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 = \text{area of cross-section} \times \text{length}
1. In each box of cereal there is a free gift of a card. You cannot tell which card will be in a box. Each card is equally likely.

There are four different cards: A, B, C or D

(a) Zoe needs card A
Her brother Paul needs cards C and D
They buy one box of cereal.

What is the probability that the card is one that Zoe needs?

What is the probability that the card is one that Paul needs?

(b) Then their mother opens the box.
She tells them the card is not card A

Now what is the probability the card is one that Zoe needs?

What is the probability that the card is one that Paul needs?
2. I make a model with 6 cubes. The drawings show my model from different views.

(a) I join one more cube to my model. The drawing from view A shows where I join the cube. Complete the drawing from view B

(b) Then I move the cube to a different position. Complete the drawing from view B
(c) I add two cubes to make a different shape.  
Complete the drawing from **view B**

![view A](Image)

![view B](Image)

(d) I start again with my original model of 6 cubes.  
The drawing shows it from **view A** and from **view B**  
I start to draw it from a different view.  
Complete the drawing from **view C**

![view A](Image)

![view B](Image)

![view C](Image)
3. You can make ‘huts’ with matches.

A rule to find how many matches you need is

\[ m = 4h + 1 \]

\( m \) stands for the number of matches.
\( h \) stands for the number of huts.

(a) **Use the rule** to find how many matches you need to make 8 huts.

Show your working.

\[ \ldots \ldots \ldots \text{matches} \quad \ldots \ldots \]

2 marks

(b) I use 81 matches to make some huts.

How many huts do I make?

Show your working.

\[ \ldots \ldots \ldots \text{huts} \quad \ldots \ldots \]

2 marks
(c) Andy makes different ‘huts’ with matches.

1 hut needs 6 matches
2 huts need 11 matches
3 huts need 16 matches

Circle the rule below that shows how many matches he needs.

Remember: \( m \) stands for the number of matches.
\( h \) stands for the number of huts.

\[
\begin{align*}
\quad m &= h + 5 \\
\quad m &= 4h + 2 \\
\quad m &= 4h + 3 \\
\quad m &= 5h + 1 \\
\quad m &= 5h + 2 \\
\quad m &= h + 13 \\
\end{align*}
\]

1 mark
4. A school has a new canteen.
   A special person will be chosen to perform the opening ceremony.

   The names of all the pupils, all the teachers and all the canteen staff
   are put into a box.

   One name is taken out at random.

   A pupil says:

   There are only three choices.
   It could be a pupil, a teacher or one of the canteen staff.
   The probability of it being a pupil is \( \frac{1}{3} \)

   The pupil is wrong. Explain why.
5. Calculate

\[
8\% \text{ of } £26.50 = £ \quad 1 \text{ mark}
\]

\[
12 \frac{1}{2}\% \text{ of } £98 = £ \quad 1 \text{ mark}
\]

6. How many kilometres are there in 5 miles?

Complete the missing part of the sign.

Footpath to Hightown

5 miles or ....... kilometres
7. A newspaper predicts what the ages of secondary school teachers will be in six years’ time. They print this chart.

(a) The chart shows 24\% of male teachers will be aged 40 to 49. About what percentage of female teachers will be aged 40 to 49?

(b) About what percentage of female teachers will be aged 50+?
(c) The newspaper predicts there will be about **20 000** male teachers aged 40 to 49

Estimate the number of male teachers that will be aged 50+

(d) Assume the total number of male teachers will be about the same as the total number of female teachers.

Use the chart to decide which statement is correct.

Tick (✔️) your answer.

- Generally, male teachers will tend to be younger than female teachers. ☐
- Generally, female teachers will tend to be younger than male teachers. ☐

Explain how you used the chart to decide.
8. 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?

floors ....... and .......

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

\[ \ldots \ldots \text{seconds} \]

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
9. (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?


(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?


(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.


10. (a) Any quadrilateral can be split into 2 triangles.

![Diagram of a quadrilateral split into two 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?

![Diagram of a pentagon]

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

Show your working.

![Diagram of a heptagon]
11. 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>Total</td>
<td>833</td>
<td>£2751.15</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.
12. 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 mm$^2$?
Show your working.

\[
\text{\ldots\ldots\ldots mm}^2
\]

(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 mm$^2$?

\[
\text{\ldots\ldots\ldots mm}^2
\]

(c) What is the side length of the square?
Show your working.

\[
\text{\ldots\ldots\ldots mm}
\]
13. 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.
14. 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 \(\Box\)

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

What are the co-ordinates of my point?

\(( , , )\)
15. 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.

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

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

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

1 mark

(b) Calculate the length of AD

Show your working.

2 marks
17. I have two bags of counters.

**Bag A** contains
12 red counters and
18 yellow counters.

**Bag B** contains
10 red counters and
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.