



### Part I

#### Exercise (1)

##### (1) Complete each of the following:

- 1) The multiplicative inverse of the number  $\frac{-9}{8}$  is .....
- 2) If  $\frac{a}{b} = \frac{2}{3}$ , then  $\frac{3a}{2b} = \dots\dots\dots$
- 3) The remainder of subtracting  $\left(\frac{1}{5}\right)$  from  $\left(-\frac{2}{5}\right)$  equals .....
- 4) The simplest form of the expression:  $\frac{3}{4} \times \left(\frac{1}{2} - \frac{1}{3}\right)$  is .....
- 5) The rational number half way between  $-\frac{5}{2}$  and  $-\frac{3}{2}$  is .....

##### (2) Choose the correct answer from those given:

- 1) If  $\frac{15}{x} = \frac{-3}{4}$ , then  $x = \dots\dots\dots$   
a)  $-20$                       b)  $-5$                       c)  $5$                       d)  $20$
- 2) The number  $\frac{-9}{-7}$  is the additive inverse of the number: .....
- a)  $\frac{-9}{7}$                       b)  $\frac{-7}{9}$                       c)  $\frac{7}{9}$                       d)  $\frac{9}{7}$
- 3) If  $5x - 3y = 0$ , then  $x : y = \dots\dots\dots$   
a)  $5 : 3$                       b)  $3 : 5$                       c)  $-5 : 3$                       d)  $-3 : 5$
- 4) If  $a \times \frac{b}{3} = \frac{a}{3}$ , then  $b$  equals: .....
- a)  $-a$                       b)  $1$                       c)  $\frac{a}{3}$                       d)  $a$
- 5) The number  $\frac{5}{3} > \dots\dots\dots$   
a)  $\frac{10}{3}$                       b)  $\frac{25}{9}$                       c)  $\frac{10}{6}$                       d)  $\frac{3}{5}$

### (3) Answer the following:

1) Complete in the same pattern:

$$7, 6\frac{1}{3}, 5\frac{2}{3}, 4\frac{1}{3}, \dots, \dots, \dots, 1\frac{2}{3}$$

2) Use the property of distribution to calculate the value of:

$$\frac{6}{37} \times 7 + \frac{6}{37} \times 5 + \frac{6}{37} \times (-11)$$

3) If  $-3\frac{4}{7} \times x = -3\frac{4}{7}$ , then find the value of x.

4) If  $x = \frac{3}{2}$ ,  $y = -\frac{1}{4}$  and  $z = -2$ , then find the numerical value of:

$$x - (z \div y)$$

### Exercise (2)

#### (1) Complete the following:

1) The additive inverse of the number  $\frac{7}{25} \times (-5)^2$  is .....

2)  $3 \times \dots = 1$

3) If  $\frac{x-5}{x-7} = 0$ , then  $x = \dots$

4) The rational number which hasn't a multiplicative inverse is .....

5) If  $\frac{x}{2} + \frac{5}{7} = \frac{10}{35}$ , then  $2x$  equals .....

#### (2) Choose the correct answer from those given:

1)  $\frac{5}{8} - \frac{1}{8} > \dots$

a) 1

b)  $\frac{3}{4}$

c)  $\frac{1}{2}$

d)  $\frac{1}{4}$

2) The number of integers lying between  $\frac{7}{4}$ ,  $\frac{11}{8}$  is .....

a) zero

b) 1

c) 2

d) infinite number



# Algebra

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- 3) The rational number  $\frac{x}{-5}$  is negative if x .....
- a) > zero      b) < zero      c)  $\leq$  zero      d) = zero
- 4) The remainders of dividing four consecutive integers by the number 3 respectively may be:
- a) 1 , 2, 3, 1      b) 1, 2, 3, 4      c) 0, 1, 2, 3      d) 0, 1, 2, 0

### **(3) Answer the following questions:**

1) Complete in the same pattern:

$$\dots, \frac{2}{2}, \frac{3}{4}, \frac{4}{8}, \frac{5}{16}, \dots, \dots, \frac{8}{128}$$

2) If  $x = -\frac{1}{3}$ ,  $y = \frac{3}{4}$  and  $z = -3$  then find the value of:

First:  $(x + y) \div z$       second:  $xy + yz$

3) If the two rational numbers  $\frac{3x}{4}$  and  $\frac{2}{3}$  are equal then find the value of x.

4) Find the value of the expression:  $\frac{1}{3} \times \left(-\frac{1}{3}\right) \div \left(-\frac{1}{3}\right) \times \frac{1}{5}$

5) Find the rational number that lies two third of the way from  $\frac{4}{7}$  to

$1\frac{3}{4}$  from the smallest.

### Exercise (3)

#### (1) Complete the following:

- 1)  $\frac{3}{5} + \frac{7}{10} + \left(-\frac{1}{2}\right) = \dots\dots\dots$
- 2)  $\frac{4}{25} = \frac{2}{5} \times \frac{\dots\dots\dots}{35}$
- 3)  $\left(\frac{2}{7} + \frac{3}{5}\right)$  is the multiplicative inverse of the rational number .....
- 4) The rational number that lies half way between  $\frac{3}{7}$  and  $\frac{6}{7}$  is .....
- 5)  $\frac{2}{3} \left(2 + \frac{1}{2}\right) = \frac{2}{3} \times 2 + \frac{2}{3} \times \dots\dots\dots$

#### (2) Choose the correct answer from those given:

- 1) If  $\frac{7}{x+5}$  is a rational number , then  $x \neq \dots\dots\dots$   
a) - 5                      b) 0                      c) 2                      d) 10
- 2) If  $x = 3$  ,  $y = 4$  and  $z = 6$  , then  $\frac{x}{y} - \frac{z}{x}$  equals:  
a)  $-1\frac{1}{4}$                       b)  $\frac{1}{4}$                       c)  $\frac{5}{4}$                       d)  $1\frac{3}{4}$
- 3) The remainder of subtracting  $\frac{3}{7}$  from  $\frac{9}{21}$  equals:  
a) zero                      b)  $\frac{6}{21}$                       c)  $\frac{6}{14}$                       d)  $\frac{12}{28}$
- 4) If  $3a = 27$  and  $ab = 1$  , then  $b = \dots\dots\dots$   
a)  $\frac{1}{9}$                       b)  $\frac{1}{5}$                       c) 5                      d) 9
- 5) Which of the following relations is true, where  $x = 3$  ,  $y = 5$  ,  $z = 15$   
a)  $y = xz$                       b)  $x = yz$                       c)  $y = \frac{z}{x}$                       d)  $z = \frac{y}{x}$



### (3) Answer the following questions:

1) Arrange the following rational numbers in a descending order:

$$\frac{3}{10}, \frac{7}{30}, \frac{1}{3}, \frac{1}{5}, \frac{4}{15}$$

2) If  $x = -\frac{7}{4} \times -\frac{4}{7}$ , then find the value of x

3) Find the result of:  $\frac{7}{12} \times \frac{23}{45} + \frac{7}{12} \times \frac{23}{45} - 2 \times \frac{23}{45}$

4) If  $x = \frac{2}{3}$ ,  $y = -\frac{1}{6}$ ,  $z = -3$ , then find:  $(x \div y) - (z \div y)$

5) Find the number one fourth of the way from  $-\frac{1}{9}$  to  $-\frac{7}{8}$

### Exercise (4)

#### (1) Complete each of the following:

- 1) The degree of the term  $-3a^2b$  is ..... and its coefficient is .....
- 2) The increase of  $7x$  than  $10x$  is .....
- 3) The perimeter of the rectangle whose dimensions are  $(2x + 1)$  and  $(2 - x)$  equals ..... unit length.
- 4)  $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \dots \times \frac{49}{50} = \dots$

#### (2) Choose the correct answer from those given:

- 1) The algebraic expression  $x^3 - 3x^2 + 4$  is of the ..... degree.  
a) first                      b) second                      c) third                      d) fourth
- 2)  $2x + 3y$  is greater than  $3y - 2x$  by .....  
a)  $-6y$                       b)  $-4x$                       c)  $4x$                       d)  $6y$
- 3)  $\frac{3x}{5} - \frac{x}{5}$  equals:  
a)  $\frac{2}{5}$                       b)  $\frac{x}{5}$                       c)  $\frac{2x}{5}$                       d)  $2x$

**(3)** Simplify to simplest form:  $5x + 10y + 6x - 3y + 7y - 4x$

**(4)** Find four rational numbers between  $\frac{1}{3}$  and  $\frac{7}{9}$

**(5)** A rational number, if it is subtracted from its additive inverse, the result will be  $\frac{3}{2}$  what is the number?

### Exercise (5)

**(1) Choose the correct answer from those given:**

- 1) The rational number  $\frac{x}{-5}$  is negative if x :
- a) > zero      b) < zero      c)  $\leq$  zero      d) zero
- 2) If  $a = 0$  ,  $b = 5$  and  $c = 2$  , then the numerical value of  $a^2b + ac$  equals :
- a) 0      b) 2      c) 7      d) 10
- 3) If  $\frac{a}{b} = 60$  ,  $\frac{a}{3b}$  then equals:
- a) 17      b) 20      c) 23      d) 180

**(2)** 1) Find the result of:  $19 \times 17 + 19 \times 8 - 19 \times 15$  by identifying the common factor.

2) If  $x = -\frac{1}{3}$  ,  $y = \frac{3}{4}$  and  $z = -3$  , find the value of:

- a)  $x^2yz$       b)  $xy + yz$       c)  $x + y - z$

**(3)** 1) Divide:  $x^3y - 4xy^2 + 6xy$  by  $xy$

2) What is the increase of  $3x^2 - 5x + 2$  than the sum of:  $x + 5x^2 + 1$  and  $2x^2 - 4 - 2x$

3) Simplify to the simplest form:  $\left(\frac{1}{3}\right)^2 \times \left(\frac{-1}{3}\right)^3 \div \left(\frac{-1}{3}\right)^4 \times \left(\frac{1}{5}\right)^0$

**(4)** 1) Find the product:  $(2x - 3y)(3x + 7y)$

2) Simplify to simplest form:  $\frac{(17)^2 - 2 \times 17 + 17}{17}$

3) If  $a = 3x$  ,  $b = x + 2$  and  $c = 2x - 3$

Calculate the numerical value of the expression:  $ab - c^2$  when  $x = 0$

### Exercise (6)

#### (1) Complete each of the following:

- 1) The degree of the algebraic term  $-2x^2y$  is ..... and its coefficient is .....
- 2)  $(4x^2 + 2x) \div 2x = \dots\dots\dots$
- 3) If  $a + 3b = 7$  and  $c = 3$ , then the value of the expression  $a + 3(b + c) = \dots\dots\dots$
- 4) The seventh term in the pattern  $\frac{1}{10000}, \frac{1}{1000}, \frac{1}{100}, \dots\dots$  is .....
- 5) If  $x + y = 5$ , then the numerical value of  $x^2 + 2xy + y^2$  is .....

#### (2) Choose the correct answer from those given:

- 1) If  $(x + 4)(x - 3) = x^2 + m - 12$ , then  $m$  equals: .....  
a)  $-7x$                       b)  $-x$                       c)  $x$                       d)  $7x$
- 2) If  $(x + y)^2 = 15$  and  $x^2 + y^2 = 9$ , then  $xy = \dots\dots\dots$   
a) 1                      b) 2                      c) 3                      d) 4
- 3) A rectangle whose length is  $6\ell$  and its width is  $3m$ , then its perimeter is .....  
a)  $9\ell m$                       b)  $18\ell m$                       c)  $3(2\ell + m)$                       d)  $6(2\ell + m)$
- 4) If  $x = 3$ ,  $y = 4$  and  $z = 6$ , then  $\frac{x}{y} - \frac{z}{x}$  equals: .....  
a)  $-\frac{5}{4}$                       b)  $\frac{1}{4}$                       c)  $\frac{5}{4}$                       d)  $\frac{7}{4}$
- 5) The relation which represents the uniform velocity of a car covered a distance ( $s$ ) in a time ( $t$ ) is:  
a)  $\frac{t}{s}$                       b)  $\frac{s}{t}$                       c)  $ts$                       d)  $t + s$





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**(3)**

- 1) Simplify to simplest form:  $3a(2a + 3b) - 2b(2a + 3b)$
- 2) Simplify the expression  $\frac{6x^3y + 9y^3x}{3xy}$  to the simplest form.
- 3) Find the product:  $(x + 1)(x^2 - x + 1)$

**(4)**

- 1) What is the decrease of  $2a - 8b - c$  than the sum of  $3a - 3b + c$  and  $2a - 4b - 8c$
- 2) Factorize by identifying the highest common factor:  
 $5(48)^2 + 7 \times 48 + 53 \times 48$
- 3) Find the result  $201 \times 199$  as ad: difference of two squares.

### Part (2)

### Exercise (1)

**(1) Complete each of the following:**

- 1) If  $3a \times k = 12a^3$ , then  $k = \dots\dots\dots$
- 2)  $\dots\dots\dots (3x + \dots\dots\dots) = 9x^2 + 15xy$
- 3)  $4a^2 + 8ab = 4a (\dots\dots\dots + \dots\dots\dots)$
- 4)  $(4a^2 + 2a) \div 2a = (\dots\dots\dots)$
- 5)  $(50 + 1) (50 - 1) = 2500 - \dots\dots\dots$
- 6)  $a (a + b) - b (a + b) = (a + b) \times \dots\dots\dots$

**(2) Choose the correct answer:**

- 1)  $-3x \times -5y$  equals
 

a) $-15xy$	b) $-8xy$	c) $8xy$	d) $15xy$
------------	-----------	----------	-----------
- 2) If  $a^2 = 25$ ,  $b^2 = 9$  and  $ab = 15$  then  $(a - b)^2 = \dots\dots\dots$ 

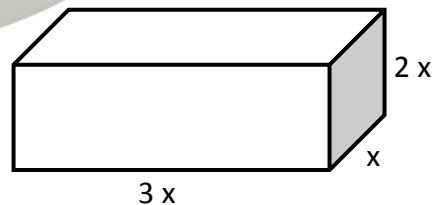
a) $-4$	b) $4$	c) $8$	d) $12$
---------	--------	--------	---------
- 3)  $(x + y)^2 - (x - y)^2$ 

a) $0$	b) $-2xy$	c) $xy$	d) $4xy$
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4) In the opposite figure:

Volume of the cuboid equals:

- |           |           |
|-----------|-----------|
| a) $6x$   | b) $6x^2$ |
| c) $5x^3$ | d) $6x^3$ |



**(3) Find the product:  $(2x - 3y) (2x + 3y)$**

**(4) Factorizing by identifying the H.C.F:  $27x^4 - 18x^3$**



(5) Use the distribution property to find the value of

$$\frac{6}{37} \times 7 + \frac{6}{37} \times 5 + \frac{6}{37} \times (-11)$$

(3) Simplify to simplest form:  $4n(n + 5) + n(6 - n)$  then find the numerical value of the expression when  $n = -1$

## Exercise (2)

**(1) Choose the correct answer from those given:**

- 1) The arithmetic mean of the set of values 19 , 32 , 27, 6, 6 is ...  
a) 90                      b) 32                      c) 18                      d) 6
- 2) The median of the set of values 15, 22 , 9, 11 , 33 is .....  
a) 9                      b) 15                      c) 18                      d) 90
- 3) The median of the set of values 34, 23, 25, 40, 22, 4 is .....  
a) 22                      b) 23                      c) 24                      d) 25
- 4) If the arithmetic mean of six values 12, then the sum of these values equals: .....  
a) 2                      b) 6                      c) 18                      d) 72
- 5) If the arithmetic mean of the values 27 , 8 , 16, 24 , 6 , k is 14, then k equals: .....  
a) 3                      b) 6                      c) 27                      d) 84
- 6) If the order of the median of a set of values is the fourth, then number of these values equals: .....  
a) 3                      b) 5                      c) 7                      d) 9
- 7) If the order of the median of a set of values is the fifth, then number of these values equals: .....  
a) 5                      b) 6                      c) 9                      d) 10



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8) If the median of the values 27 , 45 , 19 , 24 , 28 is  $x$ , then  $x$  equals: .....

- a) 24                      b) 27                      c) 28                      d) 45

## **(2) Complete:**

- 1) The mode of the values 14 , 11 , 12 , 11 , 14 , 15 , 11 is ....
- 2) If the mode of the values 15 , 9 ,  $x + 1$  , 9 , 15 is 9 , then  $x = \dots$
- 3) The arithmetic mean of the values 18 , 35 , 24 , 6 equals .....
- 4) If arithmetic mean of the numbers 3 , 3 ,  $x$  equals 4, then  $x = \dots$
- 5) If arithmetic mean of the values 9 , 6 , 5 , 14 ,  $k$  is 7, then  $k = \dots$
- 6) If the sum of five numbers is 30, then the arithmetic mean of these numbers is .....

## **(3) Answer the following questions:**

1) The following table shows the number of hours that two athletes trained in a month.

Kamal	63	70	58	30	48	53	75	72	68	46	57	66
Amer	68	56	65	70	50	49	57	62	64	54	52	63

Write the median hours of training for each athlete.

2) The following table shows the marks of a student in mathematics during a school year.

Month	October	November	December	March	April	May
Marks	30	34	42	36	38	50

First: Find the arithmetic mean for the marks of this student.

Second: Find the difference between the greatest and the smallest mark.



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- 3) The students recorded the time of their bus journeys to school for 3 weeks, they wrote times as follows: 16, 18, 14, 17, 18, 15, 19, 13, 15, 22, 16, 21, 20, 13, 18

Calculate each of the meantime, the median and the mode time.

- 4) If the arithmetic mean of a student's marks in five exams is 36 marks, what is the mark that he must get in the 6<sup>th</sup> exam to get his mean in the six exams 38 marks?

- 5) If the arithmetic mean of a student's marks in three exams (mathematics, science and social studies) is 40 marks, and his arithmetic mean in another two exams (Arabic and English) is 42 marks.

Find the arithmetic mean of his marks in the five exams.

### Model Answers

## Part (I)

### Exercise (1)

#### (1) Complete:

1)  $\frac{-8}{9}$

2) 1

3)  $\frac{-3}{5}$

4)  $\frac{1}{8}$

5) - 2

#### (2) Choose:

1) - 20

2)  $\frac{-9}{7}$

3) 3 : 5

4)  $b = 1$

5)  $\frac{3}{5}$

(3) 1)  $3\frac{2}{3}$  , 3 ,  $2\frac{1}{3}$       2)  $\frac{6}{37}$       3)  $x = 1$

4)  $\frac{-13}{2}$

### Exercise (2)

#### (1) Complete:

1) - 7

2)  $\frac{1}{3}$

3)  $x = 5$

4) 0

5)  $\frac{-12}{7}$

#### (2) Choose:

1)  $> \frac{1}{4}$

2) zero

3)  $x > \text{zero}$

4) 0 , 1, 2, 0

#### (3) Answer the following questions:

1)  $\frac{6}{32}$  ,  $\frac{7}{64}$

2) First:  $\frac{-5}{36}$

Second:  $\frac{-5}{2}$

3)  $x = \frac{8}{9}$

4)  $\frac{5}{3}$

5)  $\frac{19}{14}$

### Exercise (3)

#### (1) Complete:

$$1) \frac{8}{10} = \frac{4}{5}$$

$$2) 14$$

$$3) \frac{35}{31}$$

$$4) \frac{9}{14}$$

$$5) \frac{1}{2}$$

#### (2) Choose:

$$1) x \neq -5$$

$$2) \frac{3}{4} - \frac{6}{3} = -1\frac{1}{4}$$

$$3) \text{zero}$$

$$4) \frac{1}{9}$$

$$5) y = \frac{z}{x}$$

#### (3) Answer the following questions:

$$1) \frac{1}{3}, \frac{3}{10}, \frac{4}{15}, \frac{7}{30}, \frac{1}{5}$$

$$2) 1$$

$$3) \frac{-23}{54}$$

$$4) -22$$

$$5) \frac{-29}{96}$$

### Exercise (4)

#### (1) Complete:

$$1) \text{Third degree, } -3$$

$$2) -3x$$

$$3) 2x + 6$$

$$4) \frac{1}{50}$$

#### (2) Choose:

$$1) \text{Third}$$

$$2) 4x$$

$$3) \frac{2x}{5}$$

$$(3) 7x + 14y$$

$$(4) \frac{10}{27}, \frac{11}{27}, \frac{12}{27}, \frac{13}{27}$$

(5) let the numbers. its additive inverse = - x

$$-x - x = \frac{3}{2}$$

$$-2x = \frac{3}{2}$$

$$x = \frac{3}{2} \div (-2)$$

$$x = \frac{-3}{4}$$

### Exercise (5)

**(1) Choose:**

- 1)  $> \text{zero}$       2) 0      3) 20

**(2)** 1) 190

- 2) a)  $\frac{-1}{4}$       b)  $\frac{-5}{2}$       c)  $\frac{41}{12}$

**(3)** 1)  $x^2 - 4y + 6$       2)  $-4x^2 - 4x + 5$       3)  $\frac{-1}{3}$

- (4)** 1)  $6x^2 + 5xy - 21y^2$   
2) 16      3)  $-x^2 + 18x - 9$

### Exercise (6)

**(1) Complete:**

- 1) Third degree , - 2      2)  $2x + 1$

- 3) 16      4) 100      5) 25

**(2)**

- 1)  $x$       2) 3      3)  $6(2l + m)$

- 4)  $\frac{-5}{4}$       5)  $\frac{s}{t}$

**(3)** 1)  $6a^2 + 5ab - 6b^2$       2)  $2x^2 + 3y^2$       3)  $x^3 + 1$

**(4)** 1)  $3a + b - 6c$       2) 14400

- 3)  $(200 + 1)(200 - 1)$   
 $= 40000 - 1 = 39999$



### Part (2)

#### Exercise (1)

(1) Complete each of the following:

1)  $k = 4a^2$

2)  $3x, 5y$

3)  $a, 2b$

4)  $2a + 1$

5)  $1$

6)  $(a - b)$

(2) Choose the correct answer:

1) d)  $15xy$

2) b)  $4$

3) d)  $4xy$

4) d)  $6x^3$

(3)  $4x^2 - 9y^2$

(4)  $9x^3(3x - 2)$

(5)  $\frac{6}{37} \times (7 + 5 + (-11)) = \frac{6}{37}$  " distribution property "

(6)  $-23$

#### Exercise (2)

(1) Choose the correct answer from those given:

1) c)  $18$

2) b)  $15$

3) c)  $24$

4) d)  $72$

5) a)  $3$

6) c)  $7$

7) c)  $9$

8) b)  $27$

(2) Complete:

1)  $11$

2)  $8$

3)  $20.75$

4)  $6$

5)  $1$

6)  $6$

### (3) Answer the following questions:

1) Kama: 60.5                  Amer: 56.5

2) First:  $\frac{30+34+42+36+38+50}{6} = 38 \frac{1}{3}$

Second:  $50 - 30 = 20$

3) mean =  $\frac{255}{15} = 17$                   median = 17                  mode = 18

4)  $\frac{1^{st}+2^{nd}+3^{rd}+4^{th}+5^{th}}{5} = 36$

sum =  $5 \times 36 = 180$

$\frac{180+6^{th}}{6} = 38$

$180 + 6^{th} = 228$

$6^{th} = 228 - 180 = 48$

5)  $\frac{sum}{3} = 40$  ,                  sum =  $40 \times 3 = 120$

$\frac{sum}{2} = 42$  ,                  sum =  $42 \times 2 = 84$

The mean of the five exams =  $\frac{120+84}{5} = \frac{204}{5} = 40.8$