

Algebra (Introduction)

Question Paper, Set 01

Time: 1 hour 30 minutes

Maximum marks: 50

Name: _____ Class: _____ Date: _____

1. Answer all 20 questions. The marks for each question are shown in brackets.
2. Show your working for the 2, 3 and 5 mark questions.
3. The key sheet and worked solutions are at the end of this paper.

1. Which of the following is a constant: $-8, t, r, q$? [1 mark]
2. From $m, 10, c, q, -\frac{1}{4}, -11$, write (i) the variables (ii) the constants. [2 marks]
3. Represent in symbolic form: the sum of z and 25. [1 mark]
4. Represent the following statements in symbolic form: (i) c decreased by 23 (ii) 4 times z added to 2 times x [2 marks]
5. Represent the following statements in symbolic form: (i) c decreased by 7 (ii) 77 divided by r (iii) 17 times c (iv) Divide z by 10 (v) 17 more than p [5 marks]
6. Represent the following statements in symbolic form: (i) 8 more than half of t (ii) 15 less than one third of p [2 marks]
7. Write the value of $\frac{t}{1}$. [1 mark]
8. Simplify: (i) $1 \times y$ (ii) $-1 \times t$ (iii) $\frac{mp}{-1}$ [3 marks]
9. Write the terms in $4ac + 14t + 15 + 13x$. [1 mark]
10. Write the factors of (i) $4pr$ (ii) $-4qrt$. [2 marks]
11. In $-9pqt$, write the coefficient of (i) pqt (ii) t (iii) pq . [3 marks]
12. Write the coefficient of qr in $\frac{qr}{3}$. [1 mark]
13. State whether the following are like (or) unlike terms. Give reason. (i) $-6mn, -6my$ (ii) $13m, 3m$ [2 marks]
14. State whether the following are like (or) unlike terms. Give reason. (i) $\frac{7}{3}, \frac{7}{3}mpq$ (ii) $-\frac{2}{3}, -\frac{2}{3}c$ (iii) $-4r, 10r$ (iv) $6mpq, -9mpq$ (v) $-2yz, -4yz$ [5 marks]
15. Simplify $27z + 5z$. [1 mark]
16. Simplify $23np + 6np + 15np$. [2 marks]
17. Simplify $13t + 10m + 2m + 4t$. [3 marks]

18. Simplify: (i) $-20n + 17n$ (ii) $22n - 29n$ (iii) $-5n + 10n$ [3 marks]

19. Simplify: (i) $29mn + 28mn$ (ii) $-29mn - 28mn$ (iii) $-29mn + 28mn$ (iv) $29mn - 28mn$ (v) $-13mn + 13mn$ [5 marks]

20. Simplify: (i) $16ab - 6q - 3ab + 5q$ (ii) $7t - 15ab - 13 + 4t + 7ab - 10$ [5 marks]

Key sheet

Q	Answer
1	-8
2	(i) m, c, q (ii) $10, -\frac{1}{4}, -11$
3	$z + 25$
4	(i) $c - 23$, (ii) $2x + 4z$
5	(i) $c - 7$, (ii) $\frac{77}{r}$, (iii) $17c$, (iv) $\frac{z}{10}$, (v) $p + 17$
6	(i) $\frac{t}{2} + 8$, (ii) $\frac{p}{3} - 15$
7	t
8	(i) y , (ii) $-t$, (iii) $-mp$
9	$4ac, 14t, 15, 13x$
10	(i) $4, p, r$, (ii) $-4, q, r, t$
11	(i) -9 , (ii) $-9pq$, (iii) $-9t$
12	$\frac{1}{3}$
13	(i) Unlike, (ii) Like
14	(i) Unlike, (ii) Unlike, (iii) Like, (iv) Like, (v) Like
15	$32z$
16	$44np$
17	$17t + 12m$
18	(i) $-3n$, (ii) $-7n$, (iii) $5n$
19	(i) $57mn$, (ii) $-57mn$, (iii) $-mn$, (iv) mn , (v) 0
20	(i) $13ab - q$, (ii) $11t - 8ab - 23$

Solutions

1. Which of the following is a constant: $-8, t, r, q$? [1]

A constant has a fixed value. A variable can take various numerical values.

r, t and q can take various values, so they are variables.

-8 has a fixed value, so it is the constant.

Ans: -8

2. From $m, 10, c, q, -\frac{1}{4}, -11$, write (i) the variables (ii) the constants. [2]

Variables can take various numerical values: m, c and q .

Constants have a fixed value: $10, -\frac{1}{4}$ and -11 .

Ans: (i) m, c, q (ii) $10, -\frac{1}{4}, -11$

3. Represent in symbolic form: the sum of z and 25 . [1]

Sum means add.

$$z + 25$$

Ans: $z + 25$

4. Represent the following statements in symbolic form: (i) c decreased by 23 (ii) 4 times z added to 2 times x [2]

(i) Take 23 away from c . $c - 23$

(ii) 4 times z is $4z$; 2 times x is $2x$. Add $4z$ to $2x$: $2x + 4z$

Ans: (i) $c - 23$, (ii) $2x + 4z$

5. Represent the following statements in symbolic form: (i) c decreased by 7 (ii) 77 divided by r (iii) 17 times c (iv) Divide z by 10 (v) 17 more than p [5]

(i) Take 7 away from c . $c - 7$

(ii) 77 divided by r is $\frac{77}{r}$

(iii) Multiply: $17 \times c = 17c$

(iv) z divided by 10 is $\frac{z}{10}$

(v) 17 more than p : add 17 to p . $p + 17$

Ans: (i) $c - 7$, (ii) $\frac{77}{r}$, (iii) $17c$, (iv) $\frac{z}{10}$, (v) $p + 17$

6. Represent the following statements in symbolic form: (i) 8 more than half of t (ii) 15 less than one third of p [2]

(i) Half of t is $\frac{t}{2}$. 8 more than it: add 8 . $\frac{t}{2} + 8$

(ii) One third of p is $\frac{p}{3}$. 15 less than it: take away 15 . $\frac{p}{3} - 15$

Ans: (i) $\frac{t}{2} + 8$, (ii) $\frac{p}{3} - 15$

7. Write the value of $\frac{t}{1}$. [1]

Rule: $\frac{a}{1} = a$

$$\frac{t}{1} = t$$

Ans: t

8. Simplify: (i) $1 \times y$ (ii) $-1 \times t$ (iii) $\frac{mp}{-1}$ [3]

(i) Rule $1 \times a = a$, so $1 \times y = y$

(ii) Rule $-1 \times a = -a$, so $-1 \times t = -t$

(iii) Rule $\frac{a}{-1} = -a$, so $\frac{mp}{-1} = -mp$

Ans: (i) y , (ii) $-t$, (iii) $-mp$

9. Write the terms in $4ac + 14t + 15 + 13x$. [1]

The terms are separated by $+$ and $-$ signs; each term keeps the sign in front of it.

The terms are $4ac$, $14t$, 15 and $13x$.

Ans: $4ac$, $14t$, 15 , $13x$

10. Write the factors of (i) $4pr$ (ii) $-4qrt$. [2]

(i) $4pr = 4 \times p \times r$, so the factors are $4, p, r$.

(ii) $-4qrt = -4 \times q \times r \times t$, so the factors are $-4, q, r, t$.

Ans: (i) $4, p, r$, (ii) $-4, q, r, t$

11. In $-9pqt$, write the coefficient of (i) pqt (ii) t (iii) pq . [3]

(i) $-9pqt = -9 \times pqt$, so the coefficient of pqt is -9 .

(ii) $-9pqt = -9pq \times t$, so the coefficient of t is $-9pq$.

(iii) $-9pqt = -9t \times pq$, so the coefficient of pq is $-9t$.

Ans: (i) -9 , (ii) $-9pq$, (iii) $-9t$

12. Write the coefficient of qr in $\frac{qr}{3}$. [1]

$$\frac{qr}{3} = \frac{1}{3} \times qr$$

So the coefficient of qr is $\frac{1}{3}$.

Ans: $\frac{1}{3}$

13. State whether the following are like (or) unlike terms. Give reason. (i) $-6mn, -6my$ (ii) $13m, 3m$ [2]

(i) $-6mn$ has literal factors mn , $-6my$ has literal factors my : different, so unlike terms.

(ii) $13m, 3m$: the same literal factors m , so like terms.

Ans: (i) Unlike, (ii) Like

14. State whether the following are like (or) unlike terms. Give reason. (i) $\frac{7}{3}, \frac{7}{3}mpq$ (ii) $-\frac{2}{3}, -\frac{2}{3}c$ (iii) $-4r, 10r$ (iv) $6mpq, -9mpq$ (v) $-2yz, -4yz$ [5]

(i) $\frac{7}{3}$ has no literal factor, $\frac{7}{3}mpq$ has literal factors mpq : different, so unlike terms.

(ii) $-\frac{2}{3}$ has no literal factor, $-\frac{2}{3}c$ has literal factors c : different, so unlike terms.

(iii) $-4r, 10r$: the same literal factors r , so like terms.

(iv) $6mpq, -9mpq$: the same literal factors mpq , so like terms.

(v) $-2yz, -4yz$: the same literal factors yz , so like terms.

Ans: (i) Unlike, (ii) Unlike, (iii) Like, (iv) Like, (v) Like

15. Simplify $27z + 5z$. [1]

$$\begin{aligned} 27z + 5z &= (27 + 5)z \\ &= 32z \end{aligned}$$

Ans: $32z$

16. Simplify $23np + 6np + 15np$. [2]

$$\begin{aligned} 23np + 6np + 15np &= (23 + 6 + 15)np \\ &= 44np \end{aligned}$$

Ans: $44np$

17. Simplify $13t + 10m + 2m + 4t$. [3]

Bring the like terms together and add.

$$\begin{aligned} 13t + 10m + 2m + 4t &= (13t + 4t) + (10m + 2m) \\ &= (13 + 4)t + (10 + 2)m \\ &= 17t + 12m \end{aligned}$$

Ans: $17t + 12m$

18. Simplify: (i) $-20n + 17n$ (ii) $22n - 29n$ (iii) $-5n + 10n$ [3]

$$(i) -20n + 17n = (-20 + 17)n = -3n$$

$$(ii) 22n - 29n = (22 - 29)n = -7n$$

$$(iii) -5n + 10n = (-5 + 10)n = 5n$$

Ans: (i) $-3n$, (ii) $-7n$, (iii) $5n$

19. Simplify: (i) $29mn + 28mn$ (ii) $-29mn - 28mn$ (iii) $-29mn + 28mn$ (iv) $29mn - 28mn$ (v) $-13mn + 13mn$ [5]

$$(i) 29mn + 28mn = (29 + 28)mn = 57mn$$

$$(ii) -29mn - 28mn = (-29 - 28)mn = -57mn$$

$$(iii) -29mn + 28mn = (-29 + 28)mn = -mn$$

$$(iv) 29mn - 28mn = (29 - 28)mn = mn$$

$$(v) -13mn + 13mn = (-13 + 13)mn = 0 \times mn = 0$$

Ans: (i) $57mn$, (ii) $-57mn$, (iii) $-mn$, (iv) mn , (v) 0

20. Simplify: (i) $16ab - 6q - 3ab + 5q$ (ii) $7t - 15ab - 13 + 4t + 7ab - 10$ [5]

$$(i) 16ab - 6q - 3ab + 5q = (16ab - 3ab) + (-6q + 5q)$$

$$= (16 - 3)ab + (-6 + 5)q$$

$$= 13ab - q$$

$$(ii) 7t - 15ab - 13 + 4t + 7ab - 10 = (7t + 4t) + (-15ab + 7ab) + (-13 - 10)$$

$$= (7 + 4)t + (-15 + 7)ab + (-13 - 10)$$

$$= 11t - 8ab - 23$$

Ans: (i) $13ab - q$, (ii) $11t - 8ab - 23$
