GCSE Grade 7

Maths Booklet 2

Paper 3H
Calculator

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1 The nth term of a sequence is given by $an^2 + bn$ where a and b are integers.

The 2nd term of the sequence is –2
The 4th term of the sequence is 12

(a) Find the 6th term of the sequence.

.....

(4)

Here are the first five terms of a different quadratic sequence.

0 2 6 12 20

(b) Find an expression, in terms of n, for the nth term of this sequence.

.....

(2)

(Total for Question 1 is 6 marks)

2 (a) Factorise fully $4p^2 - 36$

.....

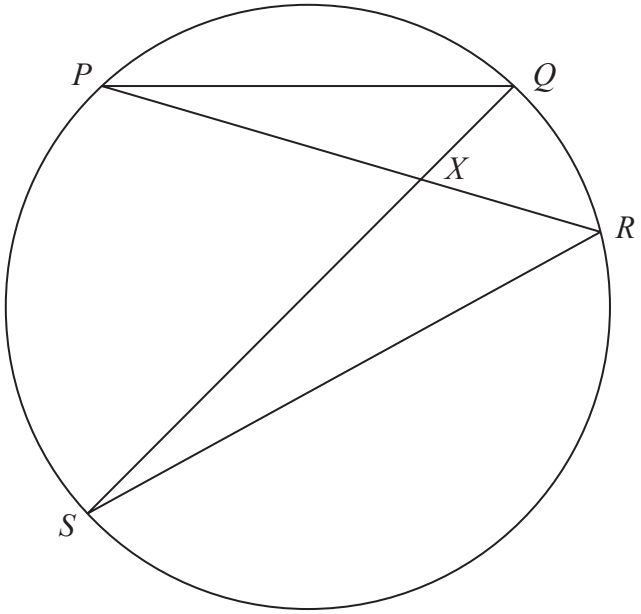
(2)

(b) Show that $(m + 4)(2m - 5)(3m + 1)$ can be written in the form $am^3 + bm^2 + cm + d$ where a, b, c and d are integers.

(3)

(Total for Question 2 is 5 marks)

3 P, Q, R and S are four points on a circle.



PXR and SXQ are straight lines.

Prove that triangle PQX and triangle SRX are similar.

(Total for Question 3 is 3 marks)

4 $p = \sqrt{\frac{2e}{f}}$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p.
Give your answer correct to 3 significant figures.
You must show all your working.

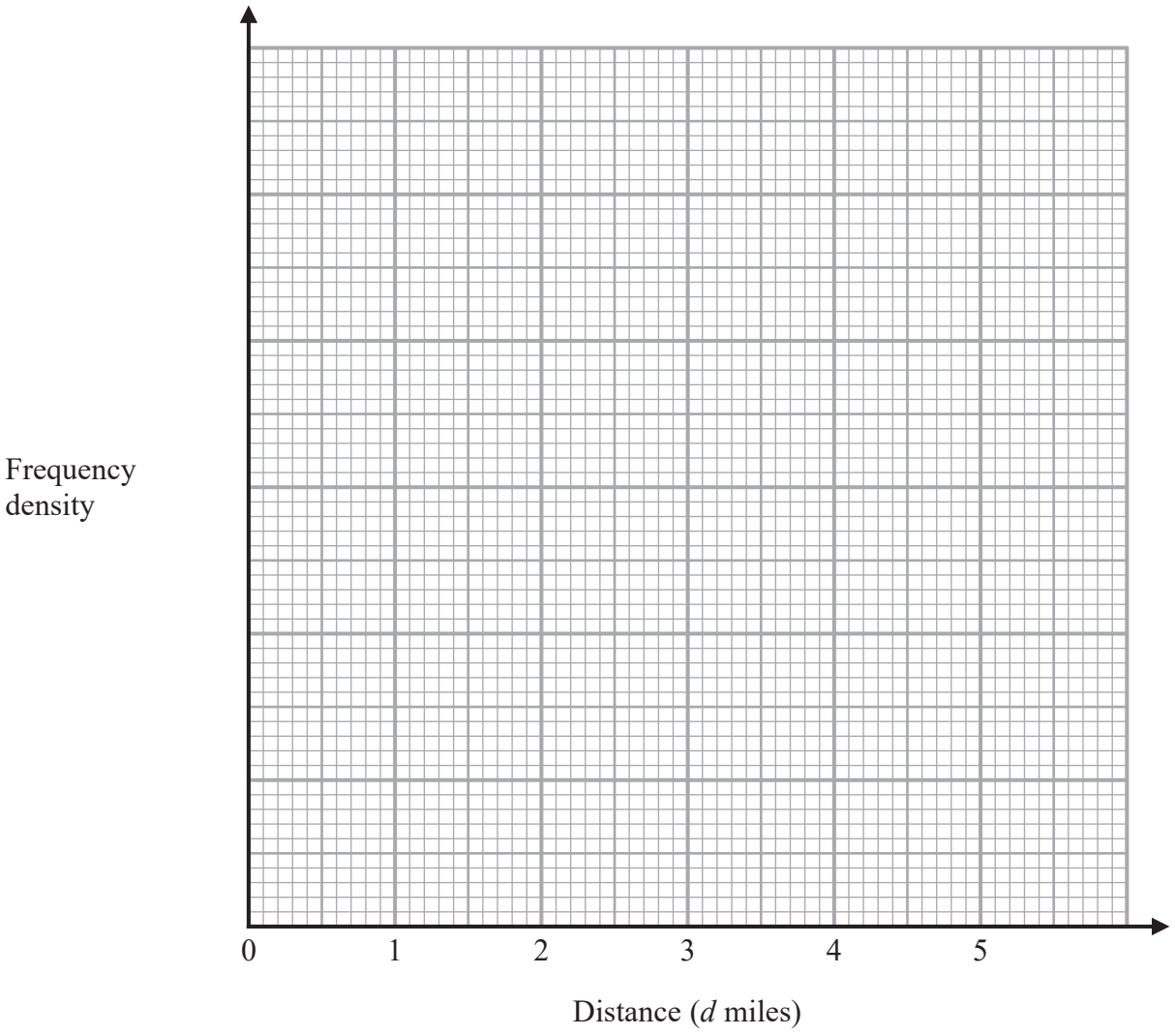
.....

(Total for Question 4 is 3 marks)

5 The table gives information about the distances, in miles, that some Year 10 students live from school.

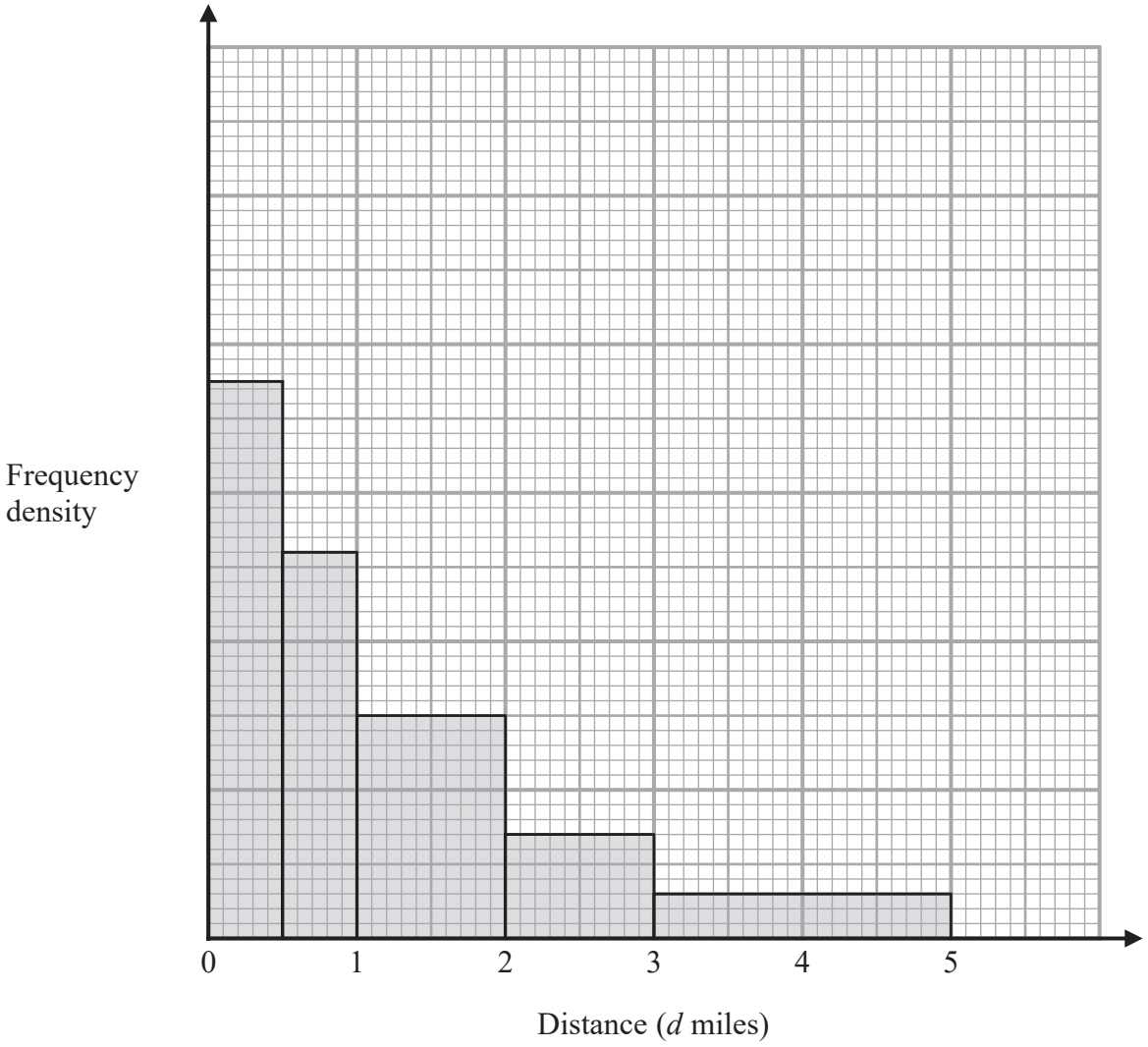
Distance (d miles)	Frequency
$0 < d \leqslant 1.0$	90
$1.0 < d \leqslant 1.5$	48
$1.5 < d \leqslant 2.0$	22
$2.0 < d \leqslant 3.0$	8
$3.0 < d \leqslant 5.0$	12

(a) On the grid, draw a histogram for this information.



(3)

The histogram below shows information about the distances, in miles, that some Year 11 students live from school.



The number of Year 11 students who live between 1 and 2 miles from school is n.

(b) Find an expression, in terms of n, for the number of Year 11 students who live between 3 and 5 miles from school.

.....

(2)

(Total for Question 5 is 5 marks)

6 The number of animals in a population at the start of year t is P_t
The number of animals at the start of year 1 is 400

Given that

$$P_{t+1} = 1.01P_t$$

work out the number of animals at the start of year 3

.....

(Total for Question 6 is 2 marks)

7 y is inversely proportional to x^3

$y = 44$ when $x = a$

Show that $y = 5.5$ when $x = 2a$

(Total for Question 7 is 3 marks)

8 Prove algebraically that the difference between the squares of any two consecutive odd numbers is always a multiple of 8

(Total for Question 8 is 3 marks)