



MATHS

BOOKS - HT Olympiad Previous Year Paper

IMO QUESTION PAPER 2017-18 SET A

Mathematical Reasoning

1. The following are the margins of victory in the matches of a football league :

3, 2, 1, 5, 6, 4, 2, 1, 3, 1, 2, 1, 4, 2, 5, 5, 6, 2, 3, 2.

Find the mean of the data .

A. 2

B. 3

C. 2.5

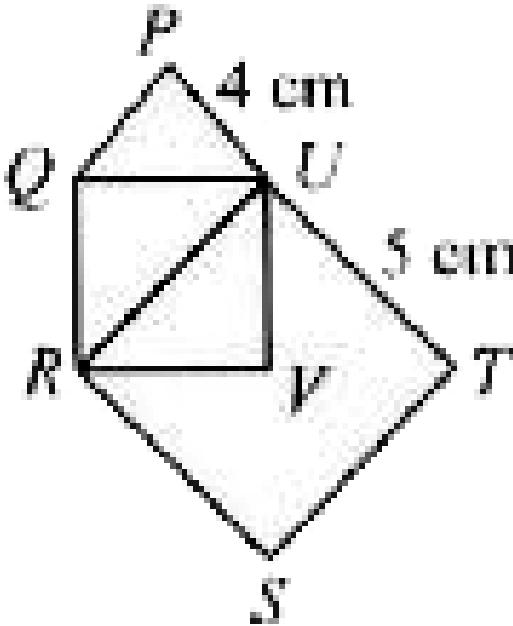
D. 3.5

Answer: B



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2. In the given diagram, PQU is an equilateral triangle, $QRVU$ is a rhombus and $RSTU$ is a square. Find the perimeter (in cm) of the whole diagram.



A. 17

B. 21

C. 26

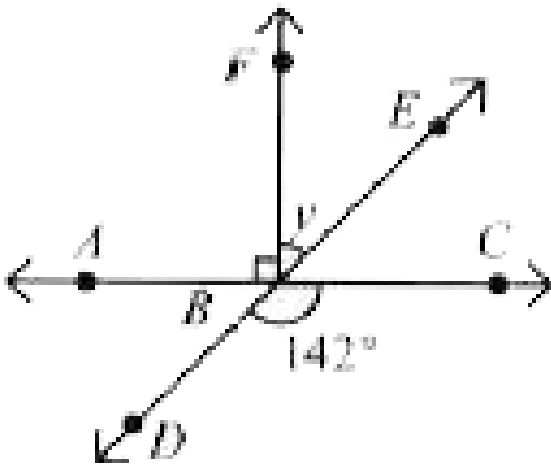
D. 27

Answer: D



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3. In the given figure (not drawn to scale), ABC and DBE are straight lines. Find the value of y .



A. 38°

B. 142°

C. 52°

D. 68°

Answer: C



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4. If $a : b = 2 : 3$, then $(3a + 2b) : (5a + 3b)$ is equal to _____

A. $\frac{13}{20}$

B. $\frac{24}{19}$

C. $\frac{12}{19}$

D. $\frac{13}{21}$

Answer: C



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5. Compare and fill the box with $>$, $<$ or $=$

$$\frac{3.45 - 6.75 + 2.05}{0.29 + 0.426 + 0.6} \quad ? \quad \frac{0.175 + 0.7 - 0.45}{5.95 - 8.25 + 2.40}$$

A. $<$

B. $=$

C. $>$

D. Can't be determined

Answer: C



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6. Which of the following options is CORRECT ?

A. Two rational numbers with different denominators can never be equal.

B. The rational number $-\frac{2}{3}$ lies on the right of 0 on the number line.

C. Difference of two rational numbers is always a rational number.

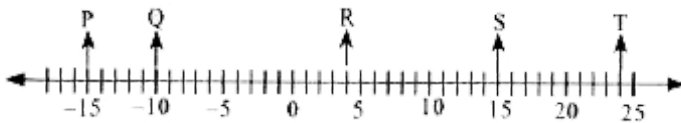
D. The standard form of $\frac{-18}{-24}$ is $-\frac{3}{4}$.

Answer: C



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7. The following number line shows the temperature in degree Celsius ($^{\circ}\text{C}$) at different places (P to T) on a particular day.



What is the difference in temperature between the hottest and coldest places as shown on the number line ?

A. 30°C

B. 39°C

C. 15° C

D. 40° C

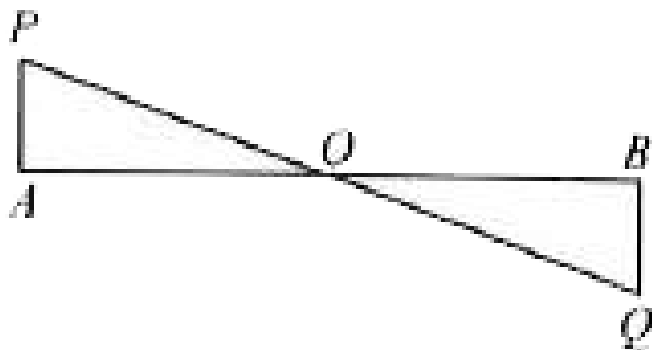
Answer: B



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8. In the given figure, if $\triangle OAP \cong \triangle OBQ$,

then which of the following is NOT true?



A. $AO = BO$

B. $AP = BQ$

C. $PO = BO$

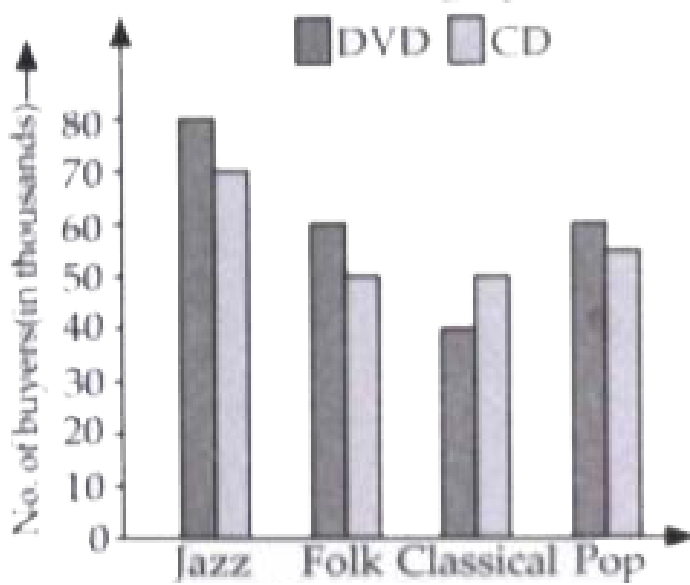
D. $\angle APO = \angle BQO$

Answer: C



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9. The given double bar graph show the buyers DVDs and CDs. Study the graph and answer the following questions .



What is the difference between DVD buyers and CD buyers in Jazz music category ?

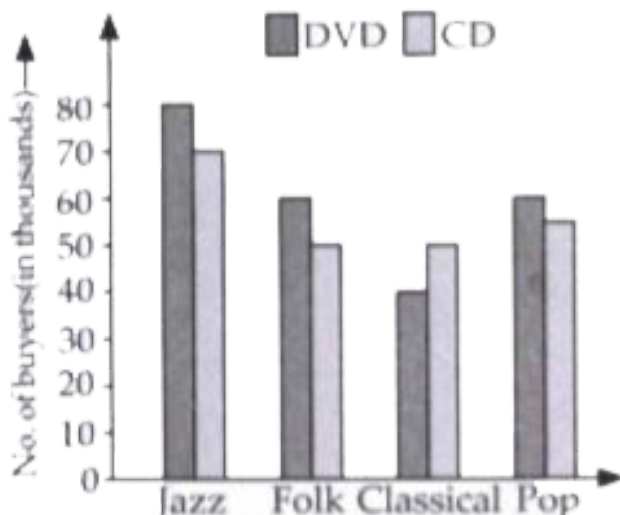
- A. Folk
- B. Classical
- C. Jazz
- D. Pop

Answer: D



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10. The given double bar graph show the buyers DVDs and CDs. Study the graph and answer the following questions .



What is the ratio of Pop music DVD buyers to the Jazz music DVD buyers ?

A. 6 : 7

B. 11 : 16

C. 11 : 14

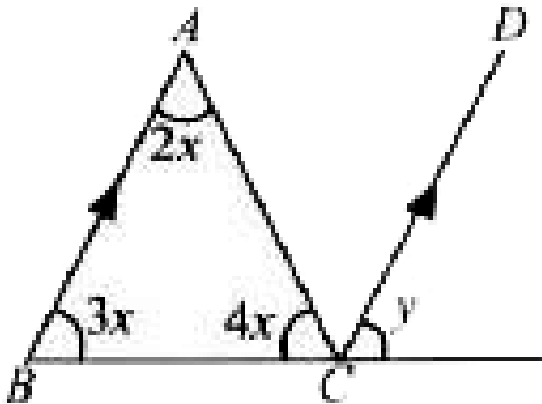
D. 3 : 4

Answer: B



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11. In the given figure, $CD \parallel AB$. Find the value of y .



A. 40°

B. 60°

C. 80°

D. 50°

Answer: B



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12. A triangle can be constructed by taking its sides as:

A. 1.8 cm, 2.6 cm, 4.4 cm

B. 2 cm, 3 cm, 4 cm

C. 2.4 cm, 2.4 cm, 6.4 cm

D. 3.2 cm, 2.3 cm, 5.5 cm

Answer: B



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13. Simplify :
$$\frac{\left(-18\frac{1}{3} \times 2\frac{8}{11}\right) - \left(4\frac{5}{7} \times 2\frac{1}{3}\right)}{\left[\frac{3}{5} + \left(\frac{-9}{10}\right)\right] + \left[-\left(\frac{-3}{5}\right)\right]}$$

A. $63\left(\frac{4}{81}\right)$

B. $-23\left(\frac{7}{9}\right)$

C. $-67\left(\frac{7}{9}\right)$

D. $12\left(\frac{6}{17}\right)$

Answer: C



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14. Solve _____ :

$$(x + 6)(x - 6) - (x - 5)^2 = 40 - 17(x - 2)$$

A. 3

B. -4

C. 5

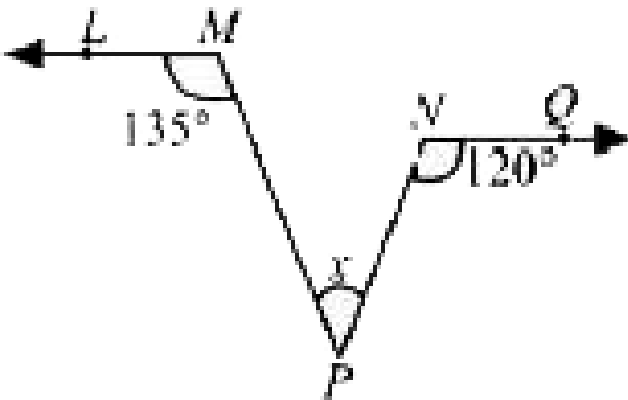
D. 0

Answer: C



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15. Given that $LM \parallel NQ$, $\angle LMP = 135^\circ$ and $\angle QNP = 120^\circ$. Find the value of x .



A. 60°

B. 75°

C. 135°

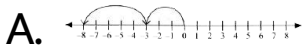
D. 120°

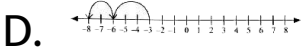
Answer: B



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16. Which of the following number line represents $-3 - 4$?



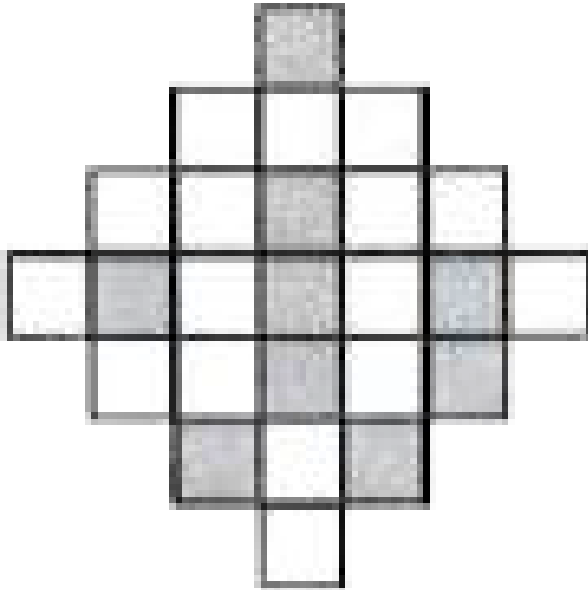


Answer: C

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17. How many more unit squares in the figure must be shaded so that the fraction of

unshaded squares becomes $\frac{2}{5}$?



A. 5

B. 6

C. 3

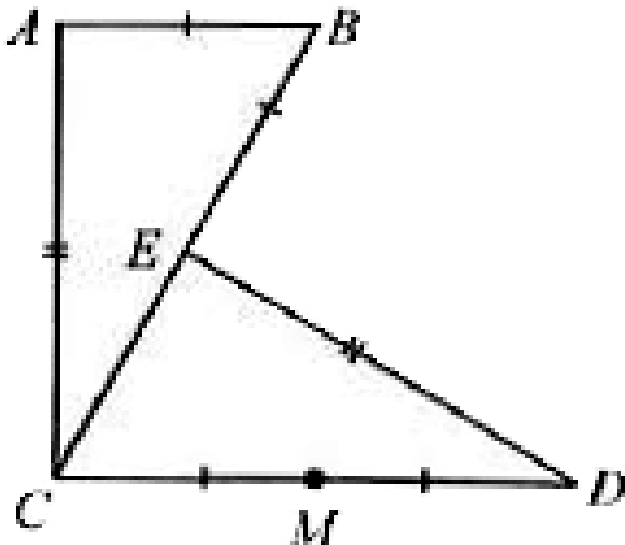
D. 2

Answer: B



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18. In the given figure, state whether the triangles are congruent and choose the correct



A. Yes, $\triangle CAB \equiv \triangle DCE$

B. No, they are not congruent

C. Yes, $\triangle DCE \equiv \triangle CAB$

D. Yes, $\triangle DEC \equiv \triangle CAB$

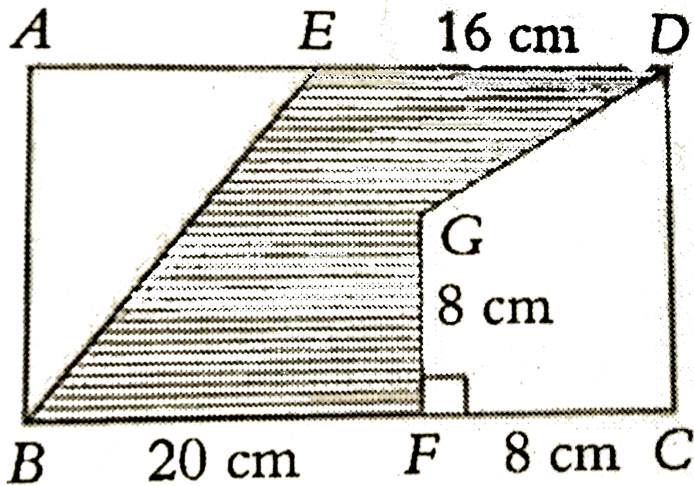
Answer: B



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19. In the figure given below, ABCD is a rectangle. ED = 16 cm, BF = 20 cm, and FG = FC = 8 cm, and FG is perpendicular to BC. If CD is

half of AD, then find the area of the shaded region (in cm^2).



A. 320

B. 325

C. 220

D. 225

Answer: C



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20. If $\frac{2x}{1 + \frac{1}{1 + \frac{x}{1-x}}} = 1$, then find the value of $\frac{x + 1}{4x - 2}$

A. $\frac{5}{4}$

B. $\frac{3}{2}$

C. $\frac{3}{4}$

D. $\frac{5}{2}$

Answer: D



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Everyday Mathematics

1. $5\left(\frac{1}{4}\right)$ kg of oranges and $2\left(\frac{3}{5}\right)$ kg of grapes were bought together by Alisha from the supermarket. What is the total weight of the fruits will she be carrying out of supermarket ?

A. $8\left(\frac{5}{13}\right)$ kg

B. $7\left(\frac{17}{20}\right)$ kg

C. $7\left(\frac{17}{21}\right)$ kg

D. $8\left(\frac{9}{13}\right)$ kg

Answer: B



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2. A 120 m long ladder reached a window 72 m from the ground on placing it against a wall.

Find the distance of the foot of the ladder from the wall.

A. 85 m

B. 92 m

C. 96 m

D. 82 m

Answer: C



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3. A shopkeeper sells bananas in two types of boxes, one small and one large. A large box contains as many as 6 small boxes plus 2 loose bananas. Form an equation which gives the number of bananas in each small box, if the number of bananas in 1 large box is 50.

A. $3x + 1 = 50$

B. $x + 1 = 20$

C. $6x + 2 = 50$

D. $2x + 1 = 20$

Answer: C



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4. Shivam rolled a dice once. What is the probability of getting a number multiple of 3 ?

A. $\frac{1}{2}$

B. $\frac{2}{3}$

C. $\frac{1}{3}$

D. $\frac{3}{4}$

Answer: C



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5. Sahil is 15 years older than his nephew. Three years hence, his age will be twice the age of his nephew. Find the present age of Sahil's nephew.

A. 15 years

B. 12 years

C. 13 years

D. 10 years

Answer: B



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6. The average height of 20 students of a class is 105 cm. If ten more students of average height of 120 cm join the class, then the average height of the class is _____

A. 115 cm

B. 117.5 cm

C. 112.5 cm

D. 110 cm

Answer: D



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7. Sonali invests money in three different schemes for 6 years, 10 years and 12 years at 10% p.a., 12% p.a. and 15% p.a. at simple interest respectively. At the completion of

each scheme, she gets the same interest. What is the ratio of her investments ?

A. 6 : 3 : 2

B. 3 : 2 : 1

C. 3 : 4 : 5

D. 2 : 3 : 6

Answer: A



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8. Divya wants to fence the rectangular garden in front of her house. The dimensions of the garden are 15 m and 25 m. Find the cost of fencing the garden at the rate of Rs 12.25 per metre.

A. Rs 1020

B. Rs 760

C. Rs 980

D. Rs 960

Answer: C



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9. A shopkeeper sells two televisions for Rs 1955 each, gaining 15% on one and losing 15% on other. Find his gain or loss percent in the whole transaction.

A. Profit, $2\left(\frac{1}{4}\right)\%$

B. Profit, 3%

C. Loss, $2\left(\frac{1}{4}\right)\%$

D. Loss, 3%

Answer: C



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10. A certain freezing process requires room temperature be lowered from 50°C at the rate of 6°C every hour. What will be the room temperature 12 hours after the process begins ?

A. 22°C

B. 30°C

C. -22°C

D. -30°C

Answer: C



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Achievers Section

1. Consider the following statements:

A. The product of an integer and a rational number can never be a natural number.

B. The quotient of division of an integer by a rational number can never be an integer.

Which of the statements given above is /are correct?

A. Both Statement-I and Statement-II are true.

B. Both Statement-I and Statement-II are false.

C. Statement-I is true but Statement-II is false.

D. Statement-I is false but Statement-II is true.

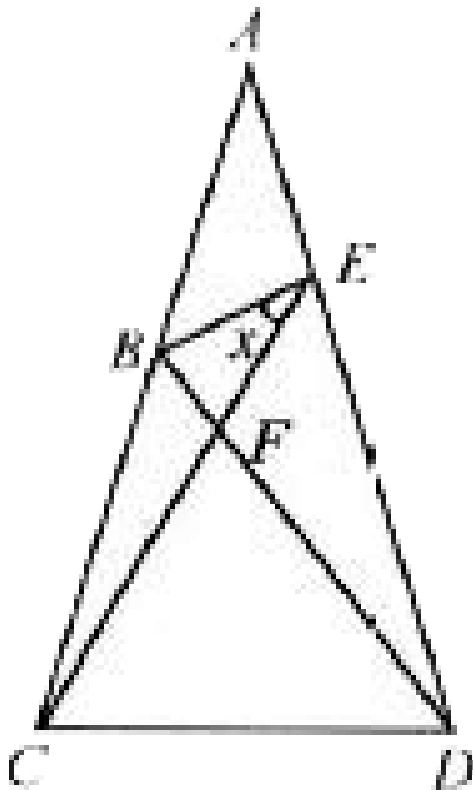
Answer: B



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2. Given that $\angle ACD$ is 4° more than $\angle CDE$ and $\angle CDE$ is 22° more than $\angle DAC$. Also, the sum of $\angle BCE$ and $\angle BDE$ is 26° and

$\angle EBF = 80^\circ$. Find the value of x .



A. 40°

B. 30°

C. 60°

D. 75°

Answer: B



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3. The area of a square and a rectangle are equal. If side of the square is 50 cm and breadth of the rectangle is 30 cm. Find :

(i) Length of the rectangle.

(ii) Perimeter of the rectangle.

A. (i)- 80 cm, (ii) 225 cm

B. (i) - 83.3 cm, (ii) - 226.6 cm

C. (i) 89.2 cm, (ii) - 226.6 cm

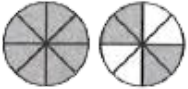
D. (i)-75.5 cm, (ii) 225.5 cm

Answer: B



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4. Match the following.

- | Column-I | Column-II |
|--|---------------------|
| P. $\left(1 + \frac{2}{9}\right) + \left(1 + 2\frac{1}{2}\right) + \left(1 + 1\frac{2}{3}\right)$ is equal to | (i) 2 |
| Q. If $\frac{1}{1 + \frac{1}{1 + \frac{1}{x}}} = \frac{4}{7}$, then x equals | (ii) $\frac{11}{2}$ |
| R. The shaded fraction of  is | (iii) 3 |
| S. $\frac{20 \times (0.03)^2}{0.018} \div 0.5$ is equal to | (iv) $\frac{3}{2}$ |

A.

$$P \rightarrow (iii), Q \rightarrow (ii), R \rightarrow (iv), S \rightarrow (i)$$

B.

$$P \rightarrow (ii), Q \rightarrow (iii), R \rightarrow (iv), S \rightarrow (i)$$

C.

$$P \rightarrow (ii), Q \rightarrow (iv), R \rightarrow (iii), S \rightarrow (i)$$

D.

$$P \rightarrow (iv), Q \rightarrow (iii), R \rightarrow (ii), S \rightarrow (i)$$

Answer: B



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5. State 'T' for true and 'F' for false and select the correct option.

(i) If the area of a rectangle PQRS is 50cm^2 and

PQ : QR is 2 : 1, then PQ = 10 cm and QR = 5 cm.

(ii) Sonali has total 120 red and black pens. If 30% of them are black, then there are 40 red pens and 80 black pens.

(iii) If $\frac{1}{x} : \frac{1}{y} : \frac{1}{z} = 4 : 5 : 6$ then

$x : y : z = 6 : 5 : 4$.

(iv) If the speed of three cars is in the ratio 3 : 4 : 5, then the ratio of time taken by these cars to travel the same distance is 20 : 15 : 12.

A. (i)-F, (ii)-T, (iii)-F, (iv)-T

B. (i)-F, (ii)-T, (iii)-T, (iv)-F

C. (i)-T, (ii)-F, (iii)-F, (iv)-T

D. (i)-T, (ii)-T, (iii)-F, (iv)-F

Answer: C



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