Name: _____

Maths Genie Stage 9

Test A

Instructions

• Use **black** ink or ball-point pen.
• Answer all questions.
• Answer the questions in the spaces provided
– *there may be more space than you need.*
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
• You must **show all your working out.**
• **Calculators may not be used.**

Information

• The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
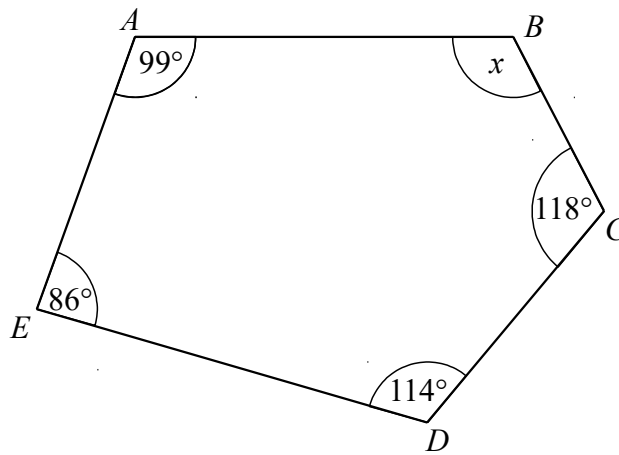• Check your answers if you have time at the end

1 $a = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $b = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$

Write down as a column vector $2\mathbf{a} + 3\mathbf{b}$

…..........................

(Total for Question 1 is 2 marks)

2

ABCDE is a pentagon.

Work out the size of angle *BAF*.

…..…°

(Total for Question 2 is 2 marks)

3 $3a = 2b + 5c$

Make c the subject of the formula.

….......................................……

(Total for Question 3 is 2 marks)

4   Use ruler and compasses to construct the perpendicular from point P to the line AB.
You must show all your construction lines.

× P

A ━━━━━━━━━━━━━━━━━━━━━ B
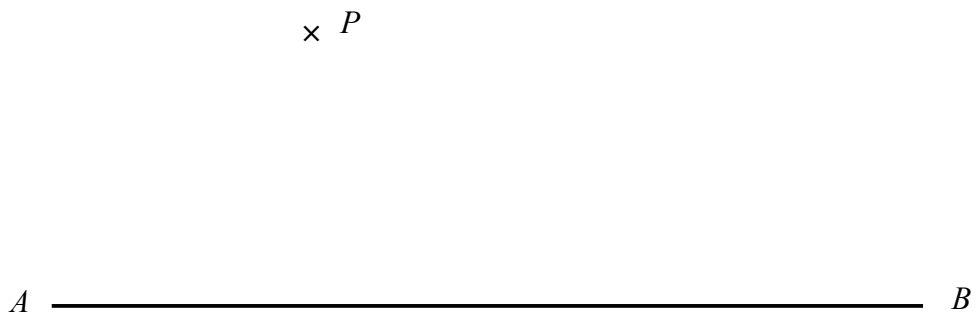
(Total for Question 4 is 2 marks)

5 A straight line has equation $y = 5 - 2x$

(a) Write down the gradient of the line.

....

(1)

(b) Write down the coordinates of the point where the line crosses the y axis.

....
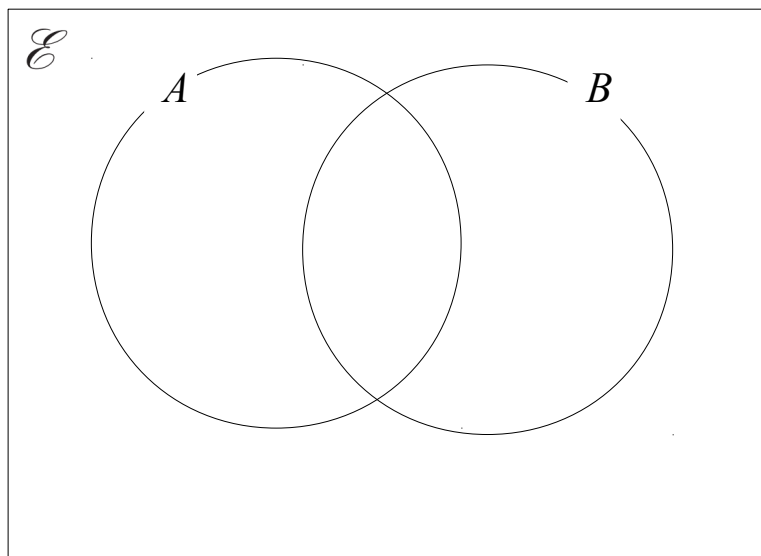
(1)

(Total for Question 5 is 2 marks)

---

6 $\mathscr{E}$ = {even numbers between 1 and 31}
A = {2, 4, 8, 14, 20, 22, 28}
B = {4, 12, 14, 18, 24, 28}

(a) Complete the Venn diagram to represent this information.

(2)

A number is chosen at random from the universal set, $\mathscr{E}$

(b) What is the probability that the number is in the set $A \cup B$?

....
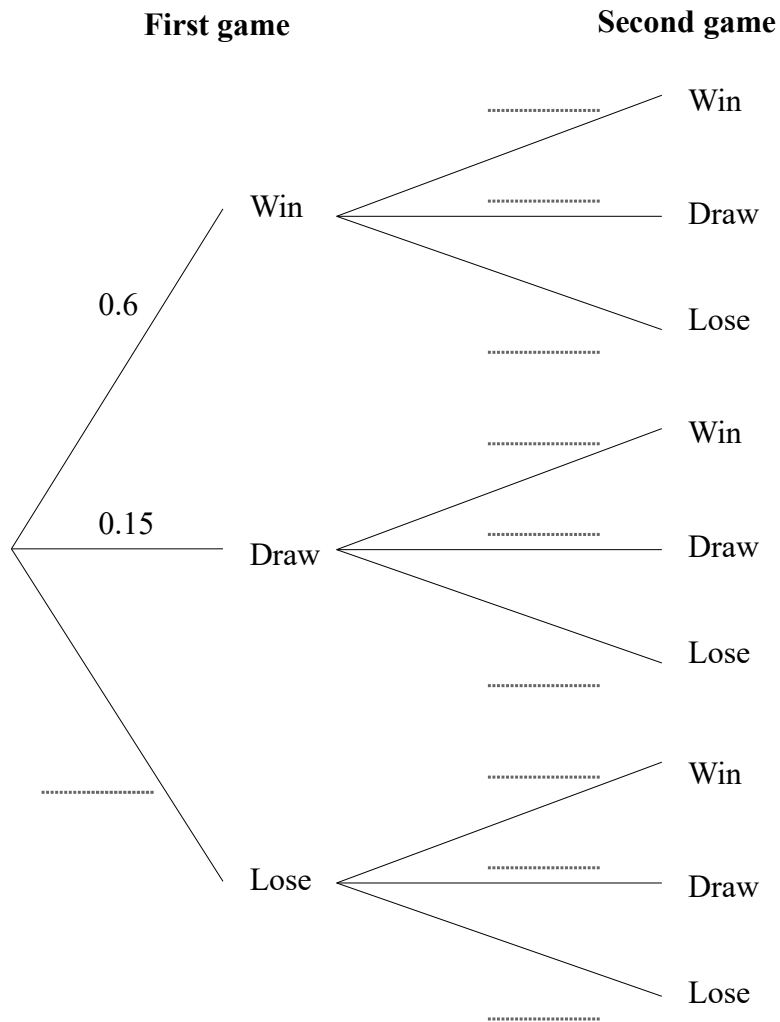
(2)

(Total for Question 6 is 4 marks)

7 Jon plays a game where he can win, draw or lose.

The probability Jon wins any game 0.6
The probability Jon draws any game is 0.15

Jon plays two games.

(a) Complete the probability tree diagram

First game **Second game**

```
                                              ........................ Win
                        Win <
                              ........................ Draw
            0.6  /
                /                             ........................ Lose

           0.15                               ........................ Win
                ———— Draw <
                \                             ........................ Draw
                 \
                  \                           ........................ Lose
                   \
         ........  \
                    \                         ........................ Win
                     Lose <
                           ........................ Draw

                                              ........................ Lose
```

(2)

(b) Work out the probability Jon wins both games.

....

(2)

(Total for Question 7 is 4 marks)

8   Find the gradient of the line that passes through (2, 12) and (5, 3).

....
(Total for Question 8 is 2 marks)

9   The accurate scale drawing shows the positions of boat *A* and boat *B*.

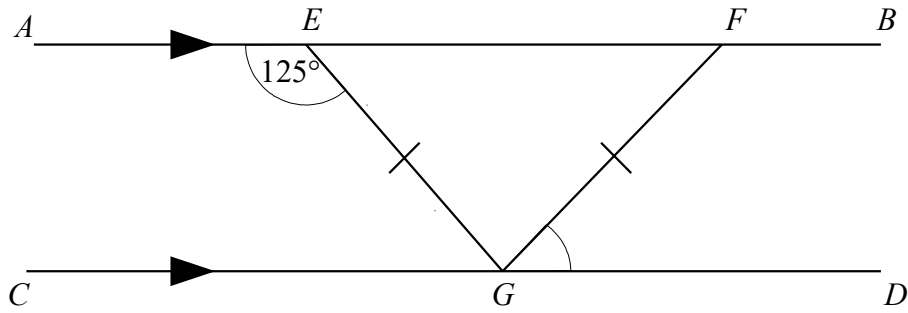Boat *C* is on a bearing of 075° from *A*.
Boat *C* is on a bearing of 330° from *B*.

N
↑

A ×

N
↑

B ×
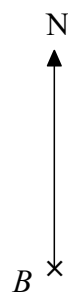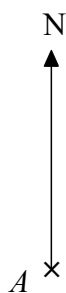
On the diagram, mark with a cross (×) the position of boat *C* on the diagram.

(Total for Question 9 is 2 marks)

10

AB and CD are parallel lines.
EFG is an isosceles triangle

Angle AEG = 125°

Find the size of angle FGD.
Give a reason for each stage of your working.

..............................°

(Total for Question 10 is 3 marks)