Name: _____

Maths Genie Stage 9

Test B

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

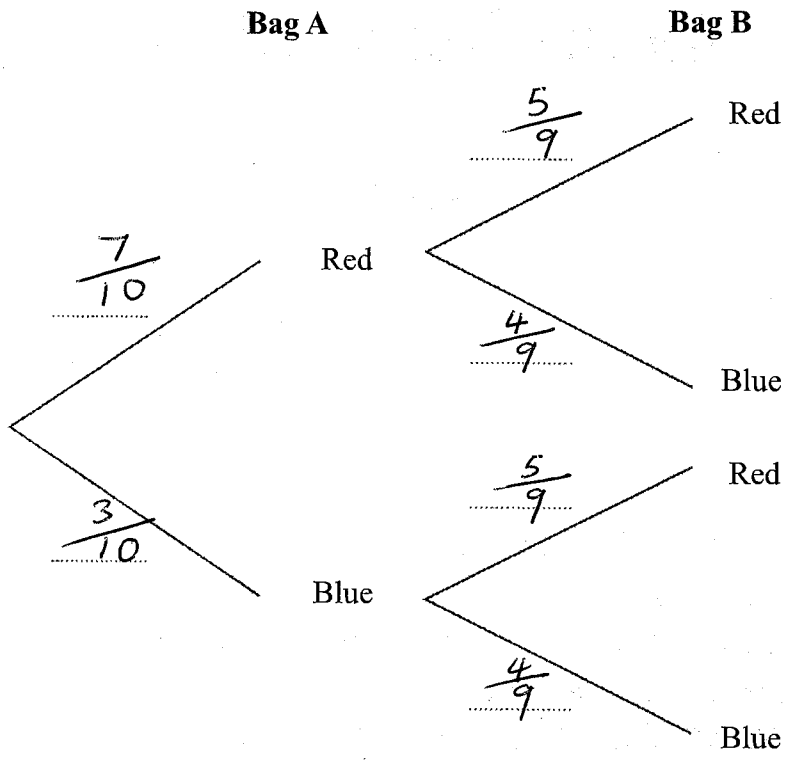
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Tina has two bags of counters, Bag A and Bag B.

There are 7 red counters and 3 blue counters in bag A.
There are 5 red counters and 4 blue counters in bag B.

Tina takes at random a counter from each bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Tina takes two blue counters.

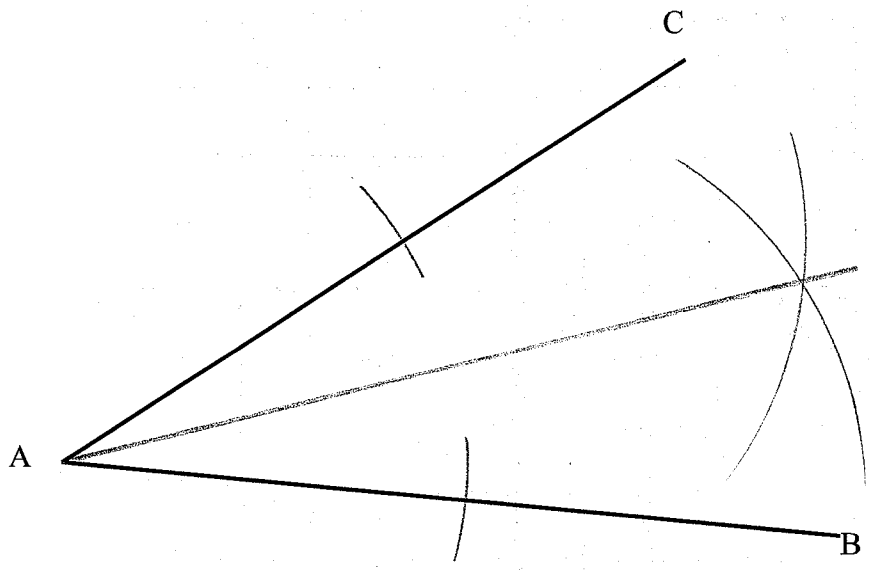
$\frac{3}{10} \times \frac{4}{9} = \frac{12}{90}$

$\frac{12}{90}$

(2)

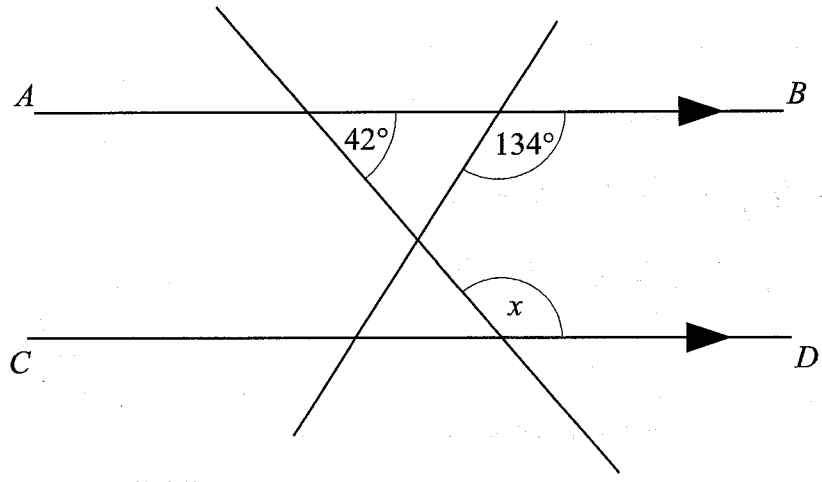
(Total for Question 1 is 4 marks)

2 Use ruler and compasses to construct the bisector of angle *BAC*.
You must show all your construction lines.



(Total for Question 2 is 2 marks)

3



AB and *CD* are parallel lines.

(a) Find the size of angle *x*

180 − 42

138

(1)

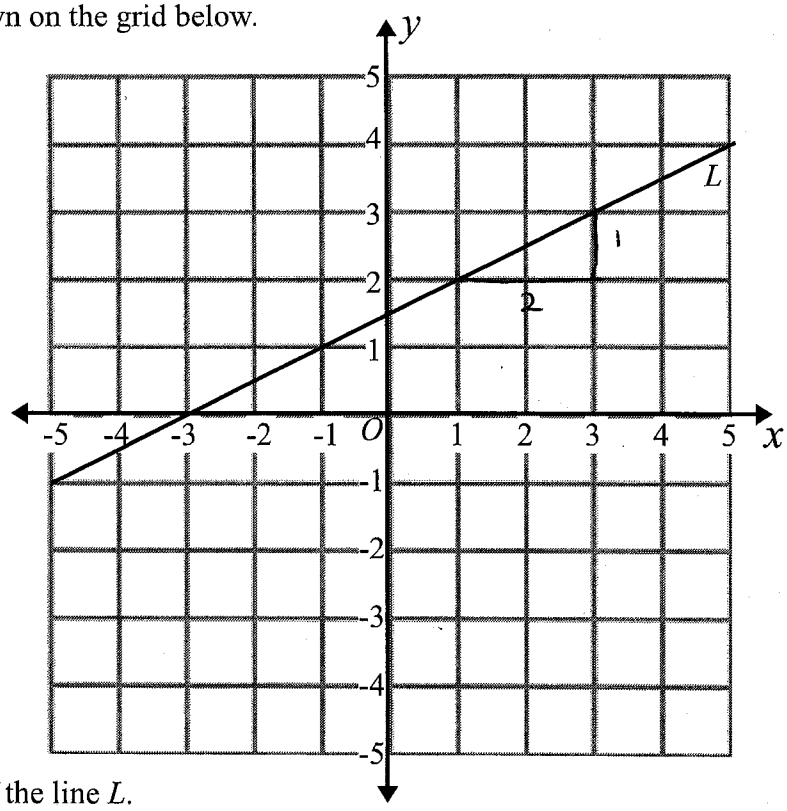
(b) Give a reason for your answer.

Co interior angles add to 180°

(1)

(Total for Question 3 is 2 marks)

4 The line L is drawn on the grid below.



Find the gradient of the line L.

$\frac{1}{2}$

(Total for Question 4 is 1 mark)

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5 A straight line has equation $4y - 5x = 6$

(a) Work out the gradient of this line.

$4y = 5x + 6$

$y = \frac{5}{4}x + \frac{6}{4}$

$\frac{5}{4}$

(2)

(b) Write down the equation of a line parallel to this line.

Any line with $m = \frac{5}{4}$ $y = \frac{5}{4}x + 1$

(1)

(Total for Question 5 is 3 marks)

6 The size of each exterior angle in a regular polygon is 12°.
Work out how many sides the polygon has.

$\frac{360}{12} = \frac{180}{6} = 30$

30

(Total for Question 6 is 2 marks)

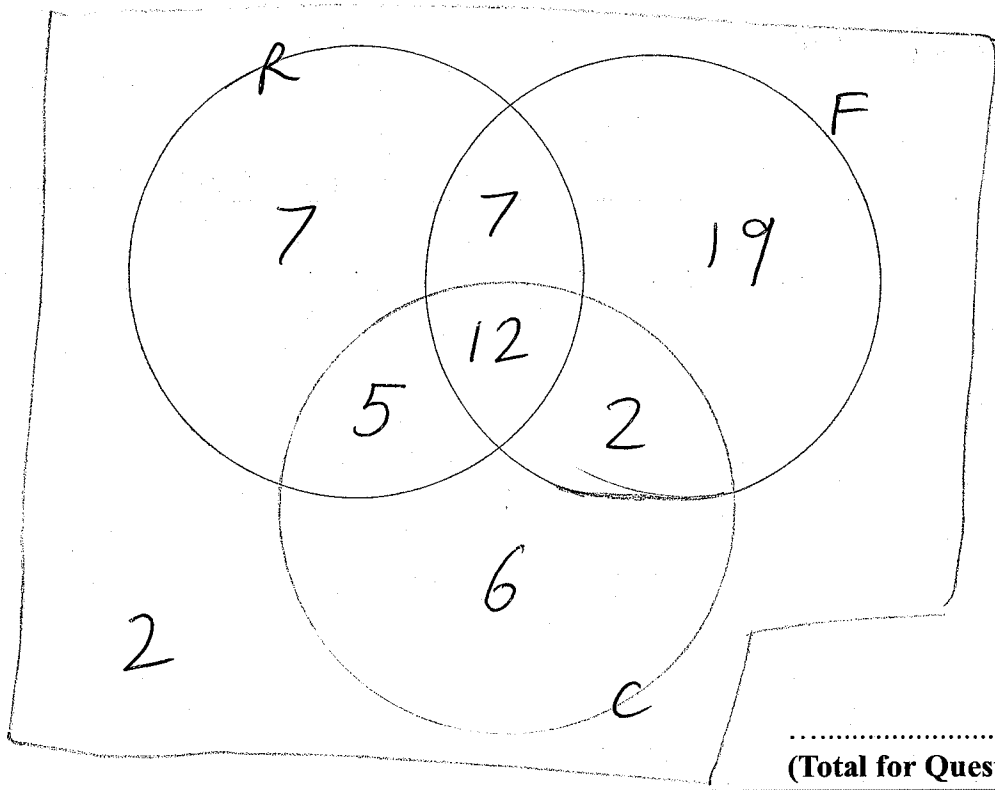
7 Sami asked 60 people which sports they liked from rugby, football and cricket.

12 people like all three sports.
19 people like rugby and football.
14 people like football and cricket.
17 people like rugby and cricket.
40 people like football.
25 people like cricket
31 people like rugby.

How many people liked neither rugby or football or cricket?

40
7
5
6
58

60 − 58 = 2

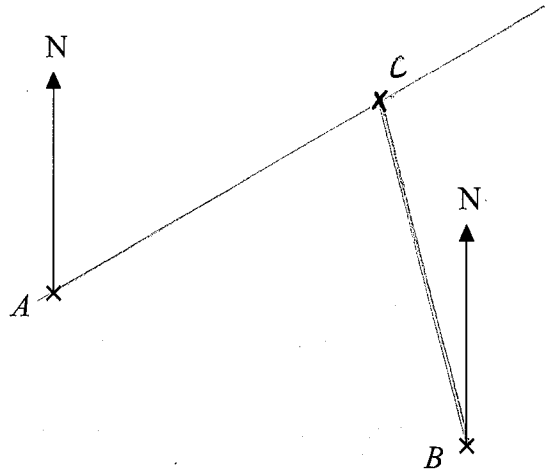


2

(Total for Question 7 is 4 marks)

8 The accurate scale drawing shows the positions of point A and point B.

Point C is 5 cm from point A on a bearing of 060°



(a) Find the distance from B to C.

4.7 cm

(2)

(b) Find the bearing of C from B.

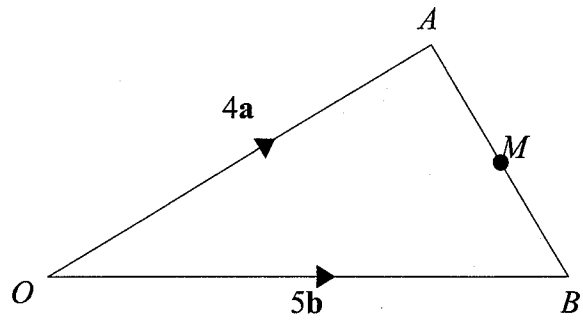
360 - 14

346 °

(2)

(Total for Question 8 is 4 marks)

9



$\overrightarrow{OA} = 4a$

$\overrightarrow{OB} = 5b$

M is the midpoint of AB

(a) Find, in terms of a and b, the vector $\overrightarrow{AB}$

$-4a + 5b$

(1)

(b) Find, in terms of a and b, the vector $\overrightarrow{AM}$

$-2a + \frac{5}{2}b$

(1)

(c) Find, in terms of a and b, the vector $\overrightarrow{OM}$

$4a - 2a + \frac{5}{2}b$

$2a + \frac{5}{2}b$

(1)

(Total for Question 9 is 3 marks)