Name: _____

Maths Genie Stage 14

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 be used.**

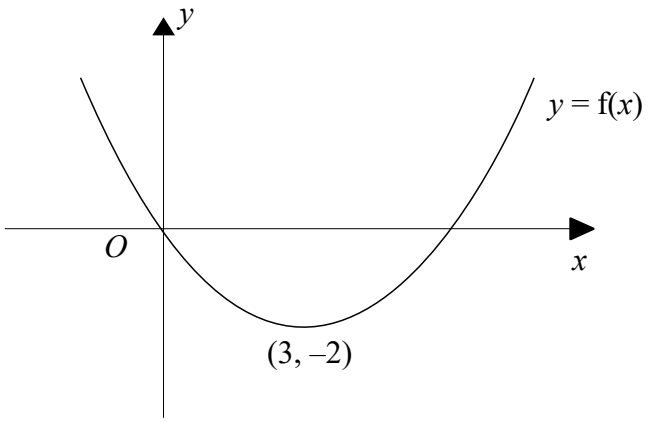
Information

- 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 The graph of $y = f(x)$ is shown below.



The coordinates of the minimum point of this curve are (3, –2).

Write down the coordinates of the minimum point of the curve with equation

(a) $y = f(x + 3)$

…….....

(1)

(b) $y = –f(x)$

…….....

(1)

(c) $y = f(–x)$

…….....

(1)

(Total for Question 1 is 3 marks)

2 The point A has the coordinates (2,4)
The point B has the coordinates (6,10)

Find the equation of the perpendicular bisector to AB.

.....

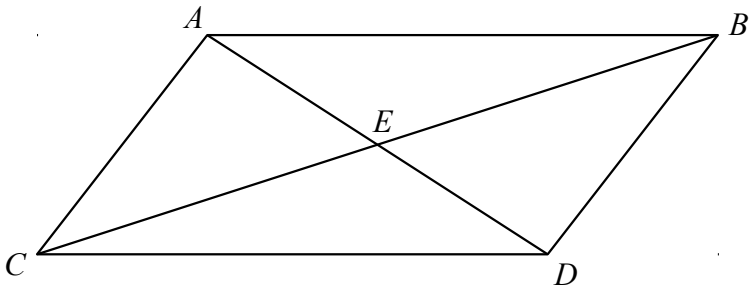
(Total for Question 2 is 4 marks)

3 Solve $x^2 - 9x + 14 \leq 0$

.....

(Total for Question 3 is 3 marks)

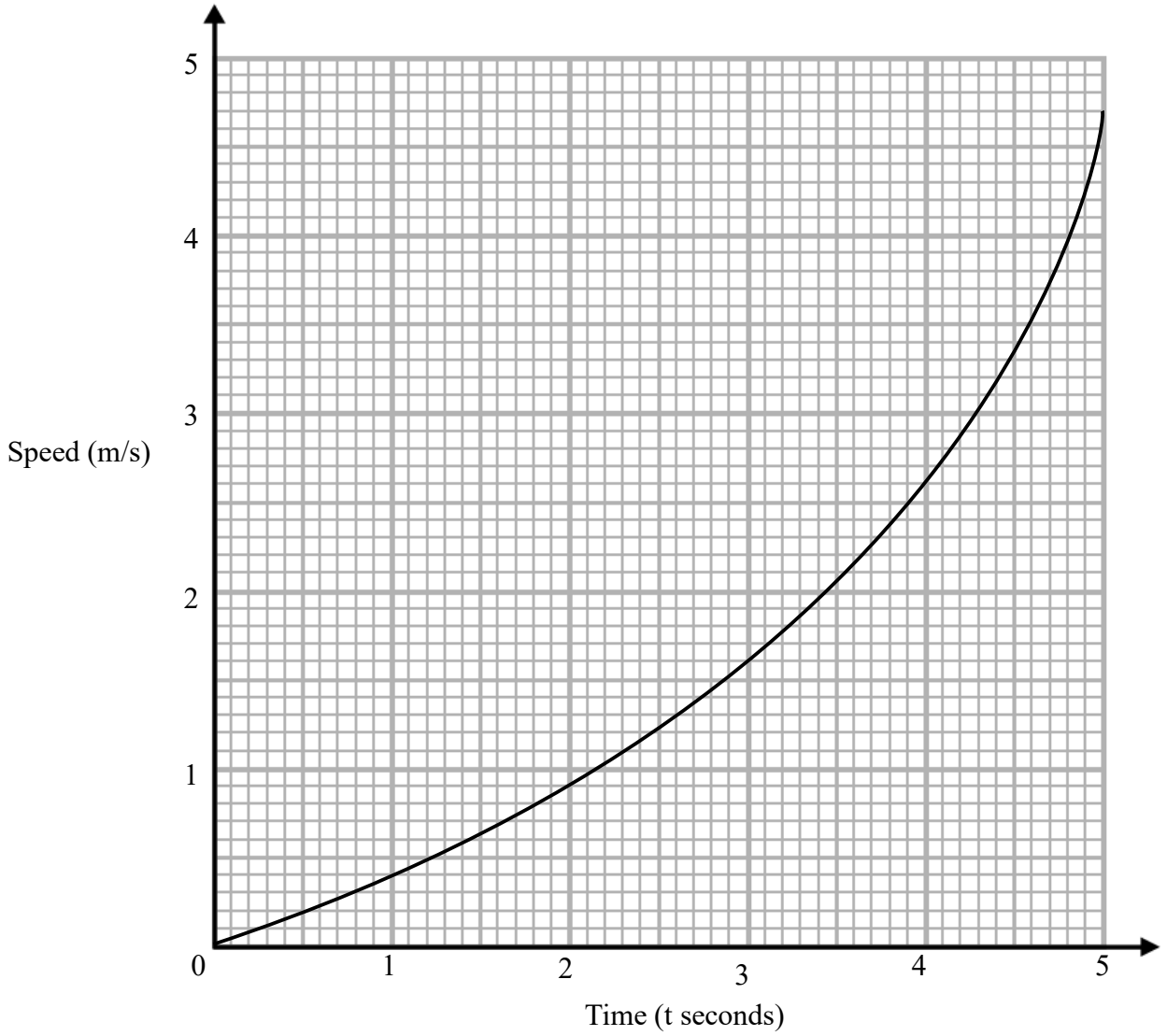
4 *ABCD* is a parallelogram
E is the point where the diagonals *AD* and *BC* meet.



Prove that triangle *ABE* is congruent to triangle *CDE*.

(Total for Question 4 is 3 marks)

5 Here is a speed-time graph.



Use 5 strips of equal width to find an estimate for the distance travelled in 5 seconds.

…..... m

(Total for Question 5 is 3 marks)

6 Solve the simultaneous equations

$$x^2 + y^2 = 17$$
$$y = 3x - 1$$

.....

(Total for Question 6 is 5 marks)

7 There are some red counters and some blue counters in a bag.

The ratio of red counters to blue counters is 3:2

Two counters are removed at random.

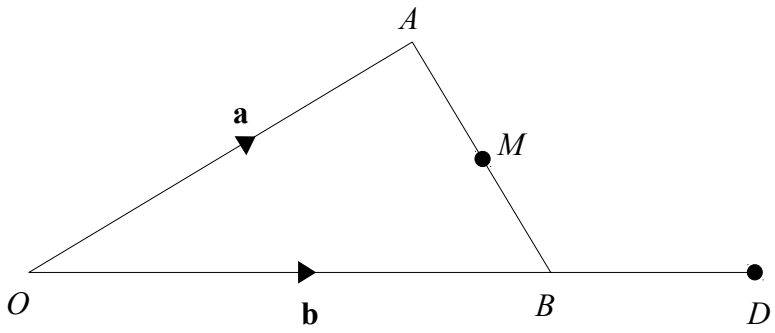
The probability that both the counters taken are red is $\frac{6}{17}$

Work how many blue counters are in the bag.

….....

(Total for Question 7 is 5 marks)

8



$\overrightarrow{OA} = a$

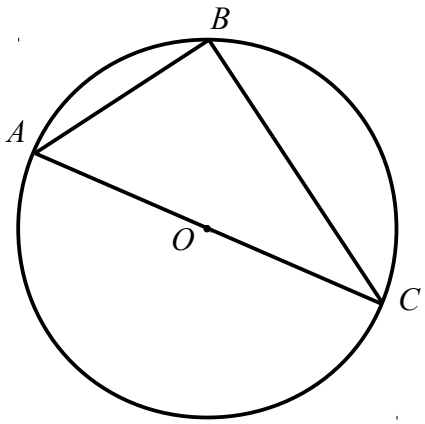
$\overrightarrow{OB} = b$

C is the point on OA such that $OC:CA = 4:1$
M is the midpoint of AB

Given that C, M and D are on the same straight line find $OB:BD$

(Total for Question 8 is 5 marks)

9



A, B and C are points on the circumference of a circle, centre O.
AOC is a diameter of the circle.

Prove that angle ABC is 90°
You must **not** use any circle theorems in your proof.

(Total for Question 9 is 4 marks)