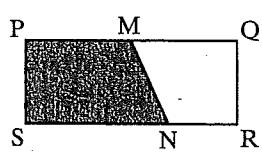


- 1 PQRS is a rectangle. $PM = MQ$.
SN is twice NR.



What fraction of the rectangle is shaded?

- A $\frac{2}{3}$ B $\frac{3}{4}$ C $\frac{5}{6}$ D $\frac{7}{12}$
- 2 If $a = -1$, what is the value of $5a - 2a^2$?
A -7 B -3 C -9 D -1

- 3 Which is equal to $3^2 \times 9^3$?
A $3 \times 2 \times 9 \times 3$
B $3 \times 3 \times 3 \times 9 \times 9$
C $9 \times 9 \times 9 \times 9$
D $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

- 4 Which of the following is **not** in order from lowest to highest?
A $\frac{1}{3}, \frac{2}{5}, \frac{7}{15}$ B $\frac{2}{3}, \frac{3}{4}, \frac{7}{12}$
C $\frac{3}{5}, \frac{7}{10}, \frac{3}{4}$ D $\frac{5}{8}, \frac{11}{16}, \frac{3}{4}$

- 5 Lines l, m and n are all parallel.
-

What is the value of x ?
A 40 B 50 C 60 D 70

- 6 Which of the points $P(-1, 5)$ and $Q(-4, -1)$ lie on the line $y = 2x + 7$?
A both P and Q B P only
C Q only D neither P nor Q

- 7 Consider this set of eight scores:
2, 2, 2, 2, 3, 4, 4, 5
What will change if the score of 3 is left out?
A median B mean C mode D range

- 8 The total number of books for sale at a stall was 600. The ratio of new books to old books was 2 to 3. 30 new books and 10 old books were sold. What is the new ratio of new to old books?
A 2 to 3 B 1 to 2 C 5 to 8 D 3 to 5

- 9 $4t^2 - 3t + 5t + t^2 =$
A $3t^2 + 8t$ B $3t^4 + 2t$
C $5t^4 - 8t$ D $5t^2 + 2t$

- 10 In a family of three children, there are eight different possible arrangements of boys and girls. What is the probability that in a family of three children there will be 1 girl and 2 boys?
A $\frac{1}{8}$ B $\frac{1}{4}$ C $\frac{3}{8}$ D $\frac{5}{8}$

- 11 Mitchell travels for $2\frac{1}{2}$ hours at an average speed of 60 kilometres per hour. If his car uses fuel at the rate of 8 litres per 100 km travelled, how much fuel will he use on the journey?
 litres

- 12 40% of students at a college are in first year. 30% of first-year students at the college are studying law. Half of the first-year law students are male. What percentage of the college students are males in first year studying law?
 %

- 13 Here are two views of the same cube.
-

- Which could be the net of the cube?
A B C D

- 14 The value of $\sqrt{0.09}$ is

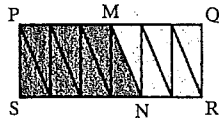
- 15 $\frac{2}{5} > \frac{a}{b}$
Which values of a and b will make this inequality true?
A $a = 1$ and $b = 2$ B $a = 3$ and $b = 8$
C $a = 4$ and $b = 9$ D $a = 5$ and $b = 12$

- 16 A rectangular shaped pond is 2.5 metres long and 2 metres wide. It can be filled to a depth of 25 cm. How many litres of water will it hold when full?
($1 \text{ m}^3 = 1000 \text{ L}$)
A 125 B 1250 C 12 500 D 125 000

1 D 2 A 3 C 4 B 5 C 6 A 7 A 8 D 9 D
10 C 11 L 12 L 12 6% 13 D 14 0.3 15 B 16 B

- 1 Divide the rectangle into 12 parts.
[The top has been divided in half and the bottom in thirds, so first divide into sixths, because 6 is the lowest common multiple of 2 and 3.]

7 of the parts are shaded.
The fraction of the rectangle that is shaded is $\frac{7}{12}$.



- 2 If $a = -1$,
 $5a - 2a^2 = 5 \times -1 - 2 \times (-1)^2$
 $= -5 - 2 \times 1$
 $= -5 - 2$
 $= -7$

- 3 $3^2 \times 9^3 = 3 \times 3 \times 9 \times 9 \times 9$
But $3 \times 3 = 9$

So $3^2 \times 9^3 = 9 \times 9 \times 9 \times 9$
[It is also $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$ but that is not one of the options.]

- 4 Write each list with a common denominator.
 $\frac{1}{3}, \frac{2}{5}, \frac{7}{15}$

The common denominator is 15.
 $\frac{1}{3} = \frac{5}{15}$
 $\frac{2}{5} = \frac{6}{15}$

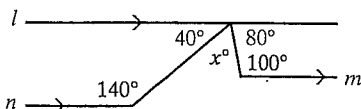
So $\frac{1}{3}, \frac{2}{5}, \frac{7}{15}$ is in ascending order.
 $\frac{2}{3}, \frac{3}{4}, \frac{7}{12}$

The common denominator is 12.
 $\frac{2}{3} = \frac{8}{12}$
 $\frac{3}{4} = \frac{9}{12}$

So $\frac{2}{3}, \frac{3}{4}, \frac{7}{12}$ is not in ascending order.

The fractions that are not in order from lowest to highest are $\frac{2}{3}, \frac{3}{4}, \frac{7}{12}$.

- 5 Co-interior angles formed by parallel lines add to 180° .
So the angle co-interior to that of 140° is 40° and the angle co-interior to that of 100° is 80° .



Now, angles in a straight line add to 180° .
So $x + 40 + 80 = 180$
 $x + 120 = 180$
 $x = 180 - 120$
 $= 60$

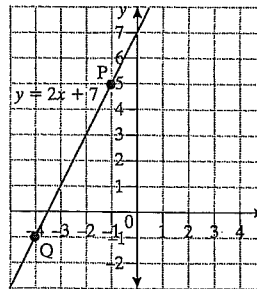
- 6 $y = 2x + 7$
When $x = -1$,
 $y = 2 \times -1 + 7$
 $= -2 + 7$
 $= 5$

So P lies on the line.

- When $x = -4$,
 $y = 2 \times -4 + 7$
 $= -8 + 7$
 $= -1$

So Q lies on the line.

P and Q both lie on the line.



- 7 2, 2, 2, 2, 3, 4, 4, 5
Mode = 2

It will remain 2 if 3 is left out.

Range = $5 - 2$
 $= 3$

It will still be 3 if 3 is left out.

Sum of scores = $4 \times 2 + 3 + 2 \times 4 + 5$
 $= 24$

Mean = $24 \div 8$
 $= 3$

It will still be 3 if 3 is left out.

Median = $\frac{2 + 3}{2}$
 $= 2\frac{1}{2}$

It will change to 2 if 3 is left out.

The median will change if 3 is left out of the scores.

- 8 For every 2 new books there were 3 old ones.

So 2 out of every 5 books were new.

Now $600 \div 5 = 120$

$2 \times 120 = 240$

So 240 books were new.

$3 \times 120 = 360$

So 360 books were old.

30 new books were sold.

Number of new books = $240 - 30$
 $= 210$

10 old books were sold.

Number of old books = $360 - 10$
 $= 350$

Ratio of new to old books = 210 to 350
 $= 21$ to 35
 $= 3$ to 5

- 9 $4t^2 - 3t + 5t + t^2 = (4t^2 + t^2) - 3t + 5t$
 $= 5t^2 + 2t$

10 There are 8 different arrangements of three children in a family.

There are 3 different arrangements of 1 girl and 2 boys: girl, boy, boy; boy, girl, boy and boy, boy, girl.

$$\text{Probability of 1 girl and 2 boys} = \frac{3}{8}$$

11 Distance travelled

$$\begin{aligned} &= \left(2\frac{1}{2} \times 60\right) \text{ km} \\ &= \left(2 \times 60 + \frac{1}{2} \text{ of } 60\right) \text{ km} \\ &= (120 + 30) \text{ km} \\ &= 150 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{Petrol used} &= 8 \text{ L for } 100 \text{ km} \\ &= 4 \text{ L for } 50 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{Fuel used} &= 12 \text{ L for } 150 \text{ km} \\ \text{So } 12 \text{ litres of fuel were used.} \end{aligned}$$

12 Percentage that is first-year students
= 40%

$$\begin{aligned} \text{Percentage that is first-year law students} \\ &= 30\% \text{ of } 40\% \\ &= \frac{30}{100} \times 40\% \\ &= 12\% \end{aligned}$$

$$\begin{aligned} \text{Percentage that is male first-year law students} \\ &= \frac{1}{2} \text{ of } 12\% \\ &= 6\% \end{aligned}$$

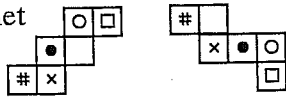
13 Five different faces can be seen.



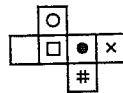
The face with the dot can be seen in both views. The face that cannot be seen in either view is opposite the dot.

So the blank face must be opposite the dot.

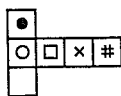
So these cannot be the net because the blank face is not opposite the dot.



This cannot be the net because if the cross is to the right of the dot the hashed face must be on the top but here it would be on the bottom.



The correct net is



$$14 \quad 0.3 \times 0.3 = 0.09$$

$$\text{So } \sqrt{0.09} = 0.3$$

$$15 \quad \frac{2}{5} > \frac{a}{b}$$

[Multiply both sides by $5b$.]

$$2b > 5a$$

Now try each option:

$$a = 1 \text{ and } b = 2$$

$$2 \times 2 > 5 \times 1 ?$$

$$4 > 5 \times$$

This option is not correct.

$$a = 3 \text{ and } b = 8$$

$$2 \times 8 > 5 \times 3 ?$$

$$16 > 15 \checkmark$$

This option is correct.

The values of a and b that make the inequality true are $a = 3$ and $b = 8$.

16 [The length and width are in metres but the depth is in centimetres. Change the depth to metres.]

$$25 \text{ cm} = 0.25 \text{ m}$$

$$\begin{aligned} \text{Volume} &= (2.5 \times 2 \times 0.25) \text{ m}^3 \\ &= (5 \times 0.25) \text{ m}^3 \\ &= 1.25 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Capacity} &= 1.25 \times 1000 \text{ L} \\ &= 1250 \text{ L} \end{aligned}$$