

Algebra (Introduction)

Question Paper, Set 03

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: y , c , z , 16 ? [1 mark]
2. From m , y , t , $-\frac{1}{9}$, $\frac{3}{7}$, $-\frac{3}{8}$, write (i) the variables (ii) the constants. [2 marks]
3. Represent in symbolic form: the product of n and z . [1 mark]
4. Represent the following statements in symbolic form: (i) 3 times a added to 8 times n (ii) 22 times b [2 marks]
5. Represent the following statements in symbolic form: (i) 58 divided by c (ii) The subtraction of $12b$ from 31 (iii) z decreased by 9 (iv) 10 times n added to 9 times c (v) 44 more than p [5 marks]
6. Represent the following statements in symbolic form: (i) 10 less than one third of r (ii) 6 more than one third of z [2 marks]
7. Write the value of $\frac{x}{-1}$. [1 mark]
8. Simplify: (i) $\frac{b}{-1}$ (ii) $\frac{mnp}{1}$ (iii) $-1 \times mnp$ [3 marks]
9. Write the terms in $14t - 11 + 3x$. [1 mark]
10. Write $11pqt$ as a product of its factors and name the factors. [2 marks]
11. In $-16mnp$, write the coefficient of (i) mnp (ii) p (iii) mn . [3 marks]
12. Write the coefficient of pq in $-pq$. Give reason. [1 mark]
13. State whether the following are like (or) unlike terms. Give reason. (i) $6pq$, 6 (ii) $-5pr$, $9pr$ [2 marks]
14. State whether the following are like (or) unlike terms. Give reason. (i) $-\frac{14}{5}acx$, $-7ac$ (ii) $12y$, $9y$ (iii) -4 , $-4qrt$ (iv) $11yz$, $-\frac{8}{3}zy$ (v) $-9mp$, $7m$ [5 marks]
15. Add: $30yz + 15yz$. [1 mark]
16. Add: $6a + 11a + 14a$. [2 marks]
17. Simplify $9q + 2y + 6n + 14q + 5y + 8n$. [3 marks]

- 18.** Simplify: (i) $-13m + 9m$ (ii) $7m - 16m$ (iii) $9m - 5m$ [3 marks]
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- 19.** Simplify: (i) $21np + 3np$ (ii) $-21np - 3np$ (iii) $-21np + 3np$ (iv) $21np - 3np$ (v) $-15np + 15np$ [5 marks]
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- 20.** Simplify: (i) $6x + 14r + 2r - 19x$ (ii) $3c + 3ab + 13 + 14ab - 19c - 14$ [5 marks]
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Key sheet

Q	Answer
1	16
2	(i) m, y, t (ii) $-\frac{1}{9}, \frac{3}{7}, -\frac{3}{8}$
3	nz
4	(i) $8n + 3a$, (ii) $22b$
5	(i) $\frac{58}{c}$, (ii) $31 - 12b$, (iii) $z - 9$, (iv) $9c + 10n$, (v) $p + 44$
6	(i) $\frac{r}{3} - 10$, (ii) $\frac{z}{3} + 6$
7	$-x$
8	(i) $-b$, (ii) mnp , (iii) $-mpq$
9	$14t, -11, 3x$
10	$11pqt = 11 \times p \times q \times t$; factors $11, p, q, t$
11	(i) -16 , (ii) $-16mn$, (iii) $-16p$
12	-1
13	(i) Unlike, (ii) Like
14	(i) Unlike, (ii) Like, (iii) Unlike, (iv) Like, (v) Unlike
15	$45yz$
16	$31a$
17	$23q + 7y + 14n$
18	(i) $-4m$, (ii) $-9m$, (iii) $4m$
19	(i) $24np$, (ii) $-24np$, (iii) $-18np$, (iv) $18np$, (v) 0
20	(i) $-13x + 16r$, (ii) $-16c + 17ab - 1$

Solutions

1. Which of the following is a constant: y , c , z , 16 ? [1]

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

y , z and c can take various values, so they are variables.

16 has a fixed value, so it is the constant.

Ans: 16

2. From m , y , t , $-\frac{1}{9}$, $\frac{3}{7}$, $-\frac{3}{8}$, write (i) the variables (ii) the constants. [2]

Variables can take various numerical values: m , y and t .

Constants have a fixed value: $-\frac{1}{9}$, $\frac{3}{7}$ and $-\frac{3}{8}$.

Ans: (i) m, y, t (ii) $-\frac{1}{9}, \frac{3}{7}, -\frac{3}{8}$

3. Represent in symbolic form: the product of n and z . [1]

Multiply: $n \times z = nz$

Ans: nz

4. Represent the following statements in symbolic form: (i) 3 times a added to 8 times n (ii) 22 times b [2]

(i) 3 times a is $3a$; 8 times n is $8n$. Add $3a$ to $8n$: $8n + 3a$

(ii) Multiply: $22 \times b = 22b$

Ans: (i) $8n + 3a$, (ii) $22b$

5. Represent the following statements in symbolic form: (i) 58 divided by c (ii) The subtraction of $12b$ from 31 (iii) z decreased by 9 (iv) 10 times n added to 9 times c (v) 44 more than p [5]

(i) 58 divided by c is $\frac{58}{c}$

(ii) Take $12b$ away from 31. $31 - 12b$

(iii) Take 9 away from z . $z - 9$

(iv) 10 times n is $10n$; 9 times c is $9c$. Add $10n$ to $9c$: $9c + 10n$

(v) 44 more than p : add 44 to p . $p + 44$

Ans: (i) $\frac{58}{c}$, (ii) $31 - 12b$, (iii) $z - 9$, (iv) $9c + 10n$, (v) $p + 44$

6. Represent the following statements in symbolic form: (i) 10 less than one third of r (ii) 6 more than one third of z [2]

(i) One third of r is $\frac{r}{3}$. 10 less than it: take away 10. $\frac{r}{3} - 10$

(ii) One third of z is $\frac{z}{3}$. 6 more than it: add 6. $\frac{z}{3} + 6$

Ans: (i) $\frac{r}{3} - 10$, (ii) $\frac{z}{3} + 6$

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

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

$\frac{x}{-1} = -x$

Ans: $-x$

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

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

(ii) Rule $\frac{a}{1} = a$, so $\frac{mnp}{1} = mnp$

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

Ans: (i) $-b$, (ii) mnp , (iii) $-mpq$

9. Write the terms in $14t - 11 + 3x$. [1]

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

The terms are $14t$, -11 and $3x$.

Ans: $14t$, -11 , $3x$

10. Write $11pqt$ as a product of its factors and name the factors. [2]

$$11pqt = 11 \times p \times q \times t$$

Each numerical (or) literal value in the product is a factor: $11, p, q, t$.

Ans: $11pqt = 11 \times p \times q \times t$; factors $11, p, q, t$

11. In $-16mnp$, write the coefficient of (i) mnp (ii) p (iii) mn . [3]

(i) $-16mnp = -16 \times mnp$, so the coefficient of mnp is -16 .

(ii) $-16mnp = -16mn \times p$, so the coefficient of p is $-16mn$.

(iii) $-16mnp = -16p \times mn$, so the coefficient of mn is $-16p$.

Ans: (i) -16 , (ii) $-16mn$, (iii) $-16p$

12. Write the coefficient of pq in $-pq$. Give reason. [1]

$$\text{Reason: } -pq = -1 \times pq$$

So the coefficient of pq is -1 .

Ans: -1

13. State whether the following are like (or) unlike terms. Give reason. (i) $6pq$, 6 (ii) $-5pr$, $9pr$ [2]

(i) $6pq$ has literal factors pq , 6 has no literal factor: different, so unlike terms.

(ii) $-5pr$, $9pr$: the same literal factors pr , so like terms.

Ans: (i) Unlike, (ii) Like

14. State whether the following are like (or) unlike terms. Give reason. (i) $-\frac{14}{5}acx$, $-7ac$ (ii) $12y$, $9y$ (iii) -4 , $-4qrt$ (iv) $11yz$, $-\frac{8}{3}zy$ (v) $-9mp$, $7m$ [5]

(i) $-\frac{14}{5}acx$ has literal factors acx , $-7ac$ has literal factors ac : different, so unlike terms.

(ii) $12y$, $9y$: the same literal factors y , so like terms.

(iii) -4 has no literal factor, $-4qrt$ has literal factors qrt : different, so unlike terms.

(iv) $11yz$, $-\frac{8}{3}zy$: the same literal factors yz ($zy = yz$), so like terms.

(v) $-9mp$ has literal factors mp , $7m$ has literal factors m : different, so unlike terms.

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

15. Add: $30yz + 15yz$. [1]

$$\begin{aligned} 30yz + 15yz &= (30 + 15)yz \\ &= 45yz \end{aligned}$$

Ans: $45yz$

16. Add: $6a + 11a + 14a$. [2]

$$\begin{aligned} 6a + 11a + 14a &= (6 + 11 + 14)a \\ &= 31a \end{aligned}$$

Ans: $31a$

17. Simplify $9q + 2y + 6n + 14q + 5y + 8n$. [3]

Bring the like terms together and add.

$$\begin{aligned} 9q + 2y + 6n + 14q + 5y + 8n &= (9q + 14q) + (2y + 5y) + (6n + 8n) \\ &= (9 + 14)q + (2 + 5)y + (6 + 8)n \\ &= 23q + 7y + 14n \end{aligned}$$

Ans: $23q + 7y + 14n$

18. Simplify: (i) $-13m + 9m$ (ii) $7m - 16m$ (iii) $9m - 5m$ [3]

$$(i) -13m + 9m = (-13 + 9)m = -4m$$

$$(ii) 7m - 16m = (7 - 16)m = -9m$$

$$(iii) 9m - 5m = (9 - 5)m = 4m$$

Ans: (i) $-4m$, (ii) $-9m$, (iii) $4m$

19. Simplify: (i) $21np + 3np$ (ii) $-21np - 3np$ (iii) $-21np + 3np$ (iv) $21np - 3np$ (v) $-15np + 15np$ [5]

$$(i) 21np + 3np = (21 + 3)np = 24np$$

$$(ii) -21np - 3np = (-21 - 3)np = -24np$$

$$(iii) -21np + 3np = (-21 + 3)np = -18np$$

$$(iv) 21np - 3np = (21 - 3)np = 18np$$

$$(v) -15np + 15np = (-15 + 15)np = 0 \times np = 0$$

Ans: (i) $24np$, (ii) $-24np$, (iii) $-18np$, (iv) $18np$, (v) 0

20. Simplify: (i) $6x + 14r + 2r - 19x$ (ii) $3c + 3ab + 13 + 14ab - 19c - 14$ [5]

$$(i) 6x + 14r + 2r - 19x = (6x - 19x) + (14r + 2r)$$

$$= (6 - 19)x + (14 + 2)r$$

$$= -13x + 16r$$

$$(ii) 3c + 3ab + 13 + 14ab - 19c - 14 = (3c - 19c) + (3ab + 14ab) + (13 - 14)$$

$$= (3 - 19)c + (3 + 14)ab + (13 - 14)$$

$$= -16c + 17ab - 1$$

Ans: (i) $-13x + 16r$, (ii) $-16c + 17ab - 1$
