Instructions

Answers

This means write down your answer or show your working and your answer.

Calculators

You may use a calculator in this test.

Formulae

You might need to use these formulae.

Trapezium

Area = \( \frac{(a+b)}{2} \times h \)

Prism

Volume = area of cross-section \( \times \) length
1. The graph shows my journey in a lift. I got in the lift at floor number 10

(a) The lift stopped at two different floors before I got to floor number 22. What floors were they?


ground floor . . . . . and . . . . .

1 mark
(b) For how long was I in the lift while it was moving? 

........... seconds ........................ ..........................................................

1 mark

(c) After I got out of the lift at floor number 22, the lift went directly to the ground floor.

It took 45 seconds.

**On the graph**, show the journey of the lift from floor 22 to the ground floor.

1 mark
2. (a) Paula played four games in a competition.
In three games, Paula scored 8 points each time.
In the other game she scored no points.

What was Paula's mean score over the four games?

\[ \ldots \ldots \ldots \text{points} \quad 1 \text{ mark} \]

(b) Jessie only played two games.
Her mean score was 3 points.
Her range was 4 points.

What points did Jessie score in her two games?

\[ \ldots \ldots \ldots \text{and} \ldots \ldots \ldots \quad 1 \text{ mark} \]

(c) Ali played three games.
His mean score was also 3 points.
His range was also 4 points.

What points might Ali have scored in his three games?
Show your working.

\[ \ldots \ldots \ldots \text{and} \ldots \ldots \ldots \text{and} \ldots \ldots \ldots \quad 2 \text{ marks} \]
3. (a) Any quadrilateral can be split into 2 triangles.

Explain how you know that the angles inside a quadrilateral add up to $360^\circ$.

(b) What do the angles inside a pentagon add up to?

(c) What do the angles inside a heptagon (7-sided shape) add up to?

Show your working.
4. A garden centre sells plants for hedges. The table shows what they sold in one week.

<table>
<thead>
<tr>
<th>Plants</th>
<th>Number of plants sold</th>
<th>Takings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beech</td>
<td>125</td>
<td>£212.50</td>
</tr>
<tr>
<td>Leylandii</td>
<td>650</td>
<td>£2437.50</td>
</tr>
<tr>
<td>Privet</td>
<td>35</td>
<td>£45.50</td>
</tr>
<tr>
<td>Hawthorn</td>
<td>18</td>
<td>£23.40</td>
</tr>
<tr>
<td>Laurel</td>
<td>5</td>
<td>£32.25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>833</strong></td>
<td><strong>£2751.15</strong></td>
</tr>
</tbody>
</table>

(a) What percentage of the total number of plants sold was **Leylandii**? Show your working.

(b) What percentage of the **total takings** was for Leylandii? Show your working.

(c) Which is the **cheaper** plant, Beech or Privet? Show working to explain how you know.
5. The diagram shows a circle and a square.

(a) The radius of the circle is 12 mm.
What is the area of the circle to the nearest mm²?
Show your working.

(b) The ratio of the area of the circle to the area of the square is 2:1
What is the area of the square to the nearest mm²?

(c) What is the side length of the square?
Show your working.
6. A groundsman marks out a football pitch.

(a) He makes the pitch 93 metres long, to the nearest metre.

What is the shortest possible length of the pitch?

.......

(b) He makes the pitch 50 metres wide, to the nearest metre.

What is the shortest possible width of the pitch?

.......

(c) Des wants to know how many times he should run around the outside of this pitch to be sure of running at least 3km.

Use your answer to parts (a) and (b) to find how many times Des should run around the pitch.

You must show your working.
I am thinking of a point on the dotted grid below.

The co-ordinates of my point are \((x, y)\)

You have 3 clues to find which of the dots is my point.

(a) **First clue: \(x > 0\) and \(y > 0\)**

Which dots cannot represent my point?

On the grid below, **cross them out** like this \(\times\)

(b) **Second clue: \(x + y < 4\)**

Which other dots cannot represent my point?

This time, put a **square around them** like this \(\square\)

(c) **Third clue: \(x > y\)**

What are the co-ordinates of my point?

\((\quad, \quad)\)
8. A class collected information about the number of children in each of their families.

The information was displayed in a frequency chart, but you cannot see all the information.

Call the number of families that have two children \( n \)

(a) Show that the total number of children in all the families is \( 55 + 2n \)

(b) Write an expression for the total number of families.
(c) The **mean** number of children per family is 3

What is the value of \( n \)?

Show your working.

\[ n = \ldots \ldots \ldots \ldots \]

2 marks
9. ABC and ACD are both right-angled triangles.

(a) Explain why the length of AC is 10cm.

(b) Calculate the length of AD
Show your working.
(c) By how many degrees is angle $x$ bigger than angle $y$?

Show your working.
10. I have two bags of counters.

**Bag A** contains

- 12 red counters
- 18 yellow counters.

**Bag B** contains

- 10 red counters
- 16 yellow counters.

I am going to take one counter at random from either bag A or bag B.

I want to get a **red** counter.

Which bag should I choose?

Show working to explain your answer.
11. Two satellites circle around the Earth. The distance from the centre of the Earth is:

- Satellite A: $1.53 \times 10^7 \text{ m}$
- Satellite B: $9.48 \times 10^6 \text{ m}$

(a) What is the minimum distance apart the satellites could be? Show your working and give your answer in standard form.

(b) What is the maximum distance apart the satellites could be? Show your working and give your answer in standard form.
12. A teacher asked fifty pupils in Year 9:

How much time did you spend on homework last night?

Results:

<table>
<thead>
<tr>
<th>Time spent on homework (minutes)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 \leq \text{time} \leq 30$</td>
<td>6</td>
</tr>
<tr>
<td>$30 &lt; \text{time} \leq 60$</td>
<td>14</td>
</tr>
<tr>
<td>$60 &lt; \text{time} \leq 90$</td>
<td>21</td>
</tr>
<tr>
<td>$90 &lt; \text{time} \leq 120$</td>
<td>9</td>
</tr>
</tbody>
</table>

Total 50

(a) Show that an estimate of the mean time spent on homework is 64.8 minutes.
The teacher used the data to draw a cumulative frequency diagram.

(b) Use the diagram to estimate the median time pupils spent on their homework.

Show on the diagram how you get your answer.

(c) Use the diagram to estimate how many pupils spent more than 100 minutes on their homework.

Show how you get your answer.
The formula for the volume, $V$, of a square-based pyramid is

$V = \frac{1}{3} b^2 h$

$b$ is the base length,
$h$ is the perpendicular height.

(a) A square-based pyramid has base length 5 cm and perpendicular height 6 cm. What is its volume?

$V = \ldots \ldots \ldots \text{cm}^3$ \hspace{1 mark}

(b) A different square-based pyramid has base length 4 cm. Its volume is $48 \text{cm}^3$. What is its perpendicular height?

$h = \ldots \ldots \ldots \text{cm}$ \hspace{1 mark}
(c) The volume of another square-based pyramid is 25 cm$^3$
Its perpendicular height is 12 cm.

What is its base length?
Show your working.

\[ b = \ldots \ldots \text{ cm} \]

2 marks

(d) The diagram shows a triangular-based pyramid.
The base is an isosceles, right-angled triangle.
The perpendicular height is $m$

Write a formula, in terms of $m$, for the volume, $V$, of the pyramid.
14. John makes two clay pots. Each pot is fired independently. The probability that a pot cracks while being fired is 0.03

(a) Calculate the probability that both of John’s pots crack while being fired.
Show your working.

(b) Calculate the probability that only one of John’s pots cracks while being fired.
Show your working.

(c) John has enough clay for 80 pots. He receives an order for 75 pots.

Does he have enough clay to make 75 pots without cracks?
Explain your answer.
END OF TEST