GCSE Grade 7

Maths Booklet 3

Paper 1H
Non-Calculator

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1 Three solid shapes **A**, **B** and **C** are similar.

The surface area of shape **A** is $4\,cm^2$
The surface area of shape **B** is $25\,cm^2$

The ratio of the volume of shape **B** to the volume of shape **C** is $27 : 64$

Work out the ratio of the height of shape **A** to the height of shape **C**.
Give your answer in its simplest form.

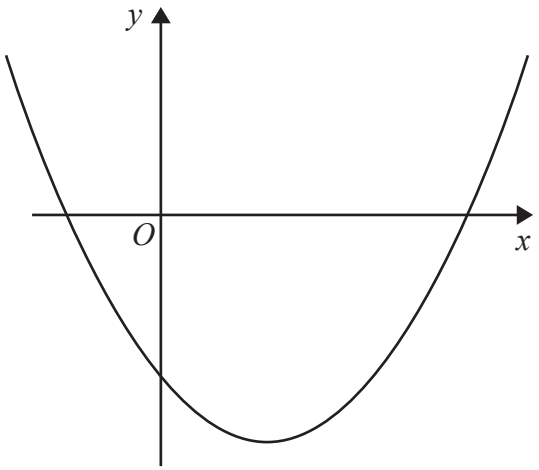
.....

(Total for Question 1 is 4 marks)

2 Prove algebraically that $0.2\dot{5}\dot{6}$ can be written as $\frac{127}{495}$

(Total for Question 2 is 3 marks)

3 Here is a sketch of a curve.



The equation of the curve is $y = x^2 + ax + b$ where a and b are integers.

The points $(0, -5)$ and $(5, 0)$ lie on the curve.

Find the coordinates of the turning point of the curve.

(..... , ...)

(Total for Question 3 is 4 marks)

4 A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

(a) Work out the total number of chicken pies that were made on Monday.

.....

(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

(b) Work out the lower bound of the probability that the pie is a steak pie.

.....

(2)

(Total for Question 4 is 4 marks)

5 The ratio $(y + x) : (y - x)$ is equivalent to $k : 1$

Show that $y = \dfrac{x(k + 1)}{k - 1}$

(Total for Question 5 is 3 marks)

6 $x = 0.4\dot{3}\dot{6}$

Prove algebraically that x can be written as $\dfrac{24}{55}$

(Total for Question 6 is 3 marks)

7 y is directly proportional to $\sqrt[3]{x}$

$y = 1\frac{1}{6}$ when $x = 8$

Find the value of y when $x = 64$

.....

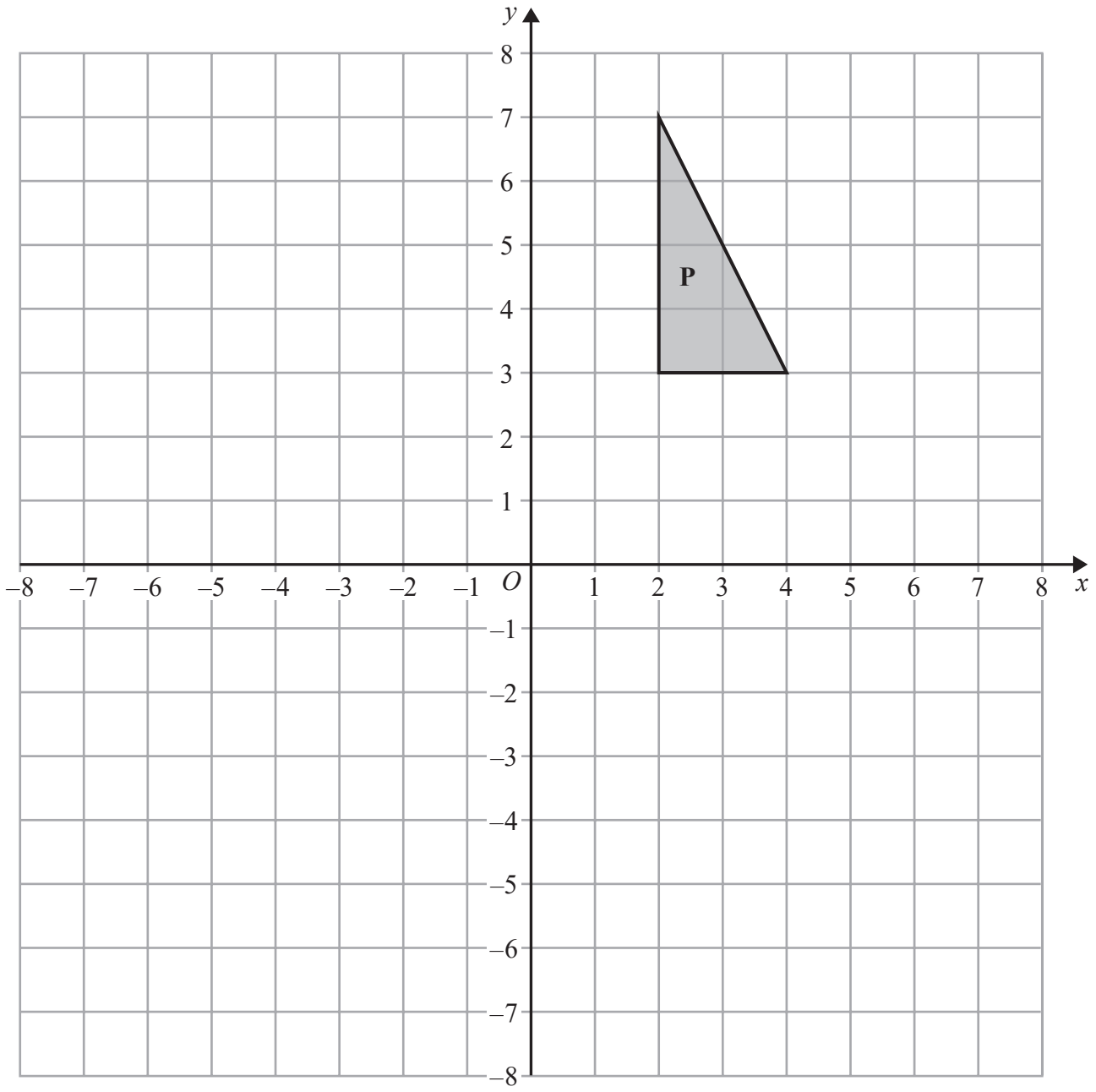
(Total for Question 7 is 3 marks)

8 n is an integer.

Prove algebraically that the sum of $\frac{1}{2}n(n + 1)$ and $\frac{1}{2}(n + 1)(n + 2)$ is always a square number.

(Total for Question 8 is 2 marks)

9



Enlarge shape **P** by scale factor $-\frac{1}{2}$ with centre of enlargement (0, 0).

Label your image **Q**.

(Total for Question 9 is 2 marks)

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10 Liquid **A** and liquid **B** are mixed to make liquid **C**.

Liquid **A** has a density of 70 kg/m^3
Liquid **A** has a mass of 1400 kg

Liquid **B** has a density of 280 kg/m^3
Liquid **B** has a volume of 30 m^3

Work out the density of liquid **C**.

..... kg/m^3

(Total for Question 10 is 3 marks)