Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2020

Mathematics

PRACTICE PAPER

Unit M8 Paper 1
(Non-Calculator)
Higher Tier

[GMC81]

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

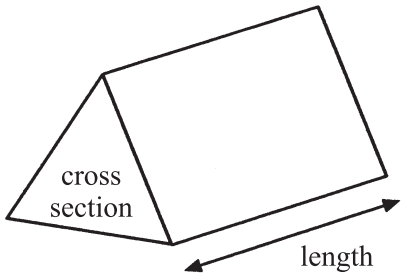
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all twelve** questions.
All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

INFORMATION FOR CANDIDATES

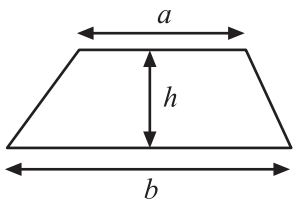
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

Volume of prism = area of cross section × length

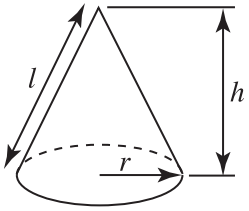


Area of trapezium $= \frac{1}{2}(a+b)h$



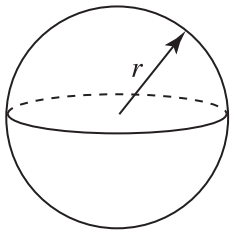
Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$

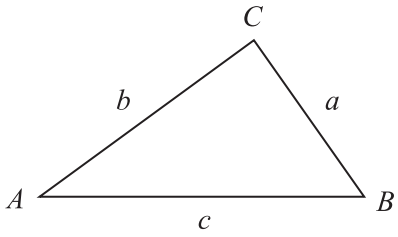


Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



In any triangle *ABC*



Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

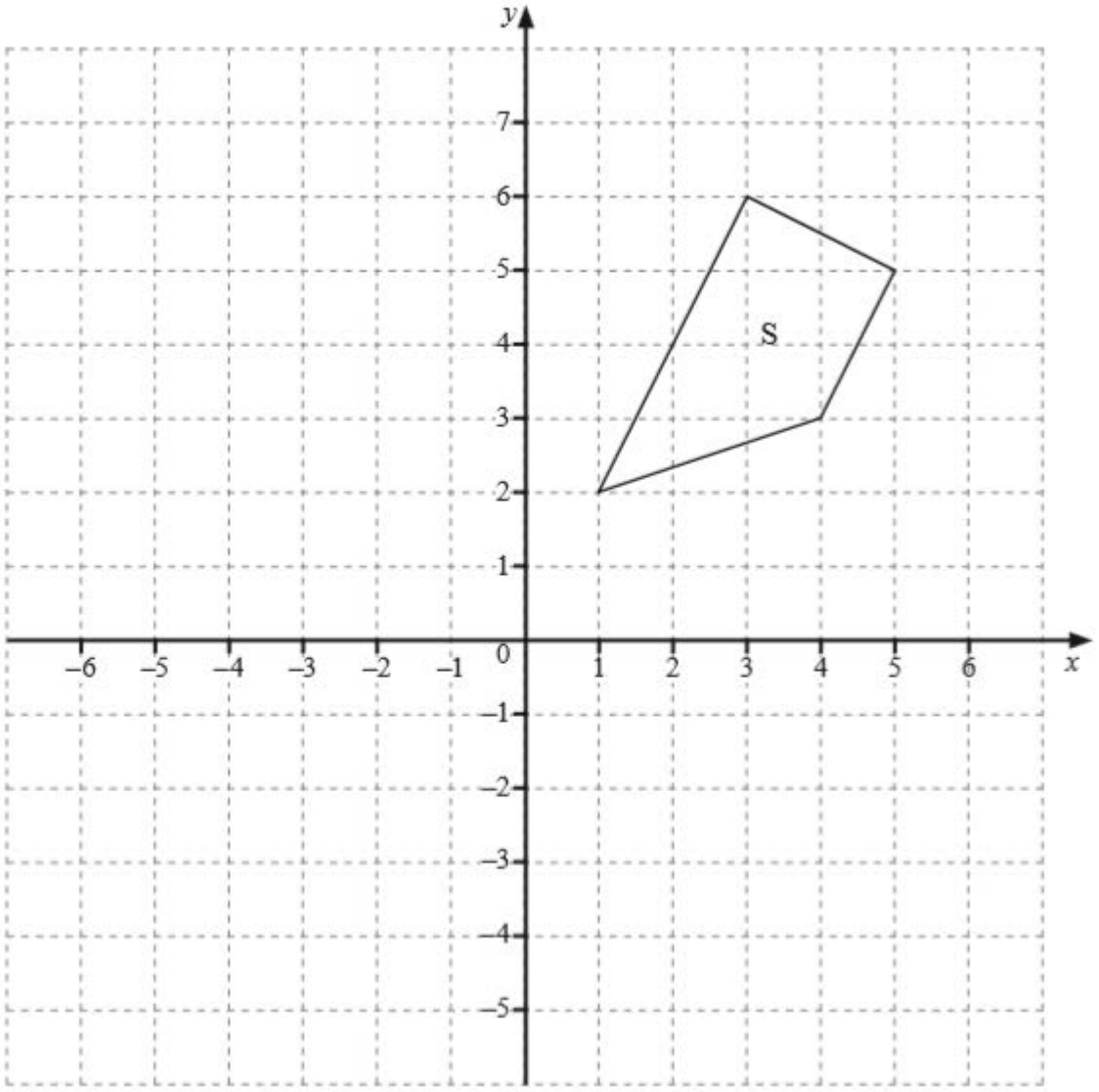
Sine Rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule: $a^2 = b^2 + c^2 - 2bc\cos A$

Area of triangle $= \frac{1}{2}ab\sin C$

12371

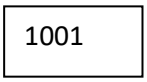
1



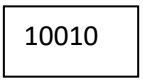
(a) Reflect the shape S in the line $y = 1$ [2]

(b) Draw the image of shape S after a translation $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$ [1]

2 John and Paul each have a card with a binary number.



John's card



Paul's card

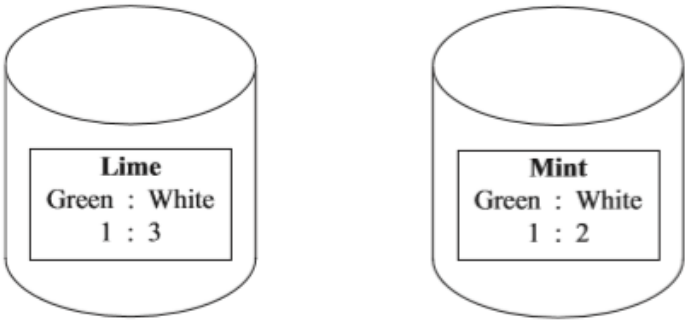
Paul says the number on his card is double the number on John's card.

Is Paul correct?

You must show how you obtained your answer.

[2]

3 Green and white paint can be mixed in different ratios to make different shades.



Janet has 1.2 litres of Lime.

How much **extra** green paint does she need to add to turn it into Mint?

Answer _____litres [3]

4 Evaluate

(a) 2^{-3}

Answer _____ [1]

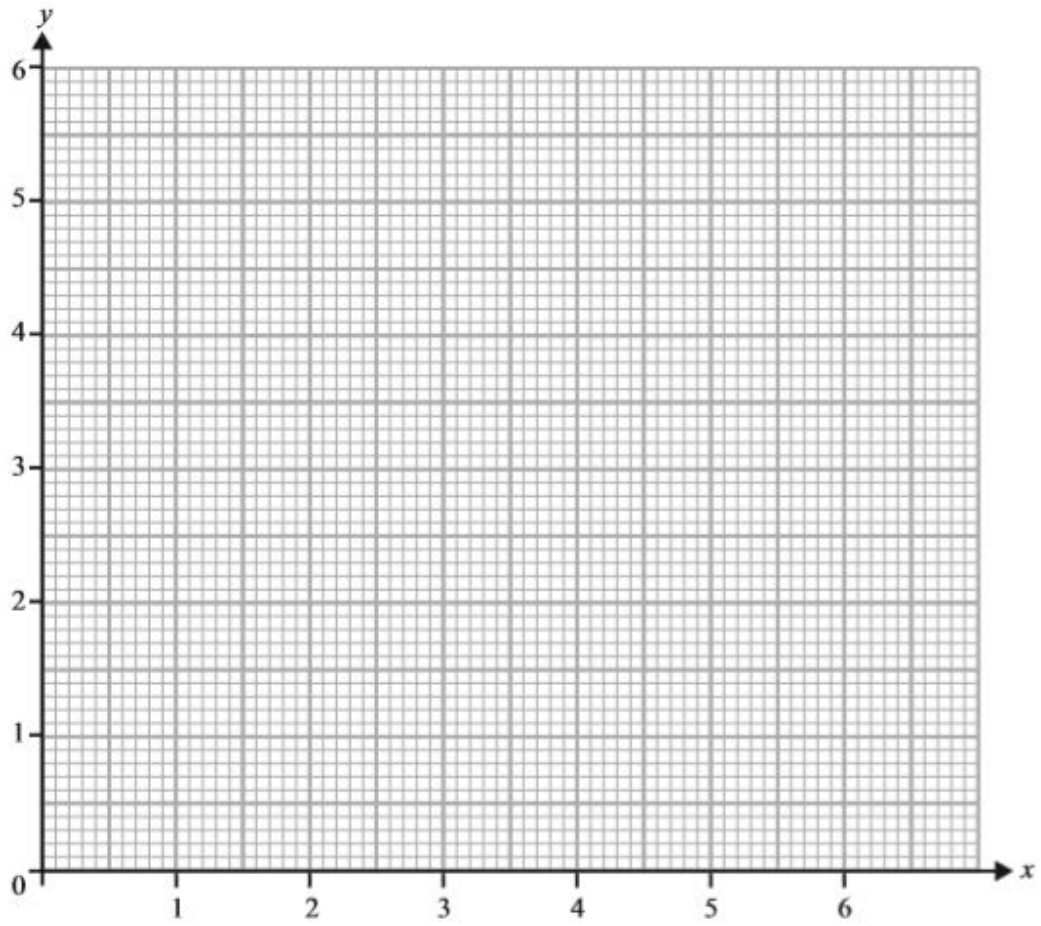
(b) 7^{0}

Answer _____ [1]

5

(a) On the grid below show by shading **and the letter R**, the region represented by the inequalities.

$$x + y \leqslant 6$$
$$x \geqslant 2$$
$$2y \geqslant x$$



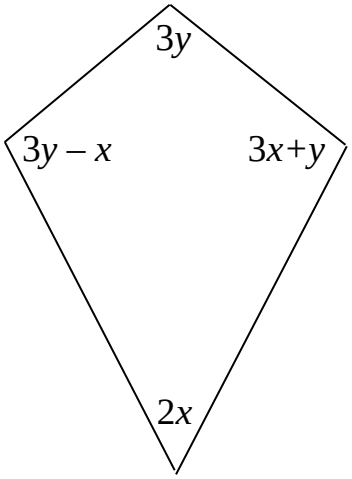
[3]

(b) Find the maximum value of $2x + 3y$, where x and y are integers, from a point in the region R.

Answer _____ [2]

6 The shape below is a kite. x and y are values in degrees.

Calculate the size of smallest angle.



Answer _____ °[7]

7 Change the formula

$$ax + b = cx$$

to make x the subject.

Answer x = _____ [3]

8 The population, P, of a town n years after 1st January 2015 is given by the formula

$$P = 8300 \times 1.07^n$$

(a) What was the population of the town on 1st January 2015?

Answer _____[1]

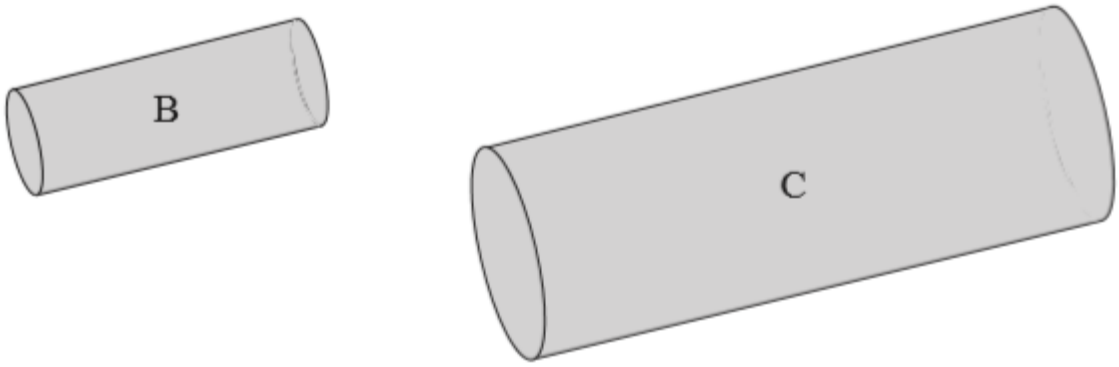
(b) Sketch the graph of P against n in the space below.

[2]

(c) Write an equation for P in terms of n if the population was deceasing by 7% each year.

Answer _____ [1]

9



B and C are two mathematically similar cylinders.

The area of the cross section of B is $14\pi\,\text{cm}^2$

The area of the cross section of C is $56\pi\,\text{cm}^2$

B has a volume of $580\,\text{cm}^3$

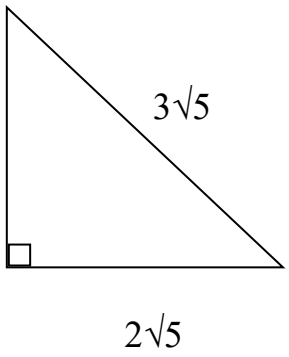
Work out the volume of C.

Answer _____ cm^3 [3]

10 The triangle drawn below is a right angled triangle.

The lengths of two of the sides are shown.

Calculate the area of the triangle.



Answer _____ square units [5]

11 (a) Write $64^{1/2} \times 27^{-1/3}$ as a fraction.

Answer _____ [3]

(b) Solve $3^{x+2} + 3^{x} = 270$

Answer $x =$ _____ [3]

12 Solve the simultaneous equations

$$y = 1 - 2x$$

$$\frac{1}{x} - \frac{1}{y} = 2$$

Answer _____ [7]

THIS IS THE END OF THE QUESTION PAPER

DO NOT WRITE ON THIS PAGE