EXPRESSWALA ACADEMY

Algebra (Introduction)

Question Paper, Set 07

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: $\frac{4}{5}$, x, c, q? [1 mark]

2. From $\frac{1}{8}$, $-\frac{1}{7}$, n, r, x, $\frac{5}{7}$, write (i) the variables (ii) the constants. [2 marks]

3. Represent in symbolic form: the sum of m and 19. [1 mark]

4. Represent the following statements in symbolic form: (i) The subtraction of $5t$ from 20 (ii) r decreased by 26 [2 marks]

5. Represent the following statements in symbolic form: (i) Divide a by 3 (ii) 10 times a added to 12 times n (iii) The subtraction of $2n$ from 12 (iv) 25 divided by x (v) p decreased by 35 [5 marks]

6. Represent the following statements in symbolic form: (i) Half of m (ii) 14 more than half of q [2 marks]

7. Simplify $0 \times n$. [1 mark]

8. Simplify: (i) $0 \times mpq$ (ii) $1 \times bc$ (iii) $\frac{xyz}{-1}$ [3 marks]

9. Write the terms in $9n - 6xz - 13$. [1 mark]

10. Write the factors of (i) $17ab$ (ii) $-16xyz$. [2 marks]

11. In $-17abc$, write the coefficient of (i) abc (ii) c (iii) ab. [3 marks]

12. Write the coefficient of yz in $\frac{yz}{6}$. [1 mark]

13. State whether the following are like (or) unlike terms. Give reason. (i) $-15mp$, -15 (ii) $-9ab$, $-8ab$ [2 marks]

14. State whether the following are like (or) unlike terms. Give reason. (i) $-3abc$, $-6ab$ (ii) $3y$, $-5y$ (iii) $-2ac$, $-6ac$ (iv) $8pq$, $-14mpq$ (v) $-13mp$, $\frac{5}{3}pm$ [5 marks]

15. Simplify $30mn + 7mn$. [1 mark]

16. Simplify $14c + 15c + 2c$. [2 marks]

17. Simplify $19b + 6np + 18b + 20np$. [3 marks]

18. Simplify: (i) $-14qr + 6qr$ (ii) $6qr - 17qr$ (iii) $-25qr - 28qr$ [3 marks]

19. Simplify: (i) $16a + 5a$ (ii) $-16a - 5a$ (iii) $-16a + 5a$ (iv) $16a - 5a$ (v) $-12a + 12a$ [5 marks]

20. Simplify: (i) $14z + 2q - 20q - 5z$ (ii) $6mn + 10 - 12z + 6z - 15mn - 11$ [5 marks]

Key sheet

Q	Answer
1	$\frac{4}{5}$
2	(i) n, r, x (ii) $\frac{1}{8}$, $-\frac{1}{7}$, $\frac{5}{7}$
3	$m + 19$
4	(i) $20 - 5t$, (ii) $r - 26$
5	(i) $\frac{a}{3}$, (ii) $12n + 10a$, (iii) $12 - 2n$, (iv) $\frac{25}{x}$, (v) $p - 35$
6	(i) $\frac{m}{2}$, (ii) $\frac{q}{2} + 14$
7	0
8	(i) 0, (ii) bc, (iii) $-xyz$
9	$9n$, $-6xz$, -13
10	(i) $17, a, b$, (ii) $-16, x, y, z$
11	(i) -17, (ii) $-17ab$, (iii) $-17c$
12	$\frac{1}{6}$
13	(i) Unlike, (ii) Like
14	(i) Unlike, (ii) Like, (iii) Like, (iv) Unlike, (v) Like
15	$37mn$
16	$31c$
17	$37b + 26np$
18	(i) $-8qr$, (ii) $-11qr$, (iii) $-53qr$
19	(i) $21a$, (ii) $-21a$, (iii) $-11a$, (iv) $11a$, (v) 0
20	(i) $9z - 18q$, (ii) $-9mn - 6z - 1$

Solutions

1. Which of the following is a constant: $\frac{4}{5}$, x, c, q? [1]

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

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

$\frac{4}{5}$ has a fixed value, so it is the constant.

Ans: $\frac{4}{5}$

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2. From $\frac{1}{8}$, $-\frac{1}{7}$, n, r, x, $\frac{5}{7}$, write (i) the variables (ii) the constants. [2]

Variables can take various numerical values: n, r and x.

Constants have a fixed value: $\frac{1}{8}$, $-\frac{1}{7}$ and $\frac{5}{7}$.

Ans: (i) n, r, x **(ii)** $\frac{1}{8}$, $-\frac{1}{7}$, $\frac{5}{7}$

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3. Represent in symbolic form: the sum of m and 19. [1]

Sum means add.

$m + 19$

Ans: $m + 19$

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4. Represent the following statements in symbolic form: (i) The subtraction of $5t$ from 20 (ii) r decreased by 26 [2]

(i) Take $5t$ away from 20. $20 - 5t$

(ii) Take 26 away from r. $r - 26$

Ans: (i) $20 - 5t$, **(ii)** $r - 26$

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5. Represent the following statements in symbolic form: (i) Divide a by 3 (ii) 10 times a added to 12 times n (iii) The subtraction of $2n$ from 12 (iv) 25 divided by x (v) p decreased by 35 [5]

(i) a divided by 3 is $\frac{a}{3}$

(ii) 10 times a is $10a$; 12 times n is $12n$. Add $10a$ to $12n$: $12n + 10a$

(iii) Take $2n$ away from 12. $12 - 2n$

(iv) 25 divided by x is $\frac{25}{x}$

(v) Take 35 away from p. $p - 35$

Ans: (i) $\frac{a}{3}$, **(ii)** $12n + 10a$, **(iii)** $12 - 2n$, **(iv)** $\frac{25}{x}$, **(v)** $p - 35$

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6. Represent the following statements in symbolic form: (i) Half of m (ii) 14 more than half of q [2]

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

(ii) Half of q is $\frac{q}{2}$. 14 more than it: add 14. $\frac{q}{2} + 14$

Ans: (i) $\frac{m}{2}$, **(ii)** $\frac{q}{2} + 14$

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7. Simplify $0 \times n$. [1]

Rule: $0 \times a = 0$

$0 \times n = 0$

Ans: 0

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8. Simplify: (i) $0 \times mpq$ (ii) $1 \times bc$ (iii) $\frac{xyz}{-1}$ [3]

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

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

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

Ans: (i) 0, (ii) bc, (iii) $-xyz$

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9. Write the terms in $9n - 6xz - 13$. [1]

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

The terms are $9n$, $-6xz$ and -13.

Ans: $9n$, $-6xz$, -13

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10. Write the factors of (i) $17ab$ (ii) $-16xyz$. [2]

(i) $17ab = 17 \times a \times b$, so the factors are $17, a, b$.

(ii) $-16xyz = -16 \times x \times y \times z$, so the factors are $-16, x, y, z$.

Ans: (i) $17, a, b$, (ii) $-16, x, y, z$

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11. In $-17abc$, write the coefficient of (i) abc (ii) c (iii) ab. [3]

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

(ii) $-17abc = -17ab \times c$, so the coefficient of c is $-17ab$.

(iii) $-17abc = -17c \times ab$, so the coefficient of ab is $-17c$.

Ans: (i) -17, (ii) $-17ab$, (iii) $-17c$

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12. Write the coefficient of yz in $\frac{yz}{6}$. [1]

$\frac{yz}{6} = \frac{1}{6} \times yz$

So the coefficient of yz is $\frac{1}{6}$.

Ans: $\frac{1}{6}$

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13. State whether the following are like (or) unlike terms. Give reason. (i) $-15mp$, -15 (ii) $-9ab$, $-8ab$ [2]

(i) $-15mp$ has literal factors mp, -15 has no literal factor: different, so unlike terms.

(ii) $-9ab$, $-8ab$: the same literal factors ab, so like terms.

Ans: (i) Unlike, (ii) Like

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14. State whether the following are like (or) unlike terms. Give reason. (i) $-3abc$, $-6ab$ (ii) $3y$, $-5y$ (iii) $-2ac$, $-6ac$ (iv) $8pq$, $-14mpq$ (v) $-13mp$, $\frac{5}{3}pm$ [5]

(i) $-3abc$ has literal factors abc, $-6ab$ has literal factors ab: different, so unlike terms.

(ii) $3y$, $-5y$: the same literal factors y, so like terms.

(iii) $-2ac$, $-6ac$: the same literal factors ac, so like terms.

(iv) $8pq$ has literal factors pq, $-14mpq$ has literal factors mpq: different, so unlike terms.

(v) $-13mp$, $\frac{5}{3}pm$: the same literal factors mp ($pm = mp$), so like terms.

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

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15. Simplify $30mn + 7mn$. [1]

$30mn + 7mn = (30 + 7)mn$

$= 37mn$

Ans: $37mn$

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16. Simplify $14c + 15c + 2c$. [2]

$14c + 15c + 2c = (14 + 15 + 2)c$

$= 31c$

Ans: $31c$

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17. Simplify $19b + 6np + 18b + 20np$. [3]

Bring the like terms together and add.

$19b + 6np + 18b + 20np = (19b + 18b) + (6np + 20np)$

$= (19 + 18)b + (6 + 20)np$

$= 37b + 26np$

Ans: $37b + 26np$

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18. Simplify: (i) $-14qr + 6qr$ (ii) $6qr - 17qr$ (iii) $-25qr - 28qr$ [3]

(i) $-14qr + 6qr = (-14 + 6)qr = -8qr$

(ii) $6qr - 17qr = (6 - 17)qr = -11qr$

(iii) $-25qr - 28qr = (-25 - 28)qr = -53qr$

Ans: (i) $-8qr$**, (ii)** $-11qr$**, (iii)** $-53qr$

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19. Simplify: (i) $16a + 5a$ (ii) $-16a - 5a$ (iii) $-16a + 5a$ (iv) $16a - 5a$ (v) $-12a + 12a$ [5]

(i) $16a + 5a = (16 + 5)a = 21a$

(ii) $-16a - 5a = (-16 - 5)a = -21a$

(iii) $-16a + 5a = (-16 + 5)a = -11a$

(iv) $16a - 5a = (16 - 5)a = 11a$

(v) $-12a + 12a = (-12 + 12)a = 0 \times a = 0$

Ans: (i) $21a$**, (ii)** $-21a$**, (iii)** $-11a$**, (iv)** $11a$**, (v)** 0

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20. Simplify: (i) $14z + 2q - 20q - 5z$ (ii) $6mn + 10 - 12z + 6z - 15mn - 11$ [5]

(i) $14z + 2q - 20q - 5z = (14z - 5z) + (2q - 20q)$

$= (14 - 5)z + (2 - 20)q$

$= 9z - 18q$

(ii) $6mn + 10 - 12z + 6z - 15mn - 11 = (6mn - 15mn) + (-12z + 6z) + (10 - 11)$

$= (6 - 15)mn + (-12 + 6)z + (10 - 11)$

$= -9mn - 6z - 1$

Ans: (i) $9z - 18q$**, (ii)** $-9mn - 6z - 1$