



Mathematics-10

Unit 3 – Review Exercise

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Miscellaneous Exercise 3

Q.1 Multiple Choice Questions

Four possible answers are given for the following question. Tick (✓) the correct answer.

- (1) In a ratio $a : b$, a is called; (SWL 2014, MTN 2015, D.G.K 2014, 15) **(K.B +A.B)**
 (a) Relation (b) Antecedent
 (c) Consequent (d) None of these
- (2) In a ratio $x : y$, y is called; (LHR 2014, GRW 2014, RWP 2015) **(K.B +A.B)**
 (a) Relation (b) Antecedent
 (c) Consequent (d) None of these
- (3) In a proportion $a : b :: c : d$, a and d are called; (LHR 2015, MTN 2015) **(K.B +A.B)**
 (a) Means (b) Extremes
 (c) Third proportional (d) None of these
- (4) In a proportion $a : b :: c : d$, b and c are called; (LHR 2015) **(K.B +A.B)**
 (a) Means (b) Extremes
 (c) Fourth proportional (d) None of these
- (5) In continued proportion $a : b = b : c$, $ac = b^2$, b is said to be _____ proportional between a and c . **(K.B +A.B)**
 (a) Third (b) Fourth
 (c) Mean (d) None of these
- (6) In continued proportion $a : b = b : c$, c is said to be _____ proportional between a and b . **(K.B +A.B)**
 (a) Third (b) Fourth
 (c) Means (d) None of these
- (7) Find x in proportion $4 : x :: 5 : 15$ **(K.B +U.B)**
 (a) $\frac{75}{4}$ (b) $\frac{4}{3}$
 (c) $\frac{3}{4}$ (d) 12
- (8) If $u \propto v^2$, then (LHR 2014, MTN 2015, D.G.K 2014) **(K.B +U.B)**
 (a) $u = v^2$ (b) $u = kv^2$
 (c) $uv^2 = k$ (d) $uv^2 = 1$
- (9) If $y^2 \propto \frac{1}{x^3}$, then (FSD 2015, SWL 2014, D.G.K 2015) **(K.B +A.B)**

Unit-3

Variations

(a) $y^2 = \frac{k}{x^3}$

(b) $y^2 = \frac{1}{x^3}$

(c) $y^2 = x^2$

(d) $y^2 = kx^3$

(10) If $\frac{u}{v} = \frac{v}{w} = k$, then

(LHR 2014, D.G.K 2015)

(K.B +U.B)

(a) $u = wk^2$

(b) $u = vk^2$

(c) $u = w^2k$

(d) $u = v^2k$



Unit-3

Variations

- (11) The third proportional of x^2 and y^2 is; **(K.B +A.B)**
(GRW 2014, MTN 2015, D.G.K 2015)
- (a) $\frac{y^2}{x^2}$ (b) x^2y^2
- (c) $\frac{y^4}{x^2}$ (d) $\frac{y^2}{x^4}$
- (12) The fourth proportional w of $x : y :: v : w$ is; **(K.B +U.B)**
(FSD 2014, 15, RWP 2014)
- (a) $\frac{xy}{v}$ (b) $\frac{vy}{x}$
- (c) xyv (d) $\frac{x}{vy}$
- (13) If $a : b = x : y$, then alternando property is; **(K.B +U.B)**
(SGD 2014)
- (a) $\frac{a}{x} = \frac{b}{y}$ (b) $\frac{a}{b} = \frac{x}{y}$
- (c) $\frac{a+b}{x} = \frac{x+y}{y}$ (d) $\frac{a-b}{x} = \frac{x-y}{y}$
- (14) If $a : b = x : y$, then invertendo property is; **(K.B +U.B)**
- (a) $\frac{a}{x} = \frac{b}{y}$ (b) $\frac{a}{a-b} = \frac{x}{x-y}$
- (c) $\frac{a+b}{b} = \frac{x+y}{y}$ (d) $\frac{b}{a} = \frac{y}{x}$
- (15) If $\frac{a}{b} = \frac{c}{d}$, then componendo property is; **(K.B +U.B)**
(FSD 2014, SGD 2014, RWP 2015)
- (a) $\frac{a}{a+b} = \frac{c}{c+d}$ (b) $\frac{a}{a-b} = \frac{c}{c-d}$
- (c) $\frac{ad}{bc}$ (d) $\frac{a-b}{b} = \frac{c-d}{d}$

ANSWER KEY

1	b	6	a	11	c
2	c	7	d	12	b
3	b	8	b	13	a
4	a	9	a	14	d
5	c	10	a	15	a

Unit-3

Variations

Q.2 Write short answers of the following questions.

(i) Define ratio and give one example.

Ans. See definition Page # 87. **(K.B)**

(ii) Define proportion. **(K.B)**

Ans. See definition Page # 87.

(iii) Define direct variation. **(K.B)**

Ans. See definition Page # 92.

(iv) Define inverse variation. **(K.B)**

Ans. See definition Page # 93.

(v) State theorem of componendo-dividendo. **(K.B)**

Ans. See theorem on proportion Pg # 103.

(vi) **Given.** **(A.B)**

$$6 : x :: 3 : 5$$

Required

Value of $x = ?$

Solution:

Here

$$6 : x :: 3 : 5$$

Product of extremes = product of means

$$6 \times 5 = 3 \times x$$

$$\frac{30}{3} = x$$

$$\Rightarrow x = 10$$

(vii) **Given** **(A.B)**

$$x \propto y^2$$

$$x = 27 \text{ when } y = 4$$

To find

$$y = ? \text{ when } x = 3$$

Solution:

Here

$$x \propto y^2$$

$$x = ky^2 \rightarrow (i)$$

For value of k

$$\text{Put } x = 27 \text{ and } y = 4$$

$$27 = k(4)^2$$

$$\frac{27}{16} = k$$

Or $k = \frac{27}{16}$

$$x = \frac{27}{16} y^2$$

For value of y

$$\text{Put } k = \frac{27}{16} \text{ and } x = 3$$

$$3 = \frac{27}{16} y^2$$

$$\frac{48}{27} = y^2$$

$$\frac{16}{9} = y^2$$

$$y^2 = \frac{16}{9}$$

Taking square root

$$\Rightarrow y = \pm \frac{4}{3}$$

(viii) **Given** **(A.B)**

$$u \propto \frac{1}{v}$$

$$u = 8, v = 3$$

To find

$$v = ? \text{ when } u = 12$$

Solution:

Here

$$u \propto \frac{1}{v}$$

$$u = \frac{k}{v} \rightarrow (i)$$

For value of k

Put $u = 8$ and $v = 3$ in equation (i)

$$8 = \frac{k}{3}$$

$$\Rightarrow k = 24$$

$$u = \frac{24}{v}$$

For value of v

Put $k = 24$ and $u = 12$ in equation (i)

$$12 = \frac{24}{v}$$

$$v = 2$$

Result

$$v = 2 \text{ when } u = 12$$

(ix) Let fourth proportional = x **(A.B)**
(LHR 2014, GRW 2017, BWP 2016)

According to given condition

$$8 : 7 :: 6 : x$$

\therefore Product of extremes = Product of means

$$8x = 7 \times 6$$

Unit-3

Variations

$$x = \frac{42}{8}$$

$$x = \frac{21}{4}$$

Result:

$$\text{Fourth proportional} = x = \frac{21}{4}$$

- (x) Let mean proportional = x **(A.B)**
(GRW 2015, 17 FSD 2016, MTN 2015, 17, BWP 2015)

According to given condition

$$16 : x :: x : 49$$

∴ Product of means = product of extremes

$$x^2 = 16 \times 49$$

$$x^2 = 784$$

Taking square root on both sides

$$x = 28$$

Result:

Mean proportional = 28

- (xi) Let third proportional = x **(A.B)**
(SWL 2014, SGD 2014, D.G.K 2016)

According to given condition

$$28 : 4 :: 4 : x$$

Product of extremes = product of means

$$28x = 4 \times 4$$

$$x = \frac{16}{28}$$

$$\Rightarrow x = \frac{4}{7}$$

Result:

$$\text{Third proportional} = \frac{4}{7}$$

- (xii) **Given** **(A.B)**

$$y \propto \frac{x^2}{z}$$

$$y = 28 \text{ when } x = 7, z = 2$$

Required

Value of $y = ?$

Solution:

$$\text{Given that } y \propto \frac{x^2}{z}$$

$$y = k \frac{x^2}{z} \rightarrow (i)$$

For value of k

Put $y = 28, x = 7, z = 2$ in equation (i)

$$28 = k \frac{(7)^2}{2}$$

$$28 \times 2 = 49k$$

$$\frac{56}{49} = k \text{ or } k = \frac{8}{7}$$

For value of y

Put $k = \frac{8}{7}$ in equation (i)

$$y = \frac{8}{7} \frac{x^2}{z} = \frac{8x^2}{7z}$$

- (xiii) **Given data:** **(A.B)**

$$z \propto xy$$

$$z = 36 \text{ when } x = 2, y = 3$$

Required

$$z = ?$$

Solution:

$$z \propto xy$$

$$z = kxy \rightarrow (i)$$

For value of k

Put $z = 36, x = 2, y = 3$ in equation (i)

$$36 = k(2)(3)$$

$$\frac{36}{6} = k$$

$$6 = k$$

For value of z

Put $k = 6$ in equation (i)

$$z = 6xy$$

- (xiv) **Given data** **(A.B)**

$$w \propto \frac{1}{v^2}$$

$$w = 2 \text{ when } v = 3$$

Required

Value of $w = ?$

Solution:

$$\text{Here } w \propto \frac{1}{v^2}$$

$$w = k \times \frac{1}{v^2} \rightarrow (i)$$

For value of k

Put $w = 2, v = 3$ in equation (i)

$$2 = k \times \frac{1}{(3)^2}$$

$$2 \times 9 = k$$

$$18 = k$$

For value of w

Put $k = 18$ in equation (i)

$$w = 18 \times \frac{1}{v^2}$$

$$w = \frac{18}{v^2}$$

Unit-3

Variations

Q.3 Fill in the blanks

- (i) The simplest form of the ratio $\frac{(x+y)(x^2+xy+y^2)}{x^3-y^3}$ is _____. **(K.B)**
- (ii) In a ratio $x : y$; x is called _____. **(K.B)**
- (iii) In a ratio $a : b$; b is called _____. **(K.B)**
- (iv) In a proportion $a : b :: x : y$; a and y are called _____. **(K.B)**
- (v) In a proportion $p : q :: m : n$; q and m are called _____. **(K.B)**
- (vi) In proportion $7 : 4 :: p : 8$, $p =$ _____. **(A.B)**
- (vii) If $6 : m :: 9 : 12$, then $m =$ _____. **(A.B)**
- (viii) If x and y varies directly, then $x =$ _____. **(A.B)**
- (ix) If v varies directly as u^3 , then $u^3 =$ _____. **(A.B)**
- (x) If w varies inversely as p^2 , then $k =$ _____. **(A.B)**
- (xi) A third proportional of 12 and 4, is _____. **(A.B)**
- (xii) The fourth proportional of 15, 6, 5 is _____. **(A.B)**
- (xiii) The mean proportional of $4m^2n^4$ and p^6 is _____. **(A.B)**
- (xiv) The continued proportion of 4, m and 9 is _____. **(A.B)**

ANSWER KEY

- | | |
|-----------------------|---------------------------|
| (i) $\frac{x+y}{x-y}$ | (ix) $\frac{v}{k}$ |
| (ii) Antecedent | (x) p^2w |
| (iii) Consequent | (xi) $\frac{4}{3}$ |
| (iv) Extremes | (xii) 2 |
| (v) Means | (xiii) $K = \pm 2mn^2p^3$ |
| (vi) $p = 14$ | (xiv) $m = \pm 6$ |
| (vii) $m = 8$ | |
| (viii) ky | |

CUT HERE

SELF TEST

Time: 40 min

Marks: 25

Q.1 Four possible answers (A), (B), (C) & (D) to each question are given, mark the correct answer. (7×1=7)

1 The third proportional of x^2 and y^2 is:

- (A) $\frac{y^2}{x^2}$ (B) x^2y^2
 (C) $\frac{y^4}{x^2}$ (D) $\frac{y^2}{x^4}$

2 If 16, a and 4 are in continued proportion, then a is equal to:

- (A) $\pm\sqrt{20}$ (B) ± 8
 (C) ± 64 (D) $\pm\sqrt{12}$

3 Find x in proportion $4 : x :: 5 : 15$

- (A) $\frac{75}{4}$ (B) $\frac{4}{3}$
 (C) $\frac{3}{4}$ (D) 12

4 In a ratio $x : y$, “y” called

- (A) Relation (B) Antecedent
 (C) Consequent (D) None

5 If $\frac{u}{v} = \frac{v}{\omega} = k$, then

- (A) $u = \omega k^2$ (B) $u = vk^2$
 (C) $u = \omega^2 k$ (D) $u = v^2 k$

6 If $a : b = x : y$, then invertendo property is:

- (A) $\frac{a+b}{b} = \frac{x+y}{y}$ (B) $\frac{a}{a-b} = \frac{x}{x-y}$
 (C) $\frac{a}{c} = \frac{b}{y}$ (D) $\frac{b}{a} = \frac{y}{x}$

7 As ‘x’ and ‘y’ varies inversely and $x = 2$ and $k = 6$ then ‘y’ is:

- (A) 3 (B) 12
 (C) $3/2$ (D) 8

Unit-3

Variations

Q.2 Give Short Answers to following Questions.

(5×2=10)

- (i) Find the third proportional of: $a^2 - b^2, a - b$
- (ii) If $a : b = c : d, (a, b, c, d \neq 0)$, then show that $\frac{a}{b} = \sqrt{\frac{a^2 + c^2}{b^2 + d^2}}$
- (iii) If y varies inversely as x^2 and $y = 16$, when $x = 5$, so find x , when $y = 100$.
- (iv) Find a , if the ratios $a + 3 : 7 + a$ and $4 : 5$ are equal.
- (v) If y varies jointly as x^2 and z and $y = 6$ when $x = 4, z = 9$. Write y as a function of x and z and determine the value of y , when $x = -8$ and $z = 12$.

Q.3 Answer the following Questions.

(4+4=8)

- (a) Solve the following by using componendo-dividendo property. $\frac{\sqrt{x+3} + \sqrt{x-3}}{\sqrt{x+3} - \sqrt{x-3}} = \frac{4}{3}$.
- (b) If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} (a, b, c, d, e, f \neq 0)$, then show that $\frac{ac + ce + ea}{bd + df + fb} = \left[\frac{ace}{bdf} \right]^{2/3}$

NOTE: Parents or guardians can conduct this test in their supervision in order to check the skill of students.