

Solution: It is known that expressions with one term is called a monomial, expressions with two terms are binomials, expressions with three terms are trinomials, and expression with more than three terms are polynomials.

$3y^2 - 7y + 5$ = Trinomial

PRACTICE SET 33 [PAGE 57]

Practice Set 33 | Q 1.1 | Page 57

Add:

9p + 16q; 13p + 2q

Solution: (9p + 16q) + (13p + 2q)

= 9p + 16q + 13p + 2q

= (9p + 13p) + (16q + 2q)

= 22p + 18q

Practice Set 33 | Q 1.2 | Page 57

Add:

2a + 6b + 8c; 16a + 13c + 18b

Solution: (2a + 6b + 8c) + (16a + 13c + 18b)

= 2a + 6b + 8c + 16a + 13c + 18b

= (2a + 16a) + (6b + 18b) + (8c + 13c)

= 18a + 24b + 21c

Practice Set 33 | Q 1.3 | Page 57

Add:

$13x^2 - 12y^2$; $6x^2 - 8y^2$

Solution: $(13x^2 - 12y^2) + (6x^2 - 8y^2)$

$= 13x^2 - 12y^2 + 6x^2 - 8y^2$

$= (13x^2 + 6x^2) + (-12y^2 - 8y^2)$

$= 19x^2 + (-20y^2)$

$= 19x^2 - 20y^2$

Practice Set 33 | Q 1.4 | Page 57

Add:

$17a^2b^2 + 16c;\ 28c - 28a^2b^2$

Solution: $(17a^2b^2 + 16c) + (28c - 28a^2b^2)$

$= 17a^2b^2 + 16c + 28c - 28a^2b^2$

$= (17a^2b^2 - 28a^2b^2) + (16c + 28c)$

$= -11a^2b^2 + 44c$

Practice Set 33 | Q 1.5 | Page 57

Add:

$3y^2 - 10y + 16;\ 2y - 7$

Solution: $(3y^2 - 10y + 16) + (2y - 7)$

$= 3y^2 - 10y + 16 + 2y - 7$

$= 3y^2 + (-10y + 2y) + (16 - 7)$

$= 3y^2 + (-8y) + 9$

$= 3y^2 - 8y + 9$

Practice Set 33 | Q 1.6 | Page 57

Add:

$-3y^2 + 10y - 16;\ 7y^2 + 8$

Solution: $(-3y^2 + 10y - 16) + (7y^2 + 8)$

$= -3y^2 + 10y - 16 + 7y^2 + 8$

$= (-3y^2 + 7y^2) + 10y + (-16 + 8)$

$= 4y^2 + 10y + (-8)$

$= 4y^2 + 10y - 8$

PRACTICE SET 34 [PAGE 58]

Practice Set 34 | Q 1.1 | Page 58

Subtract the second expression from the first.

(4xy − 9z); (3xy − 16z)

Solution: (4xy − 9z) − (3xy − 16z)

= 4xy − 9z − 3xy + 16z

= (4xy − 3xy) + (16z − 9z)

= xy + 7z

Practice Set 34 | Q 1.2 | Page 58

Subtract the second expression from the first.

(5x + 4y + 7z); (x + 2y + 3z)

Solution: (5x + 4y + 7z) − (x + 2y + 3z)

= 5x + 4y + 7z − x − 2y − 3z

= (5x − x) + (4y − 2y) + (7z − 3z)

= 4x + 2y + 4z

Practice Set 34 | Q 1.3 | Page 58

Subtract the second expression from the first.

$(14x^2 + 8xy + 3y^2)$; $(26x^2 - 8xy - 17y^2)$

Solution: $(14x^2 + 8xy + 3y^2) - (26x^2 - 8xy - 17y^2)$

$= 14x^2 + 8xy + 3y^2 - 26x^2 + 8xy + 17y^2$

$= (14x^2 - 26x^2) + (8xy + 8xy) + (3y^2 + 17y^2)$

$= -12x^2 + 16xy + 20y^2$

Practice Set 34 | Q 1.4 | Page 58

Subtract the second expression from the first.

$(6x^2 + 7xy + 16y^2)$; $(16x^2 - 17xy)$

Solution: $(6x^2 + 7xy + 16y^2) - (16x^2 - 17xy)$

$= 6x^2 + 7xy + 16y^2 - 16x^2 + 17xy$

$= (6x^2 - 16x^2) + (7xy + 17xy) + 16y^2$

$= -10x^2 + 24xy + 16y^2$

Practice Set 34 | Q 1.5 | Page 58

Subtract the second expression from the first.

(4x + 16z); (19y − 14z + 16x)

Solution: (4x + 16z) − (19y − 14z + 16x)

= 4x + 16z − 19y + 14z − 16x

= (4x − 16x) + (16z + 14z) − 19y

= −12x + 30z − 19y

PRACTICE SET 35 [PAGE 59]

Practice Set 35 | Q 1.1 | Page 59

Multiply:

16xy × 18xy

Solution: 16xy × 18xy

= 16 × 18 × x × y × x × y

= $288x^2y^2$

Practice Set 35 | Q 1.2 | Page 59

Multiply:

$23xy^2 \times 4yz^2$

Solution: $23xy^2 \times 4yz^2$

= $23 \times 4 \times x \times y^2 \times y \times z^2$

= $92xy^3z^2$

Practice Set 35 | Q 1.3 | Page 59

Multiply:

(12a + 17b) × 4c

Solution: (12a + 17b) × 4c

= 12a × 4c + 17b × 4c

= 12 × 4 × a × c + 17 × 4 × b × c

= 48ac + 68bc

Practice Set 35 | Q 1.4 | Page 59

Multiply:

(4x + 5y) × (9x + 7y)

Solution: (4x + 5y) × (9x + 7y)

= 4x(9x + 7y) + 5y(9x + 7y)

= 4x × 9x + 4x × 7y + 5y × 9x + 5y × 7y

= $36x^2$ + 28xy + 45xy +$35y^2$

= $36x^2$ + 73xy +$35y^2$

Practice Set 35 | Q 2 | Page 59

A rectangle is (8x + 5) cm long and (5x + 3) cm broad. Find its area.

Solution: Length of the rectangle = (8x + 5) cm

Breadth of the rectangle = (5x + 3) cm

Area of rectangle = length × breadth

= (8x + 5)(5x + 3)

= 8x(5x + 3) + 5(5x + 3)

= 8x × 5x + 8x × 3 + 5 × 5x + 5 × 3

= $40x^2$ + 24x + 25x + 15

= $40x^2$ + 49x + 15

So, area of rectangle is ($40x^2$ + 49x + 15) cm^2.

PRACTICE SET 36 [PAGE 60]

Practice Set 36 | Q 1 | Page 60

Simplify (3x − 11y) − (17x + 13y) and choose the right answer.

1. 7x − 12y
2. − 4x − 54y
3. −3 (5x + 4y)
4. **−2 (7x + 12y)**

Solution: − 11y) − (17x + 13y)
= 3x − 11y − 17x − 13y
= (3x − 17x) + (− 11y − 13y)
= −14x + (−24y)
= −14x − 24y
= **−2 (7x + 12y)**

So, the correct option is 2 (7x + 12y).

Practice Set 36 | Q 2 | Page 60

The product of $(23x^2y^3z)$ and $(-15x^3yz^2)$ is _____.

1. **$-345x^5y^4z^3$**
2. $345x^2y^3z^5$
3. $145x^3y^2z$
4. $170x^3y^2z^3$

Solution: $(23x^2y^3z) \times (-15x^3yz^2)$

$= 23 \times (-15) \times x^2 \times y^3 \times z \times x^3 \times y \times z^2$

$=$ **$-345x^5y^4z^3$**

So, the correct option is $-345x^5y^4z^3$.

Practice Set 36 | Q 3.1 | Page 60

Solve the following equation.

$$4x + \frac{1}{2} = \frac{9}{2}$$

Solution:

$$4x + \frac{1}{2} = \frac{9}{2}$$

$$\Rightarrow 4x = \frac{9}{2} - \frac{1}{2}$$

$$\Rightarrow 4x = \frac{9-1}{2}$$

$$\Rightarrow 4x = \frac{8}{2}$$

$$\Rightarrow 4x = 4$$

$$\Rightarrow x = \frac{4}{4}$$

$$\Rightarrow x = 1$$

Practice Set 36 | Q 3.2 | Page 60

Solve the following equation.

10 = 2y + 5

Solution: 10 = 2y + 5

⇒ 2y + 5 = 10

⇒ 2y = 10 − 5

⇒ 2y = 5

⇒ y = 5/2

Practice Set 36 | Q 3.3 | Page 60

Solve the following equation.

5m − 4 = 1

Solution: 5m − 4 = 1

⇒ 5m = 1 + 4

⇒ 5m = 5

⇒ m = 5/5

⇒ m = 1

Practice Set 36 | Q 3.4 | Page 60

Solve the following equation.

6x − 1 = 3x + 8

Solution: 6x − 1 = 3x + 8

⇒ 6x − 3x = 8 + 1

⇒ 3x = 9

⇒ x = 9/3

⇒ x = 3

Practice Set 36 | Q 3.5 | Page 60

Solve the following equation.

2(x − 4) = 4x + 2

Solution: 2(x − 4) = 4x + 2

⇒ 2 × x − 2 × 4 = 4x + 2

⇒ 2x − 8 = 4x + 2

⇒ 4x + 2 = 2x − 8

⇒ 4x − 2x = − 8 − 2

⇒ 2x = −10

⇒ x = − 10/2

⇒ x = −5

Practice Set 36 | Q 3.6 | Page 60

Solve the following equation.

5(x + 1) = 74

Solution: 5(x + 1) = 74

⇒ 5 × x + 5 × 1 = 74

⇒ 5x + 5 = 74

⇒ 5x = 74 − 5

⇒ 5x = 69

⇒ x = 69/5

Practice Set 36 | Q 4 | Page 60

Rakesh's age is less than Sania's age by 5 years. The sum of their ages is 27 years. How old are they?

Solution: Let the age of Sania = x years

Then, the age of Rakesh = (x − 5) years

According to the question, the sum of ages of Sania and Rakesh is 27 years.

∴ x + (x − 5) = 27

⇒ x + x − 5 = 27

⇒ 2x − 5 = 27

⇒ 2x = 27 + 5

⇒ 2x = 32

⇒ x = 32/2

⇒ x = 16

So, age of Sania = x years = 16 years

age of Rakesh = (x − 5) years = (16 − 5) years = 11 years

Practice Set 36 | Q 5 | Page 60

When planting a forest, the number of jambhul trees planted was greater than the number of Ashoka trees by 60. If there are altogether 200 trees of these two types, how many jambhul trees were planted?

Solution: Let the number of Ashoka trees planted in the forest = x

Then, the number of jambhul trees planted in the forest = x + 60

According to the question, the total number of Ashoka and jambhul trees planted in the forest is 200.

⇒ x + (x + 60) = 200

⇒ x + x + 60 = 200

⇒ 2x + 60 = 200

⇒ 2x = 200 − 60

⇒ 2x = 140

⇒ x = 140/2

⇒ x = 70

Number of ashoka trees planted in the forest = x = 70

Number of jambhul trees planted in the forest = x + 60 = 70 + 60 = 130

Practice Set 36 | Q 6 | Page 60

Shubhangi has twice as many 20-rupee notes as she has 50-rupee notes. Altogether, she has 2700 rupees. How many 50-rupee notes does she have?

Solution: Let the number of 50-rupee notes = x

Then, the number of 20-rupee notes = 2 × number of 50-rupee notes = 2x

Amount of 50-rupee notes = Rs(50 × x) = Rs 50x

Amount of 20-rupee notes = Rs(20 × 2x) = Rs 40x

It is given that the total amount is Rs 2700.

∴ 50x + 40x = 2700

⇒ 90x = 2700

⇒ x = 2700/90

⇒ x = 30

Number of 50-rupee notes = x = 30

Number of 20-rupee notes = 2x = 2 × 30 = 60

Practice Set 36 | Q 7 | Page 60

Virat made twice as many runs as Rohit. The total of their scores is 2 less than a double century. How many runs did each of them make?

Solution: Let the runs scored by Rohit = x

Then, the runs scored by Virat = 2 × runs scored by Rohit = 2x

According to the question, the total of their scores is 2 less than a double century.

$\therefore x + 2x = 200 - 2$

$\Rightarrow 3x = 198$

$\Rightarrow x = 198/3$

$\Rightarrow x = 66$

So, runs scored by Rohit = x = 66

Runs scored by Virat = 2x = 2 × 66 = 132