



General Certificate of Secondary Education
November 2024

Centre Number

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Candidate Number

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Mathematics

Unit M8 Paper 2
(With calculator)

Higher Tier



[GMC82]

GMC82

THURSDAY 21 NOVEMBER, 10.45am–12 NOON

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.**

Questions which require drawing or sketching should be completed using an HB pencil. All working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

Answer **all fourteen** questions.

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 calculator, ruler, compasses and a protractor.

The Formula Sheet is on page 2.

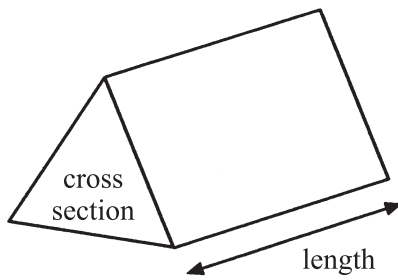
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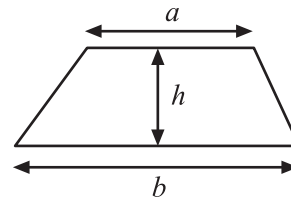
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Formula Sheet

Volume of prism = area of cross section \times length

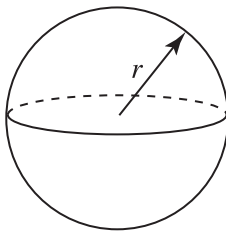


Area of trapezium = $\frac{1}{2}(a+b)h$



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

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

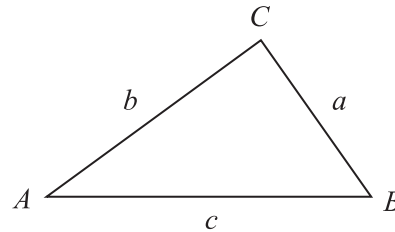


Volume of cone = $\frac{1}{3}\pi r^2 h$

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



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: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



1 There are 55 girls and 20 boys in Year 13

The probability that a girl in Year 13 has a part-time job is $\frac{2}{5}$

The probability that a boy in Year 13 has a part-time job is $\frac{3}{4}$

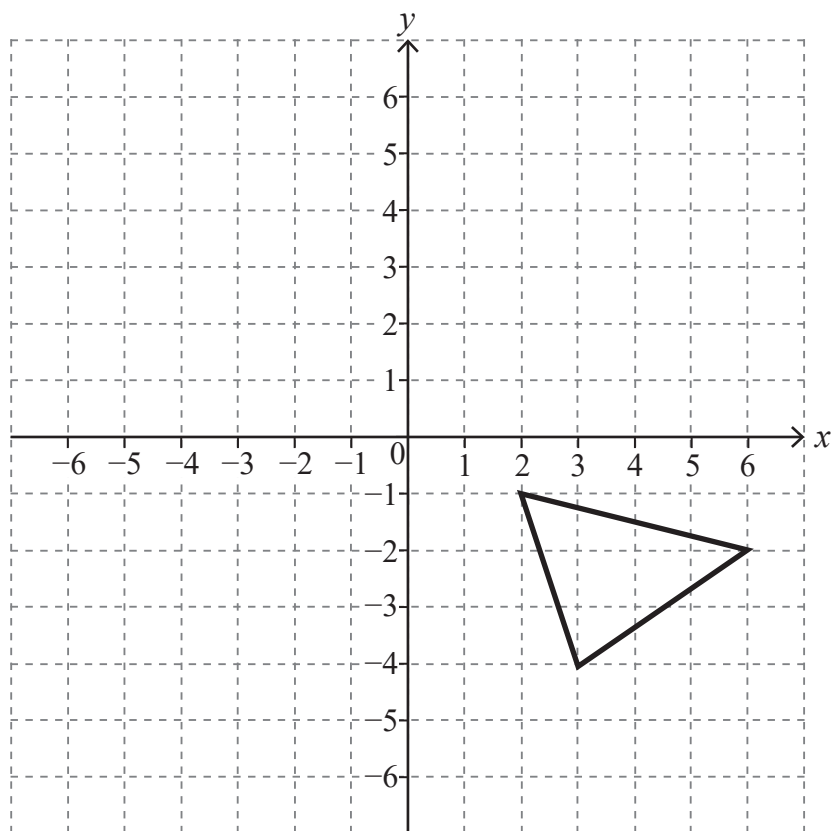
Work out the probability that a student in Year 13 has a part-time job.

Answer _____ [4]

[Turn over



2 Rotate the triangle 180° about the point $(3,1)$



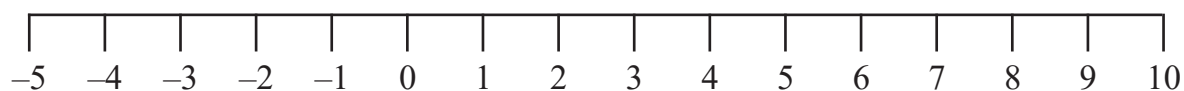
[2]



4 Solve the inequality

$$-5 < 2n \leq 8$$

showing all possible **integer** values for n on the number line below.



[2]

5 Fill in the blank below.

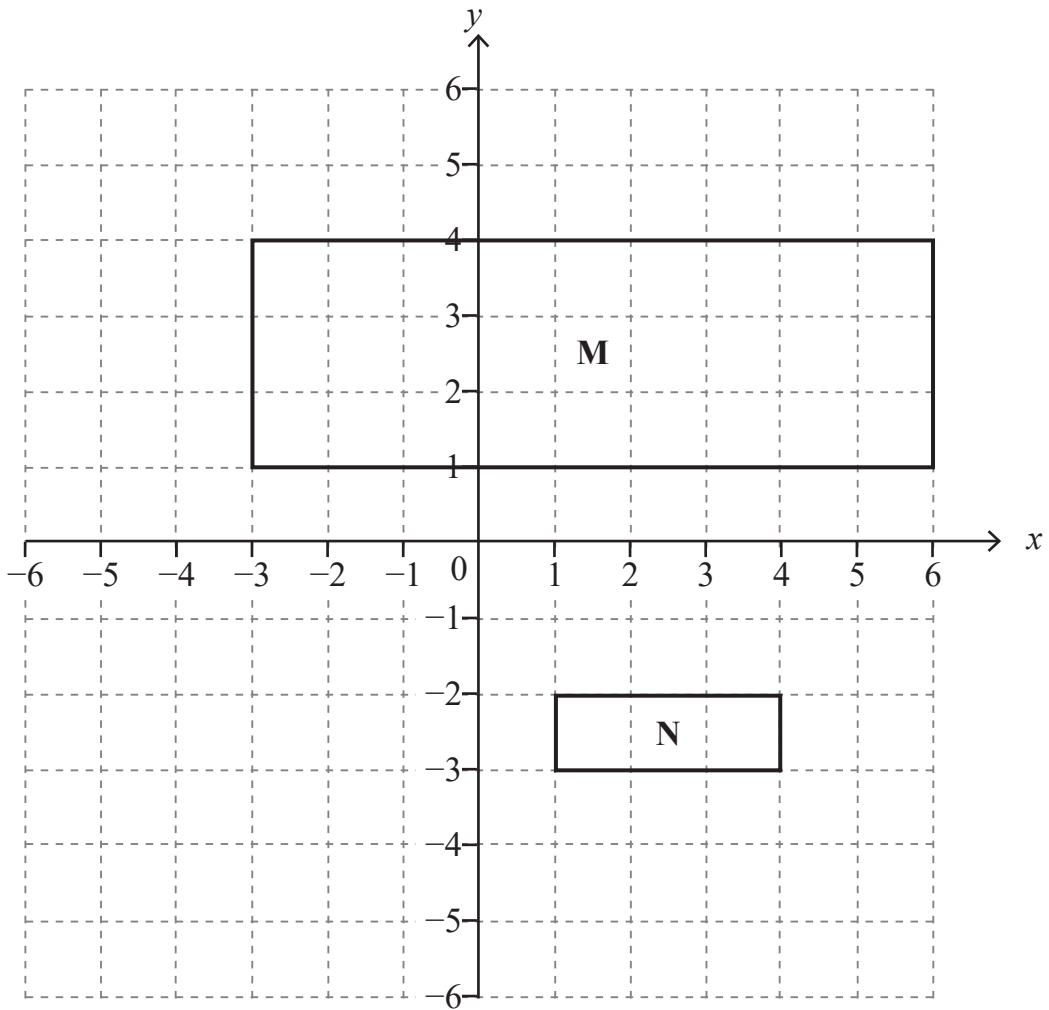
The dimensions of a large cylinder are twice the dimensions of a small cylinder.

The large cylinder will hold _____ times as much as the small cylinder.

[1]



6 Describe fully the single transformation that maps **M** to **N**.



Answer _____

[3]

[Turn over



7 A restaurant has three courses on its menu

Starter

Soup
Brie
Prawns
Pâté

Main

Beef
Chicken
Salmon
Lasagne
Pork

Dessert

Apple tart
Pavlova
Lemon cake
Ice cream
Rhubarb crumble
Fruit salad

There is a special deal when any two courses are ordered.

How many options are there when **any two different** courses are ordered?

Answer _____ [3]



8 Find the n th term of the sequence

$$\frac{1}{2}, \frac{8}{3}, \frac{27}{4}, \frac{64}{5}, \frac{125}{6}, \dots$$

Answer _____ [2]

9 The probability that Eric will win his next darts match is $\frac{1}{7}$

The probability that Fiona will win her next darts match is $\frac{1}{5}$

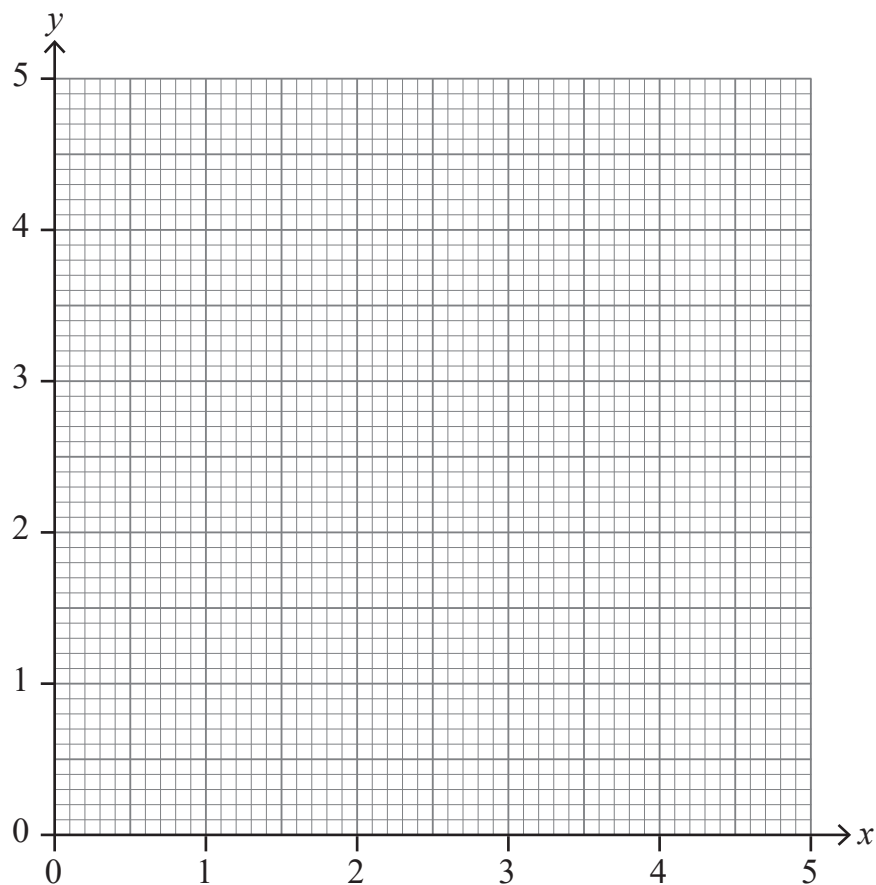
What is the probability that they will both lose their next match?

Answer _____ [2]

[Turn over



10 (a) Sketch the graph of $y = (1.3)^x$ for values of x between 0 and 5



[3]



(b) Use your graph to estimate the increase in x required to double the value of y .

Answer _____ [1]

(c) Which of the following is represented by the graph, where x is the number of years?

- A y increases in value by 3% each year.
- B y increases in value by 1.3% each year.
- C y increases in value by 13% each year.
- D y increases in value by 30% each year.

Answer _____ [1]

[Turn over



11 (a) y is inversely proportional to the square of x .

When $x = 15$, $y = 4$

Write y in terms of x .

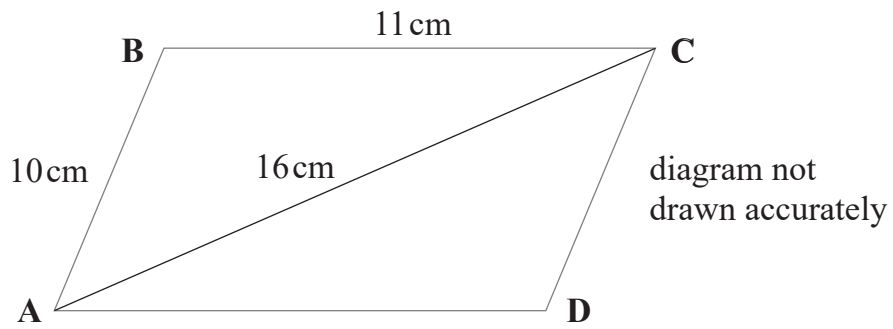
Answer $y =$ _____ [3]

(b) Hence find the values of x for which $y = 10\,000$

Answer _____ [2]



12



The parallelogram ABCD has sides $AB = 10$ cm, $BC = 11$ cm and diagonal $AC = 16$ cm.

Find the area of the parallelogram.

Answer _____ cm^2 [5]

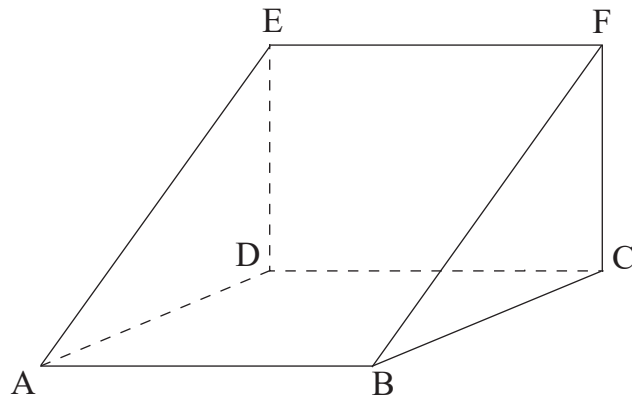
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13



ABCDEF is a right-angled triangular prism.

$BC = 5$ cm, $BF = 10$ cm and $AC = 15$ cm.

Show that the angle between AF and ABCD is half the angle between ABCD and ABFE.

[6]



14 A box contains eight cards numbered 1, 2, 3, 4, 5, 6, 7, 8 (a different number on each card).

One card is taken at random from the box and not replaced.

A second card is taken at random from the box.

The numbers on the two cards are multiplied together.

What is the probability that the answer is

(a) a prime number;

Answer _____ [3]

(b) a square number?

Answer _____ [3]



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THIS IS THE END OF THE QUESTION PAPER

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|-------------------------|-------|
| Question Number | Marks |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
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| Total Marks | |
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Examiner Number

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