

Algebra (Introduction)**Question Paper, Set 04**

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 variable: a , -12 , $\frac{1}{3}$, $-\frac{4}{5}$? [1 mark]
2. From $\frac{5}{6}$, c , $\frac{3}{4}$, n , -7 , b , write (i) the variables (ii) the constants. [2 marks]
3. Represent in symbolic form and find the value: the subtraction of 6 from 24. [1 mark]
4. Represent the following statements in symbolic form: (i) Divide n by 18 (ii) 32 more than x [2 marks]
5. Represent the following statements in symbolic form: (i) The subtraction of $14c$ from 20 (ii) 6 times a (iii) 48 divided by x (iv) Divide n by 17 (v) 10 more than y [5 marks]
6. Represent the following statements in symbolic form: (i) Half of y (ii) 8 less than half of a [2 marks]
7. Fill in the box: $\square \times m = 0$ [1 mark]
8. Simplify: (i) $\frac{m}{-1}$ (ii) $0 \times np$ (iii) $-1 \times pqr$ [3 marks]
9. Which of the following are terms: $\frac{3}{n}$, $5mpq$, $m + n$, $3 - q$, $\frac{15}{a}$? [1 mark]
10. Write the factors of (i) $-5bc$ (ii) $8abc$. [2 marks]
11. Write the coefficient of t in (i) $20t$ (ii) $9nt$ (iii) $-10rt$. [3 marks]
12. Write the coefficient of ac in ac . Give reason. [1 mark]
13. State whether the following are like (or) unlike terms. Give reason. (i) $3np$, $-13np$ (ii) $\frac{1}{2}mnp$, $3mnp$ [2 marks]
14. Group the like terms: $-15qr$, $-6mn$, $8x$, $9mn$, $8qr$, $8mn$, $-12x$, $12qr$. [5 marks]
15. Simplify $13x + 5x$. [1 mark]
16. Add: (i) $19bc + 7bc$ (ii) $20mn + 26mn$ [2 marks]
17. Simplify $11q + 8q + 3pr + 6pr$. [3 marks]
18. Simplify: (i) $28x - 12x$ (ii) $13x - 28x$ (iii) $-14x - 13x$ [3 marks]
19. Simplify: (i) $-21a + 7a$ (ii) $-15a - 27a$ (iii) $-5a + 18a$ (iv) $2np - 28np$ (v) $9np - 8np$ [5 marks]

20. Simplify $9q - 11qr - 15xy - 19q - 3qr - 8xy + 15q$.

[5 marks]

Key sheet

Q	Answer
1	a
2	(i) c, n, b (ii) $\frac{5}{6}, \frac{3}{4}, -7$
3	$24 - 6 = 18$
4	(i) $\frac{n}{18}$, (ii) $x + 32$
5	(i) $20 - 14c$, (ii) $6a$, (iii) $\frac{48}{x}$, (iv) $\frac{n}{17}$, (v) $y + 10$
6	(i) $\frac{y}{2}$, (ii) $\frac{a}{2} - 8$
7	0
8	(i) $-m$, (ii) 0, (iii) $-pqr$
9	$\frac{3}{n}, 5mpq, \frac{15}{a}$
10	(i) $-5, b, c$, (ii) $8, a, b, c$
11	(i) 20, (ii) $9n$, (iii) $-10r$
12	1
13	(i) Unlike, (ii) Like
14	$-6mn, 9mn, 8mn; -15qr, 8qr, 12qr; 8x, -12x$
15	$18x$
16	(i) $26bc$, (ii) $46mn$
17	$19q + 9pr$
18	(i) $16x$, (ii) $-15x$, (iii) $-27x$
19	(i) $-14a$, (ii) $-42a$, (iii) $13a$, (iv) $-26np$, (v) np
20	$5q - 14qr - 23xy$

Solutions

1. Which of the following is a variable: a , -12 , $\frac{1}{3}$, $-\frac{4}{5}$? [1]

A variable (or literal) can take various numerical values. A constant has a fixed value.

$\frac{1}{3}$, -12 and $-\frac{4}{5}$ have fixed values, so they are constants.

a can take various values, so it is the variable.

Ans: a

2. From $\frac{5}{6}$, c , $\frac{3}{4}$, n , -7 , b , write (i) the variables (ii) the constants. [2]

Variables can take various numerical values: c , n and b .

Constants have a fixed value: $\frac{5}{6}$, $\frac{3}{4}$ and -7 .

Ans: (i) c , n , b (ii) $\frac{5}{6}$, $\frac{3}{4}$, -7

3. Represent in symbolic form and find the value: the subtraction of 6 from 24. [1]

Take 6 away from 24.

$$24 - 6 = 18$$

Ans: $24 - 6 = 18$

4. Represent the following statements in symbolic form: (i) Divide n by 18 (ii) 32 more than x [2]

(i) n divided by 18 is $\frac{n}{18}$

(ii) 32 more than x : add 32 to x . $x + 32$

Ans: (i) $\frac{n}{18}$, (ii) $x + 32$

5. Represent the following statements in symbolic form: (i) The subtraction of $14c$ from 20 (ii) 6 times a (iii) 48 divided by x (iv) Divide n by 17 (v) 10 more than y [5]

(i) Take $14c$ away from 20. $20 - 14c$

(ii) Multiply: $6 \times a = 6a$

(iii) 48 divided by x is $\frac{48}{x}$

(iv) n divided by 17 is $\frac{n}{17}$

(v) 10 more than y : add 10 to y . $y + 10$

Ans: (i) $20 - 14c$, (ii) $6a$, (iii) $\frac{48}{x}$, (iv) $\frac{n}{17}$, (v) $y + 10$

6. Represent the following statements in symbolic form: (i) Half of y (ii) 8 less than half of a [2]

(i) Half of y is $\frac{y}{2}$

(ii) Half of a is $\frac{a}{2}$. 8 less than it: take away 8. $\frac{a}{2} - 8$

Ans: (i) $\frac{y}{2}$, (ii) $\frac{a}{2} - 8$

7. Fill in the box: $\square \times m = 0$ [1]

Rule: $0 \times a = 0$

So $0 \times m = 0$: the box is 0.

Ans: 0

8. Simplify: (i) $\frac{m}{-1}$ (ii) $0 \times np$ (iii) $-1 \times pqr$ [3]

(i) Rule $\frac{a}{-1} = -a$, so $\frac{m}{-1} = -m$

(ii) Rule $0 \times a = 0$, so $0 \times np = 0$

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

Ans: (i) $-m$, (ii) 0 , (iii) $-pqr$

9. Which of the following are terms: $\frac{3}{n}$, $5mpq$, $m + n$, $3 - q$, $\frac{15}{a}$? [1]

A term is made from constants and variables by multiplication (or) division only.

$m + n$ and $3 - q$ use $+$ (or) $-$, so they are not terms.

Terms: $\frac{3}{n}$, $5mpq$ and $\frac{15}{a}$.

Ans: $\frac{3}{n}$, $5mpq$, $\frac{15}{a}$

10. Write the factors of (i) $-5bc$ (ii) $8abc$. [2]

(i) $-5bc = -5 \times b \times c$, so the factors are $-5, b, c$.

(ii) $8abc = 8 \times a \times b \times c$, so the factors are $8, a, b, c$.

Ans: (i) $-5, b, c$, (ii) $8, a, b, c$

11. Write the coefficient of t in (i) $20t$ (ii) $9nt$ (iii) $-10rt$. [3]

(i) $20t = 20 \times t$, so the coefficient is 20 .

(ii) $9nt = 9n \times t$, so the coefficient is $9n$.

(iii) $-10rt = -10r \times t$, so the coefficient is $-10r$.

Ans: (i) 20 , (ii) $9n$, (iii) $-10r$

12. Write the coefficient of ac in ac . Give reason. [1]

Reason: $ac = 1 \times ac$

So the coefficient of ac is 1 .

Ans: 1

13. State whether the following are like (or) unlike terms. Give reason. (i) $3np$, $-13np$ (ii) $\frac{1}{2}mnp$, $3mnp$ [2]

(i) $3np$ has literal factors np , $-13np$ has literal factors np : different, so unlike terms.

(ii) $\frac{1}{2}mnp$, $3mnp$: the same literal factors mnp , so like terms.

Ans: (i) Unlike, (ii) Like

14. Group the like terms: $-15qr$, $-6mn$, $8x$, $9mn$, $8qr$, $8mn$, $-12x$, $12qr$. [5]

Like terms have the same literal factors.

Literal factor mn : $-6mn$, $9mn$ and $8mn$.

Literal factor qr : $-15qr$, $8qr$ and $12qr$.

Literal factor x : $8x$ and $-12x$.

Ans: $-6mn, 9mn, 8mn$; $-15qr, 8qr, 12qr$; $8x, -12x$

15. Simplify $13x + 5x$. [1]

$$\begin{aligned}13x + 5x &= (13 + 5)x \\ &= 18x\end{aligned}$$

Ans: $18x$

16. Add: (i) $19bc + 7bc$ (ii) $20mn + 26mn$ [2]

$$\begin{aligned}\text{(i)} \quad 19bc + 7bc &= (19 + 7)bc = 26bc \\ \text{(ii)} \quad 20mn + 26mn &= (20 + 26)mn = 46mn\end{aligned}$$

Ans: (i) $26bc$, (ii) $46mn$

17. Simplify $11q + 8q + 3pr + 6pr$. [3]

Bring the like terms together and add.

$$\begin{aligned}11q + 8q + 3pr + 6pr &= (11q + 8q) + (3pr + 6pr) \\ &= (11 + 8)q + (3 + 6)pr \\ &= 19q + 9pr\end{aligned}$$

Ans: $19q + 9pr$

18. Simplify: (i) $28x - 12x$ (ii) $13x - 28x$ (iii) $-14x - 13x$ [3]

$$\begin{aligned}\text{(i)} \quad 28x - 12x &= (28 - 12)x = 16x \\ \text{(ii)} \quad 13x - 28x &= (13 - 28)x = -15x \\ \text{(iii)} \quad -14x - 13x &= (-14 - 13)x = -27x\end{aligned}$$

Ans: (i) $16x$, (ii) $-15x$, (iii) $-27x$

19. Simplify: (i) $-21a + 7a$ (ii) $-15a - 27a$ (iii) $-5a + 18a$ (iv) $2np - 28np$ (v) $9np - 8np$ [5]

$$\begin{aligned}\text{(i)} \quad -21a + 7a &= (-21 + 7)a = -14a \\ \text{(ii)} \quad -15a - 27a &= (-15 - 27)a = -42a \\ \text{(iii)} \quad -5a + 18a &= (-5 + 18)a = 13a \\ \text{(iv)} \quad 2np - 28np &= (2 - 28)np = -26np \\ \text{(v)} \quad 9np - 8np &= (9 - 8)np = np\end{aligned}$$

Ans: (i) $-14a$, (ii) $-42a$, (iii) $13a$, (iv) $-26np$, (v) np

20. Simplify $9q - 11qr - 15xy - 19q - 3qr - 8xy + 15q$. [5]

Bring the like terms together, then add (or) subtract the numbers.

$$\begin{aligned}9q - 11qr - 15xy - 19q - 3qr - 8xy + 15q &= (9q - 19q + 15q) + (-11qr - 3qr) + (-15xy - 8xy) \\ &= (9 - 19 + 15)q + (-11 - 3)qr + (-15 - 8)xy \\ &= 5q - 14qr - 23xy\end{aligned}$$

Ans: $5q - 14qr - 23xy$
