Mock 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 3rd term of the sequence is 12
The 5th term of the sequence is 70

(a) Find the 8th term of the sequence.

.....

(4)

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

6 10 18 30 46

(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 $9y^2 - 4x^2$

.....

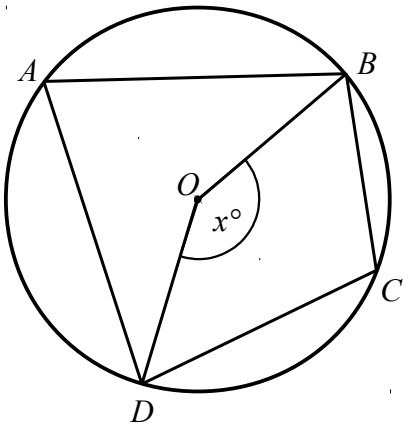
(2)

(b) Show that $(m + 3)(3m - 4)(4m + 1)$ 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



A, B, C and *D* are points on the circumference of a circle, centre *O*.

Angle $BOD = x°$

Find the size of angle *BCD*, in terms of *x*.
Give reasons for each stage of your working.

(Total for Question 3 is 3 marks)

4 $v^2 = u^2 + 2as$

v = 35.2 correct to 1 decimal place
a = 9.8 correct to 1 decimal place
s = 60.35 correct to 2 decimal places

Work out the upper bound for u.
Give your answer to 3 significant figures.

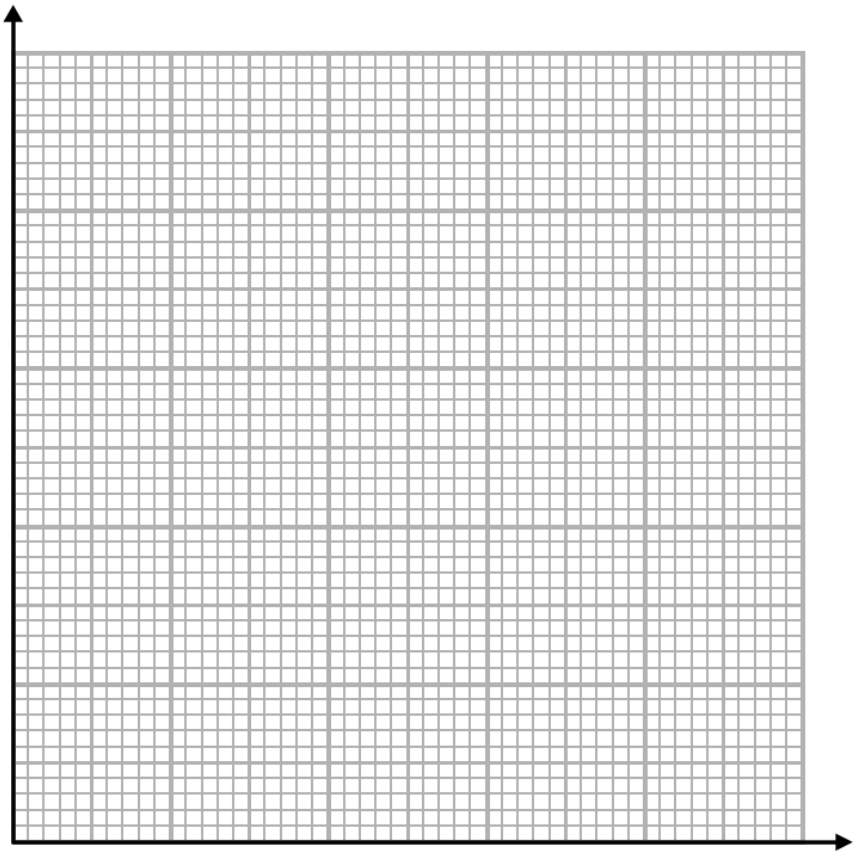
.....

(Total for Question 4 is 5 marks)

2 The table shows information about the speed, in mph, of some cars.

Speed (mph)	Frequency
$40 < s \leqslant 55$	6
$55 < s \leqslant 60$	10
$60 < s \leqslant 65$	46
$65 < s \leqslant 75$	48
$75 < s \leqslant 90$	6

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



(3)

(b) Work out an estimate for the number of cars over 70mph.

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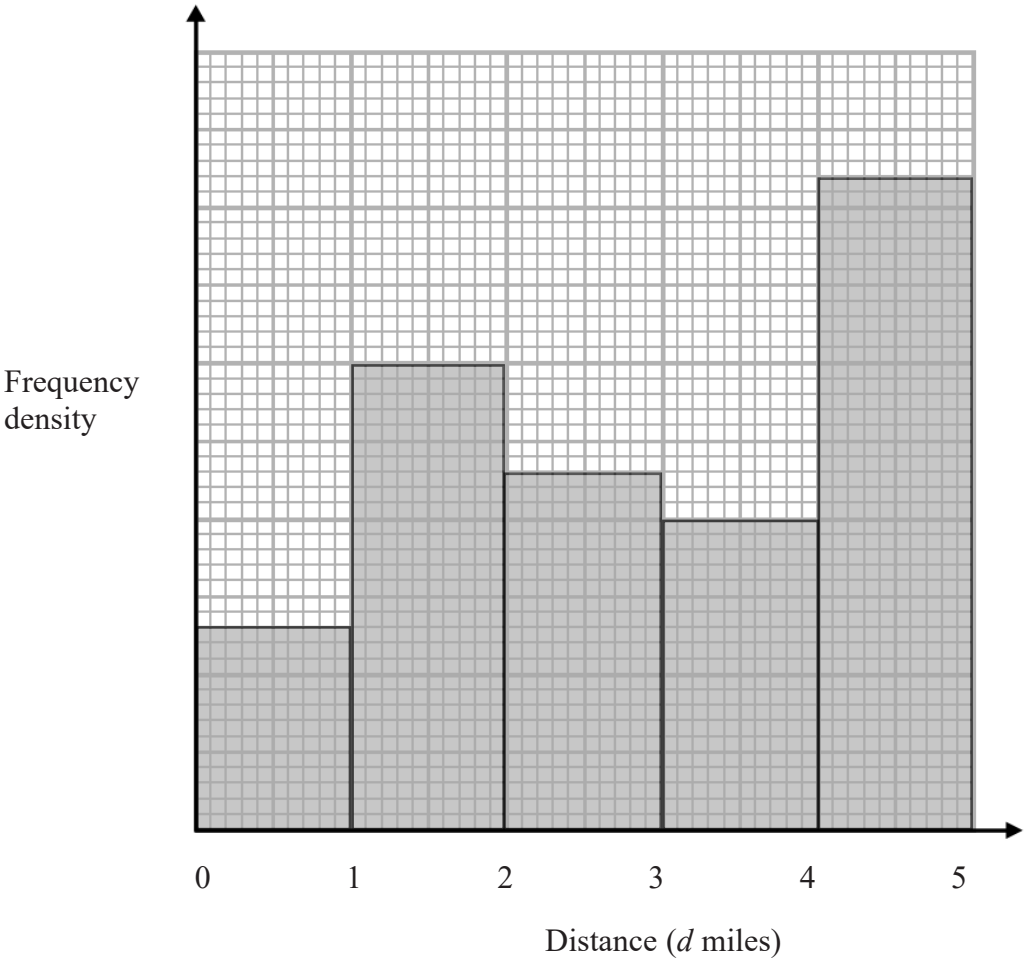
(1)

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.

(c) 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 720

Given that

$$P_{t+1} = 1.025P_t$$

work out the number of animals at the start of year 4

.....

(Total for Question 6 is 2 marks)

7 y is inversely proportional to x^2

$y = 88$ when $x = a$

Show that $y = 5.5$ when $x = 4a$

(Total for Question 7 is 3 marks)

8 Prove algebraically that the sum of any two consecutive numbers is always 3 more than a multiple of 8

(Total for Question 8 is 3 marks)