MARCH
REVISION

المنقذ

You Must Add Value

MATH

اعداد

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PREP 2

2026

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مجاب عنه

Question 1 : Choose the correct answer :

1. If $\frac{a}{4}=\frac{b}{7}$ what is the value of $\frac{2a-b}{b-a}$? a=4k b=7k

   (a) $\frac{1}{3}$ (b) $\frac{8}{3}$ (c) $\frac{15}{7}$ (d) $\frac{15}{3}$

2. If $3x=-7$, what is the value of $\frac{6x}{y}$?

   (a) 14 (b) $\frac{-7}{3}$ (c) $\frac{7}{3}$ (d) -14

3. If $x\times y=\{(5,2)\}$ what is the value of $n(x^2)\times n(y^2)$?

   (a) 100 (b) 10 (c) 1 (d) 29

4. If $3x=5y=4Z\ then\ \ x:y:z$ equals

   (a) $9:12:16$ (b) $15:10:9$ (c) $20:12:15$ (d) $8:5:3$

5. If $8a=2b$ what is the value of $\frac{a}{b}$?

   (a) $\frac{1}{2}$ (b) 4 (c) $\frac{3}{8}$ (d) $\frac{1}{4}$

6. If $\frac{a}{b}=\frac{b}{c}$ then $\frac{a}{b}$ equals?

   (a) b^2 (b) $\frac{a+b}{b+c}$ (c) $\frac{a^2}{b^2}$ (d) $\frac{ac}{b^2}$

7. If $n(x\times y)=15y=\{1,0,-1\}$ $then\ ,n(x^2)=$

   (a) 5 (b) 9 (c) 15 (d) 25

8. What is the third proportional to the two quantities x.$2x^3$?

   (a) $4x^5$ (b) $2x^4$ (c) $2x^3$ (d) x^2

9. If $n(x^2)=9$, $n(x+y)=12$ $then\ n(y^2)$?

   (a) 4 (b) 6 (c) 9 (d) 16

Question 2 : Answer the following questions :

1. Find the number that if added to the ratio **5**: **11** become **4**: **7**

2. If a,b,c,d in a continued proportion
Prove that $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$

3. If x,y,16 are in proportion x+y=12 , each of x , y ?

4. If $\frac{x}{3} = \frac{y}{4} = \frac{2}{5}$ prove that : $\sqrt{x^2+y^2} = 2x + y - Z$

5. If a,b,c are continued proportional Prove that : $\frac{b}{b+c} = \frac{a}{b+a}$

6. If $\frac{x}{y} = \frac{2}{3}$ find the value of the ratio $\frac{3x+2y}{6y-x}$

7. If $x = \{2,-1\}, y = \{4,0\}$
$z = \{4,5,-2\}$ find :

1) $(y \cap z) \times x$

2) $n(y)^2$

Model (2)

Question 1 : Choose the correct answer :

1. If $\frac{a}{5} = \frac{b}{3}$ what is the value of $\frac{a+b}{a-b}$?

(a) $\frac{8}{3}$ (b) $\frac{5}{3}$ (c) $\frac{1}{4}$ (d) 4

2. If $2a = 3b = 4c$ then a:b:c equals ?

(a) 3,4,6 (b) 6,4,3 (c) 2,3,4 (d) 2,3,6

3. If $(3,\sqrt{4}) = (3,8)$ what is the value of $\sqrt[3]{y}$?

(a) -4 (b) 4 (c) 8 (d) 64

4 If $(48,2y) = (x^2 - 1, y)$ what is the value of xy ?

(a) -7 (b) 7 (c) 14 (d) ± 14

5 What is the mean proportional between $3x^3, 27x$?

(a) $9x^2$ (b) $\pm 9x^2$ (c) $9x^2$ (d) $\pm 6x^2$

6 If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{3}{4}$ what is the value of $\frac{a+3c+2e}{b+3d+2f}$

(a) $\frac{c}{f}$ (b) $\frac{a}{d}$ (c) $\frac{3}{4}$ (d) $\frac{9}{16}$

7 If $n(x) = 3, n(x+y) = 12$ *then* $n(y) =$

(a) 4 (b) 9 (c) 15 (d) 36

8 If $(x, y-1) = (4,3)$ *then* $\frac{x}{y} =$

(a) 1 (b) 2 (c) 3 (d) 4

9 If $\frac{x}{4} = \frac{y}{3} = \frac{x+5y}{m}$ what is the value of m ?

(a) 7 (b) 10 (c) 12 (d) 19

Question 2 : Answer the following questions :

1 If b is a mean proportional between a.c prove that :
$\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$

2 If $7, x, \frac{1}{y}$ *continued proportion find* : x^4y^2

3 IF a,b,c,d are proportional prove : $\frac{a+d}{b-c+d} = \frac{a-c}{b-c}$

4 IF $\frac{2a-7b}{2a \to 7b} = \frac{2c-7b}{2c+7b}$ then prove that the quantities a,b,c,d are proportional:

5 If $\frac{x}{3} = \frac{y}{4} = \frac{z}{6} = \frac{4x-2y+z}{k+5}$ find the value of k

6 If $\frac{3}{x} = \frac{4}{y} = \frac{5}{7}$ *prove* $\sqrt{x^2+y^2} = 2x + y - z$

7 IF $x = \{6,4,8\}$, $y = \{3,4,5\}$ find each of the following and represent it :
1) $(xny)Xy$
2) $(x - y) \times y$

Model (3)

Question 1 : Choose the correct answer :

1 If $2x = 7y$ what is the value of $\left(\frac{x}{y}\right)^{-1}$?

(a) $\frac{2}{7}$ (b) $\frac{7}{2}$ (c) $\frac{49}{4}$ (d) $\frac{4}{49}$

2 If $\frac{a}{3} = \frac{b}{5}$, $5a - 2b = 20$ what is the value of b ?

(a) 3 (b) 5 (c) 15 (d) 20

3 If $4x^2 = 9y^2$ what is the value of $\frac{x}{y}$?

(a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\pm\frac{2}{3}$ (d) $\pm\frac{3}{2}$

4 If $\frac{a}{3} = \frac{b}{m} = \frac{2a+3b}{21}$ what is the value of m ?

(a) 3 (b) 5 (c) 10 (d) 15

5 If $\frac{a}{b} = \frac{2}{7}$ what is the value of $\frac{2b}{7a}$?

(a) $\frac{4}{49}$ (b) $\frac{2}{7}$ (c) 1 (d) $\frac{49}{4}$

6 If a,b,c,d are proportional quantities then : $ad = bc$

(a) $\frac{b}{d} = \frac{a}{c}$ (b) $\frac{a}{c} = \frac{d}{b}$ (c) $\frac{b}{c} = \frac{a}{d}$ (d) $ab = cd$

7 If $\frac{a}{c+a-b} = \frac{b}{a+b-c} = \frac{c}{b+c-a}$ then each ratio equals :

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1

8 What is the mean proportional between $4(x + y^2), 25(x - y^2)$

(a) $100(x + y)^2$ (b) $100(x - y)^2$
(c) $\pm 100(x - y)^2$ (d) $\pm 100(x^2 - y^2)$

9 If $(2^x - 1, -3) = (1, y)$ what is the value of $2x - y$

(a) -3 (b) -1 (c) 3 (d) 5

Question 2 : Answer the following questions :

1. If 4,x.y,32 are in continued proportion , then find the value of each of x,y ?

2. Find the number which if subtracted from each of the number 21,15,11makes them in continued proportion $21-k=15-k$,$11-k$

3. If $\frac{a}{2x+y}$, $\frac{b}{x+2y}$ prove that $b=(x+2y)k$

4. If $\frac{a}{b}=\frac{3}{5}$ find the value of $\frac{20a-7b}{15a+b}$

5. If $\frac{x}{2}=\frac{y}{4}=\frac{z}{5}$ $and\ x+y-2z=12$,
Find the value of z ?

6. The first proportion for the number $\sqrt{8},7,14\sqrt{2}$

7. If $a+b+c=26,8a=12b=3c$
Find the value of each of a,b,c , Lcm=24

Model (4)

Question 1 : Choose the correct answer :

1. Which of the following ordered pairs does not belong to Q×Q ?

(a) $\left(\frac{-3}{2},\frac{1}{4}\right)$ (b) $\left(-\sqrt{\frac{1}{9}},-9\right)$ (c) $(\sqrt{12},-5)$ (d) $\left(\sqrt[3]{27},\frac{\sqrt[3]{-1}}{8}\right)$

2. If $n(x^2)=9$, $n(y^2)=16$ then $n=(y\times x)=\cdots$

(a) 7 (b) 12 (c) 36 (d) 144

3. If $(28,2y)=(x^2-1,4)$ what is the value of xy ?

(a) -7 (b) 7 (c) 14 (d) ± 14

4. If $x, 8, x^2$ are in proportion, then x=……

   a) $8x^3$ b) 8 c) x^3 d) 4

5. If $\frac{3}{m} = \frac{7}{n}, n - m = 20$ what is the value of ?

   a) 4 b) 12 c) 15 d) 35

6. If $a:b = c:d$ *then* $\frac{2a+5c}{2b+5d}$ does not equal

   a) $\frac{a}{b}$ b) $\frac{c}{d}$ c) $\frac{a+c}{b+d}$ d) $\frac{a-c}{d\_b}$

7. If $\frac{a}{b} = \frac{b}{c} = \frac{4}{5}$ *and* $a + b + c = 122$ what is the value of a ?

   a) 4 b) 132 c) 40 d) 50

8. If $\frac{a}{b} = \frac{b}{c} = 3$ then which of the following is correct ?

   a) $a = 3c$ b) $a = 9b$ c) $a = 9c$ d) $a = 6c$

9. If $a:b = b:c$ *then* $a^4:b^4$ equals ?

   a) $ac:b^2$ b) $a^2:c^2$ c) $c^2:b^2$ d) $b^2 = ac$

Question 2 : Answer the following questions :

1. Find the value of y that makes the quantities :
   10 , 2y , 3y , 15 are proportional

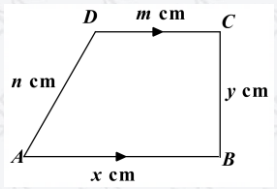
2. If a,b,c,d are proportional quantities prove $\frac{a+c}{b+d} = \frac{a^2+c2}{ab+cd}$

3. If $\frac{a}{3} = \frac{b}{4} = \frac{c}{5} = \frac{4a+mb+5c}{25}$ find the value of m ?

4. Is the given figure :

   $ABCD$ *is* a right – angled trapezium at B , perimeter equals 36cm

   If $10x = 15y = 20cm = 12n$, find x,y,m,n



5. If 3, L ,12 , M are in continued proportion , find the value of each of L , m ?

6 If the quantities 35,15,3,2x+1 are proportional m then find the numerical value of x ?

7 If $x = \{2,3,4\}$, $y = \{a, b\}$ find:

1) y^2 = ...

2) $n(x^2)$ = ...

Model (5)

Question 1 : Choose the correct answer :

1 If $x = \{1,2\}$ *then* $x \times \phi =$

(a) x (b) $\emptyset$ (c) $\{0\}$ (d) $\{(1,0),(2,0)\}$

2 If $x = \{2,3,4,7,8\}$, $y = \{1,4,5,6\}$ then $n(x^2) - n(x \times y)$

(a) 5 (b) 10 (c) 15 (d) 25

3 If $\frac{5a-7b}{2a+3b} = 0$ what is the value of $\frac{a}{b}$?

(a) $\frac{5}{7}$ (b) $\frac{7}{5}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

4 If $\frac{a}{2} = \frac{b}{8} = \frac{a+\frac{1}{4}b}{x}$ what is the value of x ?

(a) 4 (b) 6 (c) 8 (d) 10

5 If $\frac{5}{x} = \frac{6}{y}$ what is the value of $\frac{2x+y}{y-x}$?

(a) 5 (b) $\frac{11}{16}$ (c) $\frac{16}{11}$ (d) 16

6 What is the mean proportional between a , c ?

(a) $\sqrt{a+c}$ (b) $\frac{a+c}{2}$ (c) $\pm\sqrt{ac}$ (d) ac

7 What is the following numbers are proportional ?

(a) 2,6,4 (b) 3,5,8 (c) 3,9,27 (d) 1,4,9

8 If x is the positive mean proportional between 24,54 what is the value of x ?

(a) 15 (b) 36 (c) 39 (d) 78

9 If $\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=\frac{1}{4}$ so what is the value $\frac{a+b+c}{b+c+d}$?

ⓐ $\frac{1}{8}$ ⓑ $\frac{1}{64}$ ⓒ $\frac{1}{4}$ ⓓ $\frac{3}{4}$

Question 2 : Answer the following questions :

1 If $\boldsymbol{x}=\{\mathbf{1},\mathbf{2},\mathbf{3}\},\boldsymbol{y}=\{\boldsymbol{a},\boldsymbol{b},\boldsymbol{c}\}$
How many ordered Paris $(\boldsymbol{x},\boldsymbol{y})\in\boldsymbol{x}\times\boldsymbol{y}$ satisfying that the first projection is an odd number and the second projection is not b ?

2 If $x\times y=\{(2,6),(2,7),(3,6),(3,9),(5,6),(5,9)\}$, then find each of x,y?

3 If 3,a,b,81 are in continued proportion , then find the value of each of a, b?

4 If x , y , 5 are in proportion $x+y=30$, then find each of x , y ?

5 If b is the mean proportional between a , c prove $\frac{a-b}{a}=\frac{a-c}{a_{+b}}$

6 If $a:b=3:5$ find the value of $20a-7b:15a+b$

7 Find the number which if added to each of the numbers 1,13,7,31 they become proportional numbers

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Question 1 : Choose the correct answer :

1) If $\frac{a}{4}=\frac{b}{7}$ what is the value of $\frac{2a-b}{b-a}$? a=4k b=7k

(a) $\frac{1}{3}$ (b) $\frac{8}{3}$ (c) $\frac{15}{7}$ (d) $\frac{15}{3}$

2) If $3x=-7$, what is the value of $\frac{6x}{y}$?

(a) 14 (b) $\frac{-7}{3}$ (c) $\frac{7}{3}$ (d) -14

3) If $x\times y=\{(5,2)\}$ what is the value of $n(x^2)\times n(y^2)$?

(a) 100 (b) 10 (c) 1 (d) 29

4) If $3x=5y=4Z\ then\ \ x:y:z$ equals

(a) 9: 12: 16 (b) 15: 10: 9 (c) 20: 12: 15 (d) 8: 5: 3

5) If $8a=2b$ what is the value of $\frac{a}{b}$?

(a) $\frac{1}{2}$ (b) 4 (c) $\frac{3}{8}$ (d) $\frac{1}{4}$

6) If $\frac{a}{b}=\frac{b}{c}$ then $\frac{a}{b}$ equals?

(a) b^2 (b) $\frac{a+b}{b+c}$ (c) $\frac{a^2}{b^2}$ (d) $\frac{ac}{b^2}$

7) If $n(x\times y)=15y=\{1,0,-1\}$ $then\ ,n(x^2)=$

(a) 5 (b) 9 (c) 15 (d) 25

8) What is the third proportional to the two quantities x.$2x^3$?

(a) $4x^5$ (b) $2x^4$ (c) $2x^3$ (d) x^2

9) If $n(x^2)=9$, $n(x+y)=12$ $then\ n(y^2)$?

(a) 4 (b) 6 (c) 9 (d) 16

Question 2 : Answer the following questions :

1) Find the number that if added to the ratio **5**: **11** become **4**: **7**

$$\frac{5+x}{11+x}=\frac{4}{7}\rightarrow 7(5+x)=4(11+x)$$
$$7x+35=44+4x$$
$$3x=9 \qquad x=3$$

② If a,b,c,d in a continued proportion

Prove that $\frac{a}{b+d} = \frac{c^3}{c^2d+d^3}$

$$a = dk^3 \quad b = dk^2 \quad c = dk$$

$$\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = k$$

$$L \cdot H \cdot S = \frac{(dk^3)}{dk^2 + d} = \frac{dk^3}{d(k^2+1)} = \frac{k^3}{k^2+1}$$

$$R \cdot H \cdot S = \frac{(dk)^3}{d^2k^2 \cdot d + d^3} = \frac{d^3k^3}{d^3(k^2+1)} = \frac{k^3}{k^2+1}$$

L.H.S = R.H.S

③ If x,y,16 are in proportion x+y=12 , each of x , y ?

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

$$x = \frac{y^2}{16} \quad \frac{y2}{16} + y = 12 \rightarrow y^2 + 16y = 192$$

$$y^2 + 16y - 192 = 0 \rightarrow (y+24)(y-8) = 0$$

$$y = -24, \quad y = 8$$

$$x = 36, \quad x = 4$$

④ If $\frac{x}{3} = \frac{y}{4} = \frac{2}{5}$ prove that : $\sqrt{x^2+y^2} = 2x + y - Z$

$$\frac{x}{3} = \frac{y}{4} = \frac{z}{5} = k$$

$$x = 3ky = 4kz = 5k$$

$$L \cdot H \cdot S = \sqrt{x^2+y^2} = \sqrt{(3k)^2 + (4k)^2} = \sqrt{25k^2} = 5K$$

$$R \cdot H \cdot .S = 2(3k) + 4k - 5k = 5k + 4k - 5k = 5k$$

L.H.S=R.H.S

⑤ If a,b,c are continued proportional Prove that : $\frac{b}{b+c} = \frac{a}{b+a}$

$$\frac{9}{b}=\frac{b}{c}=k$$

$$b=cka=ck^2$$

$$L\cdot H\cdot S=\frac{ck}{c+ck}=\frac{ck}{c(1+k)}=\frac{k}{1+k}$$

$$R.H.S=\frac{ck2}{ck+ck^2}=\frac{ck^2}{ck(1+k)}=\frac{k}{1+k}$$

L.H.S=R.H.S

6 If $\frac{x}{y}=\frac{2}{3}$ find the value of the ratio $\frac{3x+2y}{6y-x}$

$$x=2ky=3k$$

$$\frac{3(2k)+2(3k)}{6(3k)-2k}=\frac{6k+6k}{18k-2k}=\frac{12k}{16k}=\frac{3}{4}$$

7 If $x=\{2,-1\}, y=\{4,0\}$ $z=\{4,5,-2\}$ find :

1) $(y\cap z)\times x$

$y\cap z=\{4\}$

$[43\times\{2,-1\}]=\{(4,2),(4,-1)\}$

2) $n(y)^2$

$n(y)=2\rightarrow n(y^2)=4$

Model (2)

Question 1 : Choose the correct answer :

1 If $\frac{a}{5}=\frac{b}{3}$ what is the value of $\frac{a+b}{a-b}$?

(a) $\frac{8}{3}$ (b) $\frac{5}{3}$ (c) $\frac{1}{4}$ (d) 4

2 If $2a=3b=4c$ then a:b:c equals ?

(a) 3,4,6 (b) 6,4,3 (c) 2,3,4 (d) 2,3,6

3. If $(3,\sqrt{4}) = (3,8)$ what is the value of $\sqrt[3]{y}$?

(a) -4 (b) 4 (c) 8 (d) 64

4. If $(48,2y) = (x^2-1,y)$ what is the value of xy ?

(a) -7 (b) 7 (c) 14 (d) ± 14

5. What is the mean proportional between $3x^3, 27x$?

(a) $9x^2$ (b) $\pm 9x^2$ (c) $9x^2$ (d) $\pm 6x^2$

6. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{3}{4}$ what is the value of $\frac{a+3c+2e}{b+3d+2f}$

(a) $\frac{c}{f}$ (b) $\frac{a}{d}$ (c) $\frac{3}{4}$ (d) $\frac{9}{16}$

7. If $n(x) = 3, n(x+y) = 12$ *then* $n(y) =$

(a) 4 (b) 9 (c) 15 (d) 36

8. If $(x, y-1) = (4,3)$ *then* $\frac{x}{y} =$

(a) 1 (b) 2 (c) 3 (d) 4

9. If $\frac{x}{4} = \frac{y}{3} = \frac{x+5y}{m}$ what is the value of m ?

(a) 7 (b) 10 (c) 12 (d) 19

Question 2 : Answer the following questions :

1. If b is a mean proportional between a.c prove that :

$$\frac{a^2}{b^2} + \frac{b^2}{c^2} = \frac{2a}{c}$$

$$b2 = ac$$

$$L \cdot H \cdot S = \frac{a^2}{ac} + \frac{ac}{c^2} = \frac{a}{c} + \frac{a}{c}$$

$$R \cdot H \cdot s = \frac{2a}{c}$$

L.H.S=R.H.S

2. If $7, x, \frac{1}{y}$ *continued proportion find* : x^4y^2

$$\frac{7}{x} = \frac{x}{\frac{1}{y}} \rightarrow x^2 = \frac{7}{y}$$

$$x^2y = 7 \rightarrow (x^2y)^2 = (7)^2 = 49$$

$$= x^4y^2$$

③ IF a,b,c,d are proportional prove : $\frac{a+d}{b-c+d}=\frac{a-c}{b-c}$

$$a=dK^3 \qquad c=dk \qquad b=dK^2$$
$$\frac{a}{b}=\frac{b}{c}=\frac{c}{d}=k$$
$$L\cdot H\cdot S=\frac{dk^3+d}{dk^2-dk+d}=\frac{d(k+1)(k^2-k+1)}{d(k^2-k+1)}$$
$$=k+1\rightarrow R.H.S=\frac{dk^3-dk}{dk^2-dk}=\frac{dk(k-1)(k+1)}{dk(k-1)}$$
$$=\boldsymbol{K+1\rightarrow L.H.S=R.H.S=K+1}$$

④ IF $\frac{2a-7b}{2a\rightarrow 7b}=\frac{2c-7b}{2c+7b}$ then prove that the quantities a,b,c,d are proportional:

$$(2a-7b)(2c+7d)=(2a+7b)(2c-7d)$$
$$4ac+14ad-14bc-49bd=4ac-14ad+14$$
$$bc-49bd\rightarrow 14ad+14ad=14bc+14bc$$
$$28ad=28bc\rightarrow ad=bc$$
$$\frac{a}{b}=\frac{c}{d}$$

⑤ If $\frac{x}{3}=\frac{y}{4}=\frac{z}{6}=\frac{4x-2y+z}{k+5}$ find the value of k

$$x=3t \quad , \quad y=4t \quad , \quad z=6t$$
$$\frac{x}{3}=\frac{y}{4}=\frac{2}{6}=t$$
$$\frac{4x-2y+z}{k+5}=\frac{4(3t)-2(4t)+6t}{k+5}=t$$
$$\frac{12t-8t+6t}{k+5}=t=\frac{10t}{k+5}=t$$
$$\frac{10}{k+5}=1\rightarrow k+5=10$$
$$k=5$$

⑥ If $\frac{3}{x}=\frac{4}{y}=\frac{5}{7}$ $prove\ \sqrt{x^2+y^2}=2x+y-z$

$$x=3ky=4kz=5k$$
$$L\cdot H\cdot S=\sqrt{x^2+y^2}=\sqrt{9k^2+16k^2}=\sqrt{25k^2}=5k$$
$$R\cdot H.S=2(3k)+4k-5k=6k+4k-5k=5K$$
$$L.H.S=R.H.S=5K$$

⑦ IF $x=\{6,4,8\}$, $y=\{3,4,5\}$ find each of the following and represent it :

1) $(xny)Xy$

$xny=\{4\}$

$\{4\} \times \{3,4,5\} = \{(3,4),(4,4),(4,5)\}$

2) $(x-y) \times y$

$(x-y) = \{6,8\}$

$\{6,8\} \times \{3,4,5\} = \{(6,3),(6,4),(6,5),(8,3),(8,4),(8,5)\}$

Model (3)

Question 1 : Choose the correct answer :

1. If $2x = 7y$ what is the value of $\left(\frac{x}{y}\right)^{-1}$?

   (a) $\frac{2}{7}$ (b) $\frac{7}{2}$ (c) $\frac{49}{4}$ (d) $\frac{4}{49}$

2. If $\frac{a}{3} = \frac{b}{5}$, $5a - 2b = 20$ what is the value of b ?

   (a) 3 (b) 5 (c) 15 (d) 20

3. If $4x^2 = 9y^2$ what is the value of $\frac{x}{y}$?

   (a) $\frac{9}{4}$ (b) $\frac{3}{2}$ (c) $\pm\frac{2}{3}$ (d) $\pm\frac{3}{2}$

4. If $\frac{a}{3} = \frac{b}{m} = \frac{2a+3b}{21}$ what is the value of m ?

   (a) 3 (b) 5 (c) 10 (d) 15

5. If $\frac{a}{b} = \frac{2}{7}$ what is the value of $\frac{2b}{7a}$?

   (a) $\frac{4}{49}$ (b) $\frac{2}{7}$ (c) 1 (d) $\frac{49}{4}$

6. If a,b,c,d are proportional quantities then : $ad = bc$

   (a) $\frac{b}{d} = \frac{a}{c}$ (b) $\frac{a}{c} = \frac{d}{b}$ (c) $\frac{b}{c} = \frac{a}{d}$ (d) $ab = cd$

7. If $\frac{a}{c+a-b} = \frac{b}{a+b-c} = \frac{c}{b+c-a}$ then each ratio equals :

   (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) 1

8. What is the mean proportional between $4(x+y^2), 25(x-y^2)$

   (a) $100(x+y)^2$ (b) $100(x-y)^2$

   (c) $\pm 100(x-y)^2$ (d) $\pm 100(x^2-y^2)$

9 If $(2^x - 1, -3) = (1, y)$ what is the value of $2x - y$

(a) -3 (b) -1 (c) 3 (d) 5

Question 2 : Answer the following questions :

1 If 4,x.y,32 are in continued proportion , then find the value of each of x,y ?

$$\frac{4}{x} = \frac{x}{y} = \frac{y}{32}$$

$$x^2 = 4y$$
$$y = \frac{x^2}{4}$$

$$y^2 = 32x \rightarrow \left(\frac{x^2}{4}\right)^2 = 32x$$

$$\frac{x^4}{16} = 32 \rightarrow x^4 = 512x = x^3 = 512$$

$$x = 8 , y = 16$$

2 Find the number which if subtracted from each of the number 21,15,11makes them in continued proportion $21 - k = 15 - k$,$11 - k$

$$(15 - k)^2 = (21 - k)(11 - k)$$
$$231 - 32k + k^2 = 225 - 30k + k^2$$
$$225 - 30k = 231 - 32k$$
$$2k = 6 \quad , \quad k = 3$$

3 If $\frac{a}{2x+y}$, $\frac{b}{x+2y}$ prove that $b = (x + 2y)k$

$$\frac{u + b}{a - b} = \frac{3x + 3y}{x - y} \; a = (2x + y)k$$

$$L \cdot H \cdot s = \frac{(2x + y)k + (t + 2y)k}{(2x + y)k - (x + 2y)k} = \frac{k[3x + 3y]}{k[x - y]}$$

$$\frac{3x + 3y}{x - y}$$

$$L.H.S = R.H.S$$

4 If $\frac{a}{b} = \frac{3}{5}$ find the value of $\frac{20a-7b}{15a+b}$

$$a = 3k \quad b = 5k$$
$$\frac{20(3k) - 7(5k)}{15(3k) + (5k)} = \frac{60k - 35k}{45k + 5k}$$

$$\frac{25k}{50k} = \frac{1}{2}$$

5 If $\frac{x}{2} = \frac{y}{4} = \frac{z}{5}$ and $x + y - 2z = 12$,
Find the value of z ?

$$x = 2k \quad y = 4k \quad z = 5k$$
$$2k + 4k - 2(5)k = 12$$
$$6k - 10k = 12$$
$$-4k = 12 \quad k = -3$$
$$z = 5(-3) = -15$$

6 The first proportion for the number $\sqrt{8}, 7, 14\sqrt{2}$

$$\frac{x}{\sqrt{8}} = \frac{7}{14\sqrt{2}} \qquad x = \frac{7\sqrt{8}}{14\sqrt{2}}$$
$$x = \frac{14\sqrt{2}}{14\sqrt{2}} = 1$$

7 If $a + b + c = 26, 8a = 12b = 3c$
Find the value of each of a,b,c , Lcm=24

$$8a = 12b = 3c = k$$
$$\frac{8a}{24} = \frac{12b}{24} = \frac{3c}{24} \rightarrow \frac{a}{3} = \frac{b}{2} = \frac{c}{8} = k$$
$$a = 3kb = 2Kc = \rho k$$
$$3k + 2k + 8k = 26 \rightarrow 13k = 26 = k = 2$$

$a = 6$
$b = 4$
$c = 16$

Model (4)

Question 1 : Choose the correct answer :

1 Which of the following ordered pairs does not belong to Q×Q ?

(a) $\left(\frac{-3}{2}, \frac{1}{4}\right)$ (b) $\left(-\sqrt{\frac{1}{9}}, -9\right)$ (c) $(\sqrt{12}, -5)$ (d) $\left(\sqrt[3]{27}, \frac{\sqrt[3]{-1}}{8}\right)$

2 If $n(x^2) = 9$, $n(y^2) = 16$ then $n = (y \times x) = \cdots$

(a) 7 (b) 12 (c) 36 (d) 144

3 If $(28, 2y) = (x^2 - 1, 4)$ what is the value of xy ?

(a) -7 (b) 7 (c) 14 (d) ± 14

4. If $x, 8, x^2$ are in proportion, then x=……

(a) $8x^3$ (b) 8 (c) x^3 (d) 4

5. If $\frac{3}{m} = \frac{7}{n}, n - m = 20$ what is the value of ?

(a) 4 (b) 12 (c) 15 (d) 35

6. If $a:b = c:d$ *then* $\frac{2a+5c}{2b+5d}$ does not equal

(a) $\frac{a}{b}$ (b) $\frac{c}{d}$ (c) $\frac{a+c}{b+d}$ (d) $\frac{a-c}{d\_b}$

7. If $\frac{a}{b} = \frac{b}{c} = \frac{4}{5}$ *and* $a + b + c = 122$ what is the value of a ?

(a) 4 (b) 132 (c) 40 (d) 50

8. If $\frac{a}{b} = \frac{b}{c} = 3$ then which of the following is correct ?

(a) $a = 3c$ (b) $a = 9b$ (c) $a = 9c$ (d) $a = 6c$

9. If $a:b = b:c$ *then* $a^4:b^4$ equals ?

(a) $ac:b^2$ (b) $a^2:c^2$ (c) $c^2:b^2$ (d) $b^2 = ac$

Question 2 : Answer the following questions :

1. Find the value of y that makes the quantities :
10 , 2y , 3y , 15 are proportional

$$\frac{10}{2y} = \frac{3y}{15} \rightarrow 6y^2 = 150$$
$$y^2 = 25$$
$$y = \pm 5$$

2. If a,b,c,d are proportional quantities prove $\frac{a+c}{b+d} = \frac{a^2+c2}{ab+cd}$

$$\frac{a}{b} = \frac{c}{d} = ka = b_{k,c} = dk$$
$$L \cdot H.S = \frac{a+c}{b+d} = \frac{bk+dk}{b+0} = \frac{k(b+d)}{b+d} = K$$
$$R.H.S = \frac{a^2+c^2}{ab+cd} = \frac{b^2k^2+d^2k^2}{b^2k+d^2k} = \frac{k^2(b+d)}{(b+d)} = k$$
$$L.H.S = R.H.S$$

3. If $\frac{a}{3} = \frac{b}{4} = \frac{c}{5} = \frac{4a+mb+5c}{25}$ find the value of m ?

$$first\ ratio\ x4\ ,second\ xm\ ,third\ x5$$

$$\frac{4a}{12}=\frac{mb}{4m}=\frac{5c}{25}\rightarrow\frac{4a+mb+sc}{12+4m+25}$$

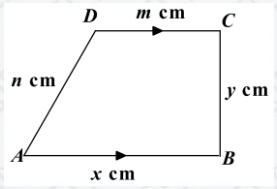
$$12+4m+25=25\rightarrow 4m+12=0$$

$$m=-3$$

4 Is the given figure :

$ABCD$ *is* a right – angled trapezium at B , perimeter equals 36cm

If $10x=15y=20cm=12n$, find x,y,m,n



$$\frac{10x}{60}=\frac{15y}{60}=\frac{20}{60}=\frac{12n}{60}\rightarrow\frac{x}{6}=\frac{y}{4}=\frac{m}{3}=\frac{n}{5}$$

$$\frac{x+y+m+n}{6+4+3+5}=\frac{36}{18}=2$$

$$x=2\times 6=12$$

$$y=2+4=8$$

$$n=2\times 3=6$$

5 If 3, L ,12 , M are in continued proportion , find the value of each of L , m ?

$$\frac{3}{L}=\frac{12}{m}=\frac{L}{12}$$

$$L^2=3\times 12\rightarrow L=\pm\sqrt{3\times 12}=\pm\sqrt{36}=\pm 6$$

$$m=\frac{12\times 12}{\pm 6}=\pm 24$$

6 If the quantities 35,15,3,2x+1 are proportional m then find the numerical value of x ?

$$\frac{35}{15}=\frac{3}{2x+1}$$

$$70x+35=45\rightarrow 70x=10$$

$$x=\frac{1}{7}$$

7 If $x=\{2,3,4\}$, $y=\{a,b\}$ find:

1) $y^2=\{(a,a),(a,b),(b,b),(b_1a)\}$

2) $n(x^2)=3^2=9$

Question 1 : Choose the correct answer :

1. If $x = \{1,2\}$ *then* $x \times \phi = \ldots.$

   (a) x (b) $\emptyset$ (c) $\{0\}$ (d) $\{(1,0),(2,0)\}$

2. If $x = \{2,3,4,7,8\}$, $y = \{1,4,5,6\}$ then $n(x^2) - n(x \times y)$

   (a) 5 (b) 10 (c) 15 (d) 25

3. If $\frac{5a-7b}{2a+3b} = 0$ what is the value of $\frac{a}{b}$?

   (a) $\frac{5}{7}$ (b) $\frac{7}{5}$ (c) $\frac{2}{3}$ (d) $\frac{3}{2}$

4. If $\frac{a}{2} = \frac{b}{8} = \frac{a+\frac{1}{4}b}{x}$ what is the value of x ?

   (a) 4 (b) 6 (c) 8 (d) 10

5. If $\frac{5}{x} = \frac{6}{y}$ what is the value of $\frac{2x+y}{y-x}$?

   (a) 5 (b) $\frac{11}{16}$ (c) $\frac{16}{11}$ (d) 16

6. What is the mean proportional between a , c ?

   (a) $\sqrt{a+c}$ (b) $\frac{a+c}{2}$ (c) $\pm\sqrt{ac}$ (d) ac

7. What is the following numbers are proportional ?

   (a) 2,6,4 (b) 3,5,8 (c) 3,9,27 (d) 1,4,9

8. If x is the positive mean proportional between 24,54 what is the value of x ?

   (a) 15 (b) 36 (c) 39 (d) 78

9. If $\frac{a}{b} = \frac{b}{c} = \frac{c}{d} = \frac{1}{4}$ so what is the value $\frac{a+b+c}{b+c+d}$?

   (a) $\frac{1}{8}$ (b) $\frac{1}{64}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$

Question 2 : Answer the following questions :

1. If $\boldsymbol{x} = \{\boldsymbol{1,2,3}\}, \boldsymbol{y} = \{\boldsymbol{a,b,c}\}$
   How many ordered Paris $(\boldsymbol{x,y}) \in \boldsymbol{x} \times \boldsymbol{y}$ satisfying that the first projection is an odd number and the second projection is not b ?

   $\{\boldsymbol{1,3}\} = \{\boldsymbol{a,c}\}$

number of ordered paris $2 \times 2 = 4$

② If $x \times y = \{(2,6), (2,7), (3,6), (3,9), (5,6), (5,9)\}$, then find each of x,y?

$x = \{2,3,5\}$ $y = \{6,9\}$

③ If 3,a,b,81 are in continued proportion , then find the value of each of a, b?

$$\frac{3}{a} = \frac{a}{b} = \frac{b}{81} = k$$

$3 = 81k^3$ $k^3 = \frac{3}{81} \rightarrow k = 3$

$$3 = 81k^2 = 81\left(\frac{1}{3}\right)^2 = 9$$

$$b = 81k = 81\left(\frac{1}{3}\right) = 27$$

$3 \overline{)\ \frac{3}{81}}$

$3 \overline{)\ \frac{3}{27}}$

$= 1/3$

④ If x , y , 5 are in proportion $x + y = 30$, then find each of x , y ?

$\frac{x}{y} = \frac{y}{5}$ $y^2 = 5x$ $x = \frac{y2}{5}$

$$\frac{y^2}{5} + y = 30$$

$$y^2 - 5y - 30 = 0$$

$$(y + 15)(y - 10) = 0$$

$y = -15$ $y = 10$

$x = 45$ $x = 20$

$(20,10) - (45, -15)$

⑤ If b is the mean proportional between a , c prove $\frac{a-b}{a} = \frac{a-c}{a_{+b}}$

$\frac{a}{b} = \frac{b}{c} = k$ $b = ck$ $a = ck^2$

$$L \cdot H \cdot S = \frac{ck^2 - ck}{ck^2} = \frac{ck(k-1)}{ck2} = \frac{k-1}{k}$$

$$R.H.S = \frac{ck^2 - ck^2}{ck2 + ck} = \frac{c(k^2 - 1)}{ck(k+1)} = \frac{c(k-1)(k+1)}{ck(k+1)} = \frac{k-1}{K}$$

$$L.H.S = R.H.S$$

6 If $a:b = 3:5$ find the value of $20a - 7b : 15a + b$

$$\frac{a}{b} = \frac{3}{5} = k \qquad a = 3K \qquad b = 5k$$

$$\frac{20(3k) - 7(5k)}{15(3k) + 15k} = \frac{60k - 35k}{45k - 15k}$$

$$\frac{25k}{50k} = \frac{1}{2}$$

7 Find the number which if added to each of the numbers 1,13,7,31 they become proportional numbers

$$\frac{1+x}{13+x} = \frac{7+x}{31+x}$$

$$(1+x)(31+x) = (7+x)(13+x)$$

$$31 + 32x + x^2 = 91 + 20x + x^2$$

$$32x - 20x = 91 - 31 \rightarrow 12x = 60$$

$$x = 5$$