

Algebra (Introduction)**Question Paper, Set 05**

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: $\frac{2}{9}$, t , q , x ? [1 mark]
2. From y , -5 , $\frac{3}{4}$, z , 22 , a , write (i) the variables (ii) the constants. [2 marks]
3. Write $10 \times m$ in short form. [1 mark]
4. Represent the following statements in symbolic form: (i) The subtraction of $12c$ from 15 (ii) 79 divided by c [2 marks]
5. Represent the following statements in symbolic form: (i) The subtraction of $15y$ from 27 (ii) 2 more than a (iii) Divide x by 11 (iv) 57 divided by c (v) 6 times x added to 3 times a [5 marks]
6. Represent the following statements in symbolic form: (i) 11 more than half of y (ii) 2 less than one third of p [2 marks]
7. Write the value of $-1 \times qr$. [1 mark]
8. Simplify: (i) $0 \times mnp$ (ii) $-1 \times np$ (iii) $1 \times mpq$ [3 marks]
9. Write the terms in $9 + 11ac + 7yz$. [1 mark]
10. Write 20 as a product of two factors in all possible ways. [2 marks]
11. In $17mpq$, write the coefficient of (i) mpq (ii) q (iii) mp . [3 marks]
12. Write the coefficient of z in $\frac{z}{4}$. [1 mark]
13. State whether the following are like (or) unlike terms. Give reason. (i) $-14bc$, $11bc$ (ii) $-\frac{9}{5}xz$, $-\frac{7}{3}x$ [2 marks]
14. State whether the following are like (or) unlike terms. Give reason. (i) $5pq$, $-11pqt$ (ii) $9mnq$, $-\frac{8}{5}mnq$ (iii) $-11qr$, $11qrt$ (iv) $\frac{7}{4}pqr$, $6pqr$ (v) $-7xz$, $11xz$ [5 marks]
15. Add: $6xy + 17xy$. [1 mark]
16. Add: $9pr + 12pr + 17pr$. [2 marks]
17. Add the like terms: $16mp + 7 + 13 + 8mp$. [3 marks]

18. Simplify: (i) $-10z - 29z$ (ii) $-13z + 15z$ (iii) $18z - 19z$ [3 marks]

19. Simplify: (i) $26ab + 4ab$ (ii) $-26ab - 4ab$ (iii) $-26ab + 4ab$ (iv) $26ab - 4ab$ (v) $-26ab + 26ab$ [5 marks]

20. Simplify: (i) $3mp - 20y - 18y + 10mp$ (ii) $13xy - 18qr + 20 + 9xy + 16qr - 8$ [5 marks]

Key sheet

Q	Answer
1	$\frac{2}{9}$
2	(i) y, z, a (ii) $-5, \frac{3}{4}, 22$
3	$10m$
4	(i) $15 - 12c$, (ii) $\frac{79}{c}$
5	(i) $27 - 15y$, (ii) $a + 2$, (iii) $\frac{x}{11}$, (iv) $\frac{57}{c}$, (v) $3a + 6x$
6	(i) $\frac{y}{2} + 11$, (ii) $\frac{p}{3} - 2$
7	$-qr$
8	(i) 0, (ii) $-np$, (iii) mpq
9	9, $11ac$, $7yz$
10	$20 = 1 \times 20 = 2 \times 10 = 4 \times 5$
11	(i) 17, (ii) $17mp$, (iii) $17q$
12	$\frac{1}{4}$
13	(i) Like, (ii) Unlike
14	(i) Unlike, (ii) Like, (iii) Unlike, (iv) Like, (v) Like
15	$23xy$
16	$38pr$
17	$24mp + 20$
18	(i) $-39z$, (ii) $2z$, (iii) $-z$
19	(i) $30ab$, (ii) $-30ab$, (iii) $-22ab$, (iv) $22ab$, (v) 0
20	(i) $13mp - 38y$, (ii) $22xy - 2qr + 12$

Solutions

1. Which of the following is a constant: $\frac{2}{9}$, t , q , x ? [1]

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

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

$\frac{2}{9}$ has a fixed value, so it is the constant.

Ans: $\frac{2}{9}$

2. From y , -5 , $\frac{3}{4}$, z , 22 , a , write (i) the variables (ii) the constants. [2]

Variables can take various numerical values: y , z and a .

Constants have a fixed value: -5 , $\frac{3}{4}$ and 22 .

Ans: (i) y , z , a (ii) -5 , $\frac{3}{4}$, 22

3. Write $10 \times m$ in short form. [1]

$$10 \times m = 10m$$

Ans: $10m$

4. Represent the following statements in symbolic form: (i) The subtraction of $12c$ from 15 (ii) 79 divided by c [2]

(i) Take $12c$ away from 15 . $15 - 12c$

(ii) 79 divided by c is $\frac{79}{c}$

Ans: (i) $15 - 12c$, (ii) $\frac{79}{c}$

5. Represent the following statements in symbolic form: (i) The subtraction of $15y$ from 27 (ii) 2 more than a (iii) Divide x by 11 (iv) 57 divided by c (v) 6 times x added to 3 times a [5]

(i) Take $15y$ away from 27 . $27 - 15y$

(ii) 2 more than a : add 2 to a . $a + 2$

(iii) x divided by 11 is $\frac{x}{11}$

(iv) 57 divided by c is $\frac{57}{c}$

(v) 6 times x is $6x$; 3 times a is $3a$. Add $6x$ to $3a$: $3a + 6x$

Ans: (i) $27 - 15y$, (ii) $a + 2$, (iii) $\frac{x}{11}$, (iv) $\frac{57}{c}$, (v) $3a + 6x$

6. Represent the following statements in symbolic form: (i) 11 more than half of y (ii) 2 less than one third of p [2]

(i) Half of y is $\frac{y}{2}$. 11 more than it: add 11 . $\frac{y}{2} + 11$

(ii) One third of p is $\frac{p}{3}$. 2 less than it: take away 2 . $\frac{p}{3} - 2$

Ans: (i) $\frac{y}{2} + 11$, (ii) $\frac{p}{3} - 2$

7. Write the value of $-1 \times qr$. [1]

Rule: $-1 \times a = -a$

$$-1 \times qr = -qr$$

Ans: $-qr$

8. Simplify: (i) $0 \times mnp$ (ii) $-1 \times np$ (iii) $1 \times mpq$ [3]

(i) Rule $0 \times a = 0$, so $0 \times mnp = 0$

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

(iii) Rule $1 \times a = a$, so $1 \times mpq = mpq$

Ans: (i) 0, (ii) $-np$, (iii) mpq

9. Write the terms in $9 + 11ac + 7yz$. [1]

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

The terms are 9, $11ac$ and $7yz$.

Ans: 9, $11ac$, $7yz$

10. Write 20 as a product of two factors in all possible ways. [2]

$$20 = 1 \times 20$$

$$20 = 2 \times 10$$

$$20 = 4 \times 5$$

So the factors of 20 are 1, 2, 4, 5, 10 and 20.

Ans: $20 = 1 \times 20 = 2 \times 10 = 4 \times 5$

11. In $17mpq$, write the coefficient of (i) mpq (ii) q (iii) mp . [3]

(i) $17mpq = 17 \times mpq$, so the coefficient of mpq is 17.

(ii) $17mpq = 17mp \times q$, so the coefficient of q is $17mp$.

(iii) $17mpq = 17q \times mp$, so the coefficient of mp is $17q$.

Ans: (i) 17, (ii) $17mp$, (iii) $17q$

12. Write the coefficient of z in $\frac{z}{4}$. [1]

$$\frac{z}{4} = \frac{1}{4} \times z$$

So the coefficient of z is $\frac{1}{4}$.

Ans: $\frac{1}{4}$

13. State whether the following are like (or) unlike terms. Give reason. (i) $-14bc$, $11bc$ (ii) $-\frac{9}{5}xz$, $-\frac{7}{3}x$ [2]

(i) $-14bc$, $11bc$: the same literal factors bc , so like terms.

(ii) $-\frac{9}{5}xz$ has literal factors xz , $-\frac{7}{3}x$ has literal factors x : different, so unlike terms.

Ans: (i) Like, (ii) Unlike

14. State whether the following are like (or) unlike terms. Give reason. (i) $5pq$, $-11pqt$ (ii) $9mnq$, $-\frac{8}{5}mnq$ (iii) $-11qr$, $11qrt$ (iv) $\frac{7}{4}pqr$, $6pqr$ (v) $-7xz$, $11xz$ [5]

(i) $5pq$ has literal factors pq , $-11pqt$ has literal factors pqt : different, so unlike terms.

(ii) $9mnq$, $-\frac{8}{5}mnq$: the same literal factors mnq , so like terms.

(iii) $-11qr$ has literal factors qr , $11qrt$ has literal factors qrt : different, so unlike terms.

(iv) $\frac{7}{4}pqr$, $6pqr$: the same literal factors pqr , so like terms.

(v) $-7xz$, $11xz$: the same literal factors xz , so like terms.

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

15. Add: $6xy + 17xy$. [1]

$$\begin{aligned}6xy + 17xy &= (6 + 17)xy \\&= 23xy\end{aligned}$$

Ans: $23xy$

16. Add: $9pr + 12pr + 17pr$. [2]

$$\begin{aligned}9pr + 12pr + 17pr &= (9 + 12 + 17)pr \\&= 38pr\end{aligned}$$

Ans: $38pr$

17. Add the like terms: $16mp + 7 + 13 + 8mp$. [3]

Letter terms together, numbers together.

$$\begin{aligned}16mp + 7 + 13 + 8mp &= (16mp + 8mp) + (7 + 13) \\&= (16 + 8)mp + (7 + 13) \\&= 24mp + 20\end{aligned}$$

Ans: $24mp + 20$

18. Simplify: (i) $-10z - 29z$ (ii) $-13z + 15z$ (iii) $18z - 19z$ [3]

$$(i) -10z - 29z = (-10 - 29)z = -39z$$

$$(ii) -13z + 15z = (-13 + 15)z = 2z$$

$$(iii) 18z - 19z = (18 - 19)z = -z$$

Ans: (i) $-39z$, (ii) $2z$, (iii) $-z$

19. Simplify: (i) $26ab + 4ab$ (ii) $-26ab - 4ab$ (iii) $-26ab + 4ab$ (iv) $26ab - 4ab$ (v) $-26ab + 26ab$ [5]

$$(i) 26ab + 4ab = (26 + 4)ab = 30ab$$

$$(ii) -26ab - 4ab = (-26 - 4)ab = -30ab$$

$$(iii) -26ab + 4ab = (-26 + 4)ab = -22ab$$

$$(iv) 26ab - 4ab = (26 - 4)ab = 22ab$$

$$(v) -26ab + 26ab = (-26 + 26)ab = 0 \times ab = 0$$

Ans: (i) $30ab$, (ii) $-30ab$, (iii) $-22ab$, (iv) $22ab$, (v) 0

20. Simplify: (i) $3mp - 20y - 18y + 10mp$ (ii) $13xy - 18qr + 20 + 9xy + 16qr - 8$ [5]

$$(i) 3mp - 20y - 18y + 10mp = (3mp + 10mp) + (-20y - 18y)$$

$$= (3 + 10)mp + (-20 - 18)y$$

$$= 13mp - 38y$$

$$(ii) 13xy - 18qr + 20 + 9xy + 16qr - 8 = (13xy + 9xy) + (-18qr + 16qr) + (20 - 8)$$

$$= (13 + 9)xy + (-18 + 16)qr + (20 - 8)$$

$$= 22xy - 2qr + 12$$

Ans: (i) $13mp - 38y$, (ii) $22xy - 2qr + 12$
