



Year 10 Baseline Test

Mathematics

Higher

Calculator

Time: 1 hour

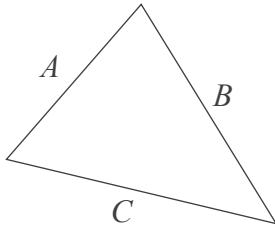
Marks: 60 marks

Name _____

Date _____ Class _____

1. Heron's formula can be used to find the area of a triangle.

It has two parts:

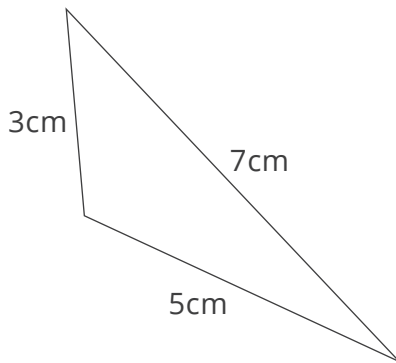


$$S = \frac{A + B + C}{2}$$

$$\text{Area} = \sqrt{S(S - A)(S - B)(S - C)}$$

Use Heron's formula to find the area of this triangle, giving your answer correct to 1 decimal place.

[3 marks]



2. Factorise fully:

a. $4a^2 + 16a$

[2 marks]

b. $b^2 + 5b + 6$

[2 marks]

- 3a. Select all the square numbers:

[1 mark]

5	10	2	4	1	1000	100
☐	☐	☐	☐	☐	☐	☐

- b. Alex says that if you add two prime numbers together, the answer is always even. Is Alex correct? Justify your answer.

[1 mark]

4a. Increase 240 by 18%.

[2 marks]

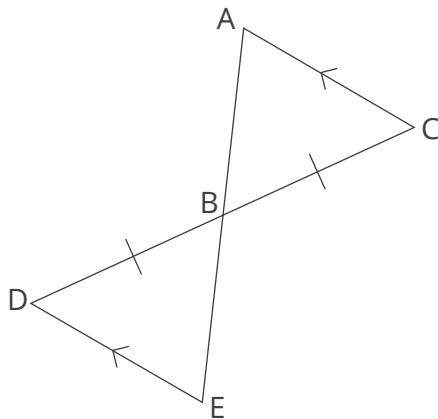
b. To calculate VAT, a shop adds 20% to the price of its goods. This gives the total price they will charge their customers.

Find the amount of VAT on an item for which a customer pays £15.

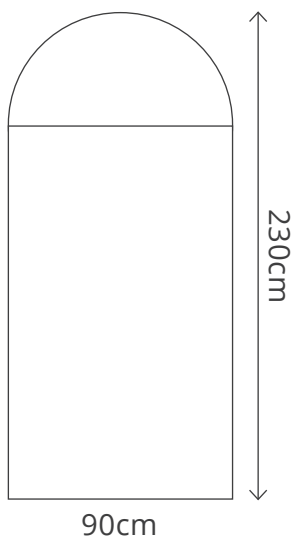
[3 marks]

5. Prove that triangle ABC and triangle BDE are congruent.

[3 marks]



6. A bench joiner makes a popular type of wooden door made from a semicircle and a rectangle. They need to apply a coat of varnish to the front of each door before they are complete.



Each tin of varnish will cover 10m^2 . How many doors can be varnished from one tin? Remember to show your working.

[6 marks]

7. The table below shows the results of a survey in which people were asked their height.

Height (cm)	Frequency
$120 < w \leq 140$	3
$140 < w \leq 150$	8
$150 < w \leq 160$	23
$160 < w \leq 170$	35
$170 < w \leq 180$	26
$180 < w \leq 200$	4

Find the estimated mean of the heights. Give your answer correct to 1 decimal place. [4 marks]

- 8a. Find the length of the diagonal AC in this rectangle. Give your answer correct to 1 decimal place. [3 marks]

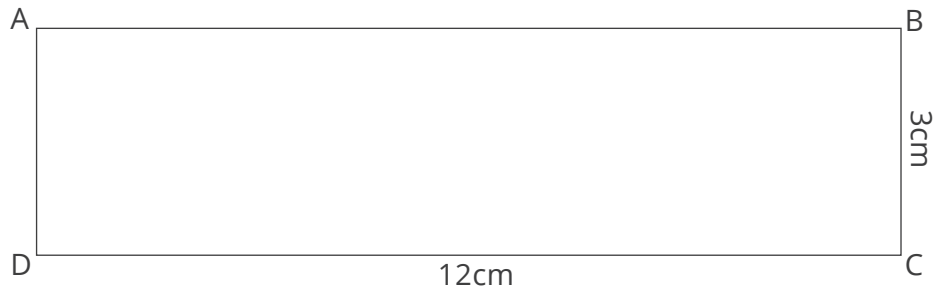
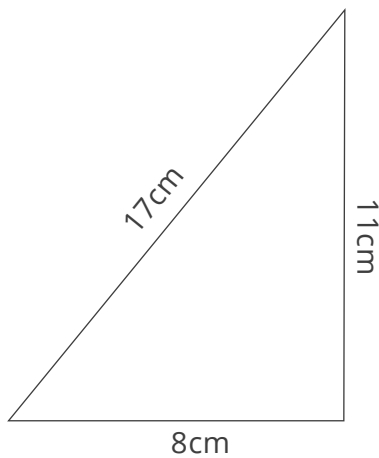
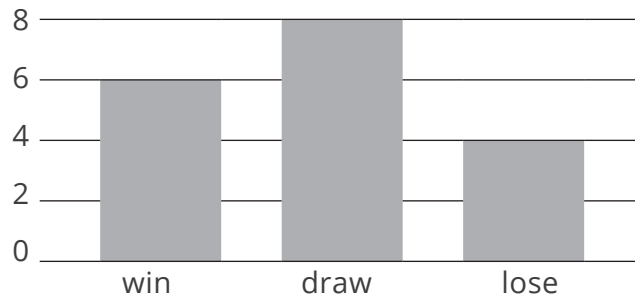


Diagram not drawn accurately.

- b. Prove whether or not this triangle is right-angled. [3 marks]

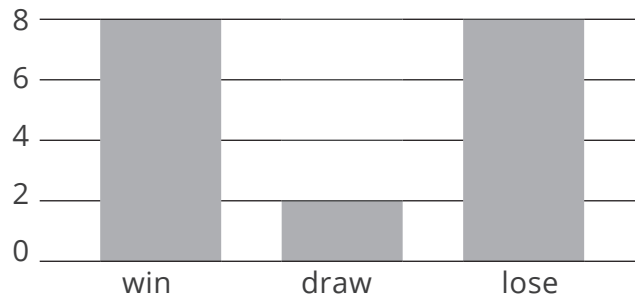


9. This chart shows the number of wins, draws and losses for a local football team.



- a. Based on this data, estimate the probability that the team will lose their next match. [1 mark]

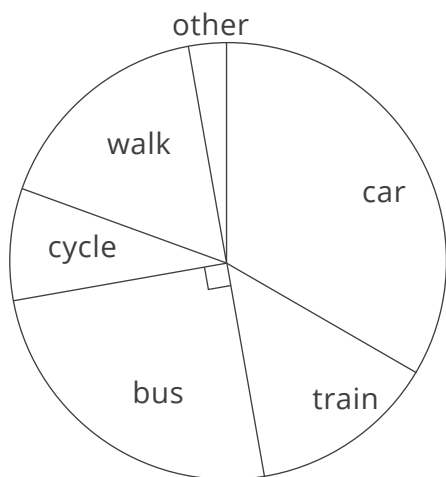
- b. The team have a local rival that they will play against next season. Here are their results:



Make two comparisons between the results of each team. [2 marks]

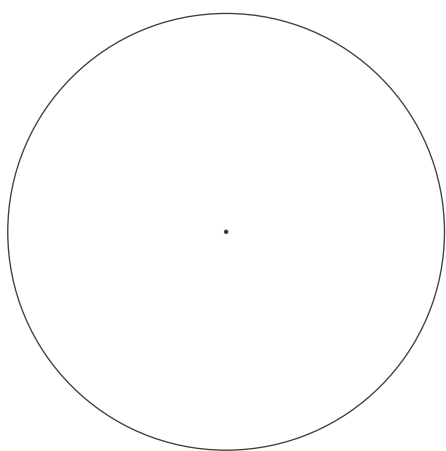
- c. If the teams are awarded 3 points for a win and 1 point for a draw, calculate each team's total points for this season. Which team scored the most points? [2 marks]

10. Javid surveyed 72 people in his town about how they travel to work. Here are his results:



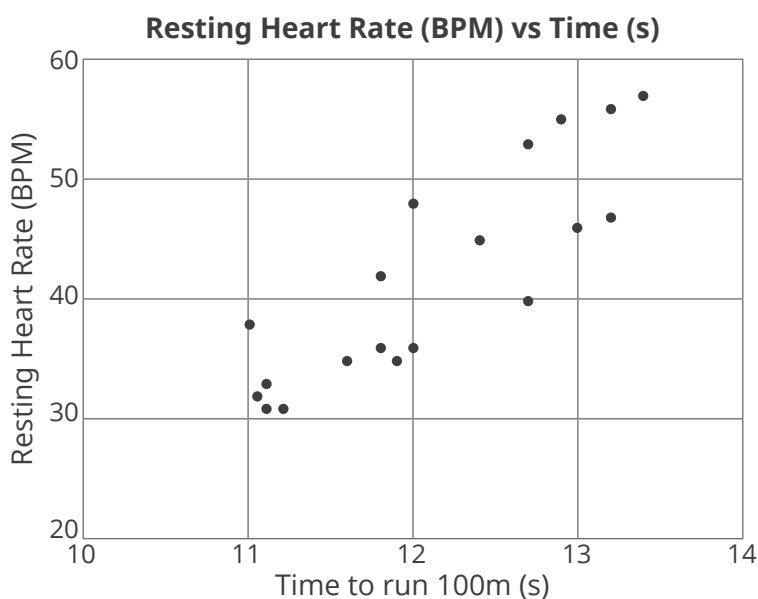
a. How many people travel by train? [2 marks]

b. Javid also asked how long their journeys take. The table below shows his results. Draw a pie chart to represent this data. [3 marks]



Journey Time (Mins)	Frequency
$0 < t \leq 15$	36
$15 < t \leq 30$	12
$30 < t \leq 45$	18
$45 < t \leq 90$	6

11. An athletics club measures the 100m times for its athletes and compares the data with their resting heart rates.



a. Draw a line of best fit on the diagram. [1 mark]

b. Describe the relationship between the athletes' times and their heart rates.

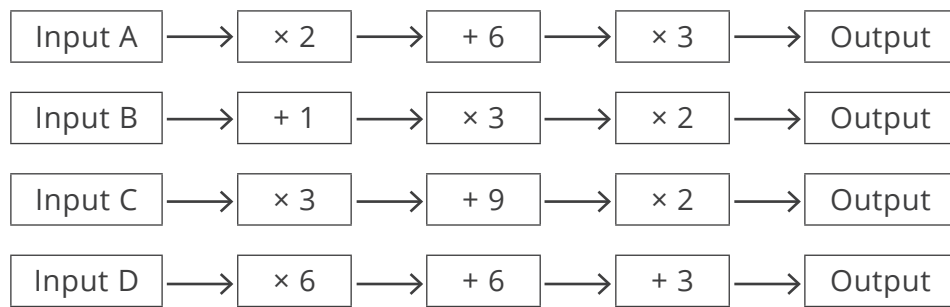
[1 mark]



12. Which two function machines will always give the same outputs as each other?

You must show your working.

[2 marks]



13. When a ball rolls down a slope, its speed is directly proportional to the square of the time since it started rolling.

After 5 seconds, the ball is travelling at 12.5m/s.

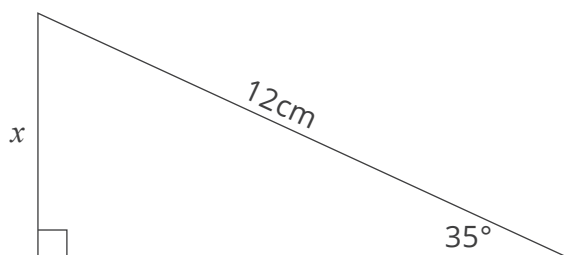
Find its speed after 10 seconds.

[3 marks]

_____ m/s

- 14a. Find the length of side x , correct to 1 decimal place.

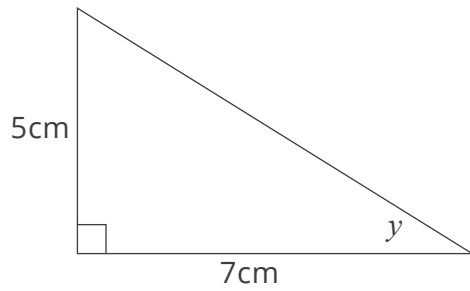
[2 marks]



_____ cm

b. Find angle y , correct to 1 decimal place.

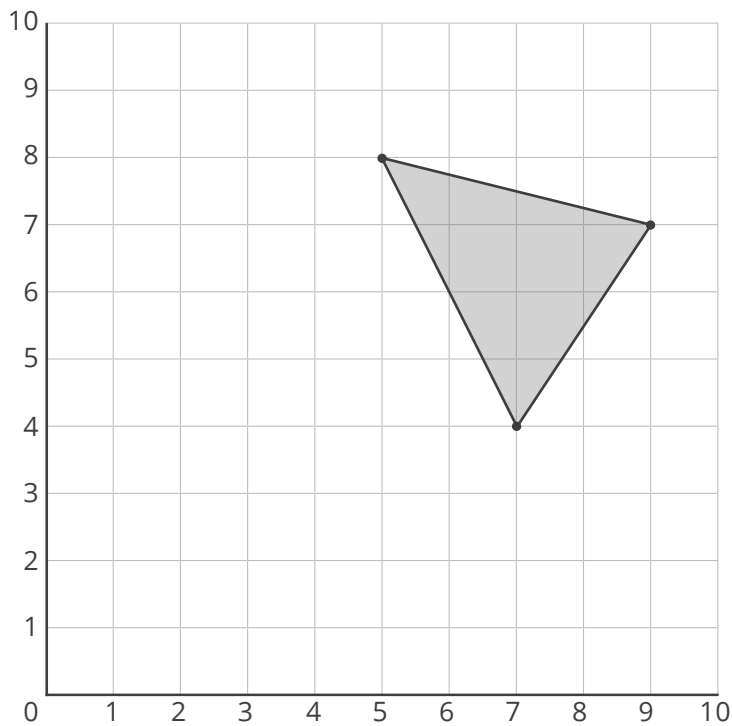
[2 marks]



_____°

15. Enlarge the triangle below using a scale factor of $\frac{1}{2}$ and centre of enlargement (1, 2).

[3 marks]



b. Describe the single transformation which takes shape ABCD to EFGH.

[3 marks]

