



General Certificate of Secondary Education

Centre Number

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Candidate Number

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Mathematics

Unit M8 Paper 2
(With calculator)

Higher Tier



[GMC82]
Assessment

GMC82

TIME

1 hour 15 minutes.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 eleven** questions.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **may** 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.

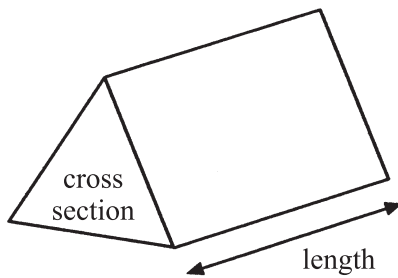
You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on page 2.

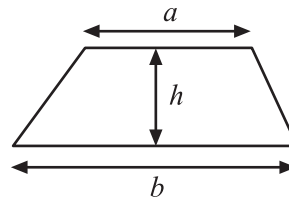


Formula Sheet

Volume of prism = area of cross section \times length

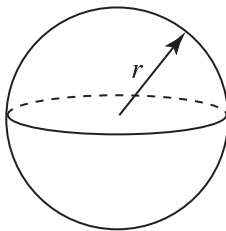


Area of trapezium = $\frac{1}{2}(a+b)h$



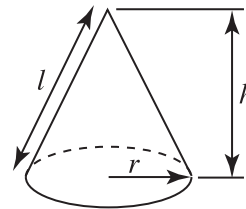
Volume of sphere = $\frac{4}{3}\pi r^3$

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

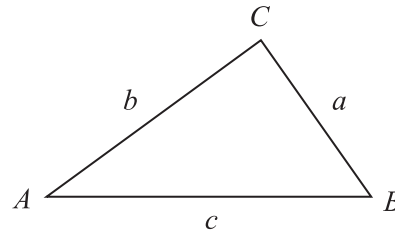


Volume of cone = $\frac{1}{3}\pi r^2 h$

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

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

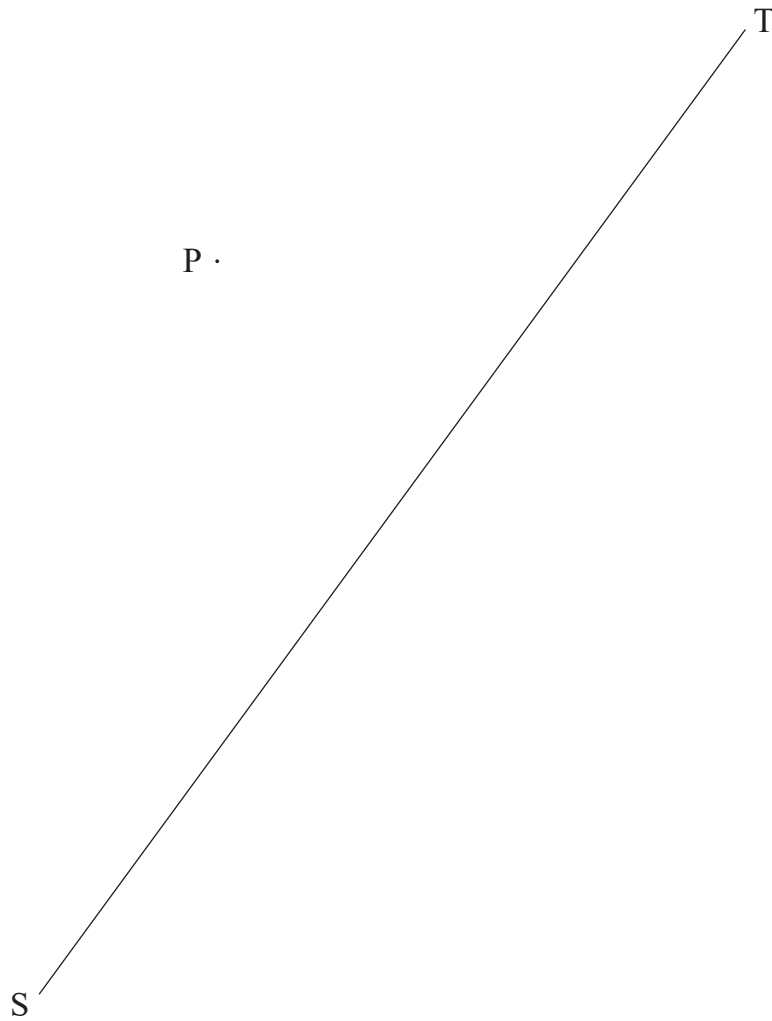
Sine Rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



- 1 Construct the line which represents the shortest distance from point P to the line ST in the diagram below.



[2]

[Turn over

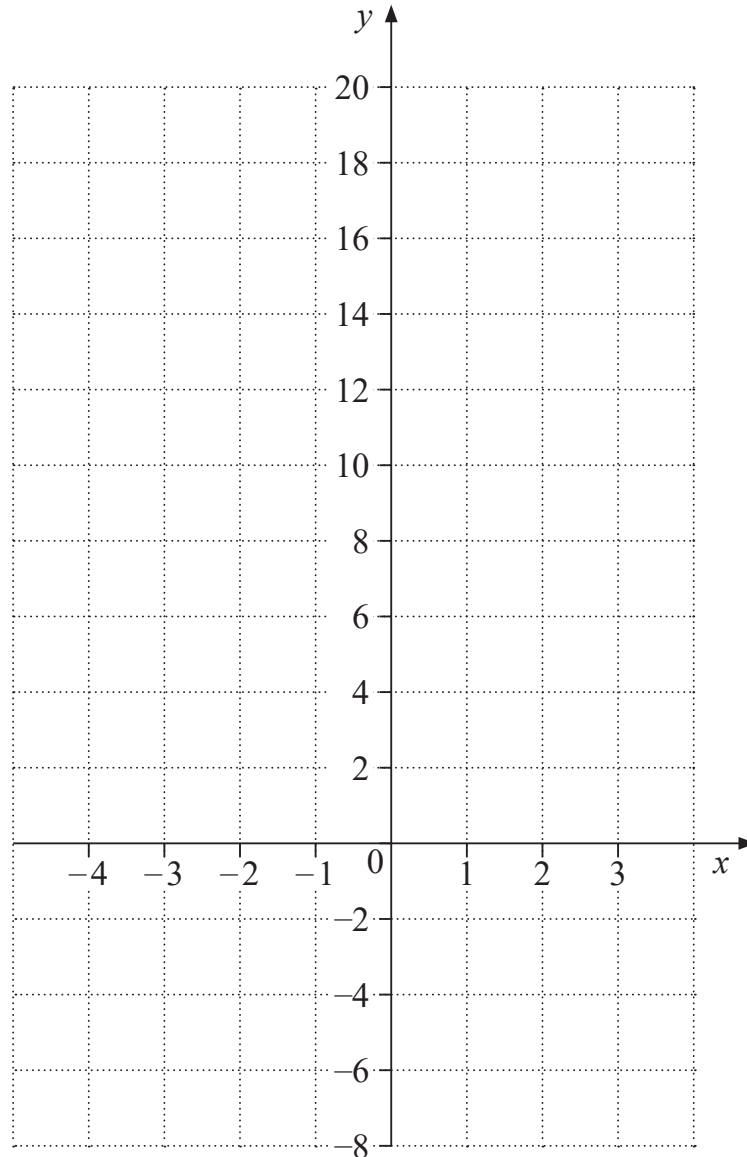


3 (a) Complete the table of values for $y = 3x^2 + 6x - 4$

x	-4	-3	-2	-1	0	1	2
y	20	5	-4		-4	5	20

[1]

(b) Hence, draw the graph of $y = 3x^2 + 6x - 4$ on the grid below.



[2]

(c) Draw the line $y = 12$ on the grid.

Write down the x values of the points of intersection with this line.

Answer _____, _____ [2]

[Turn over



4 Write the binary number 1011001 as a decimal number.

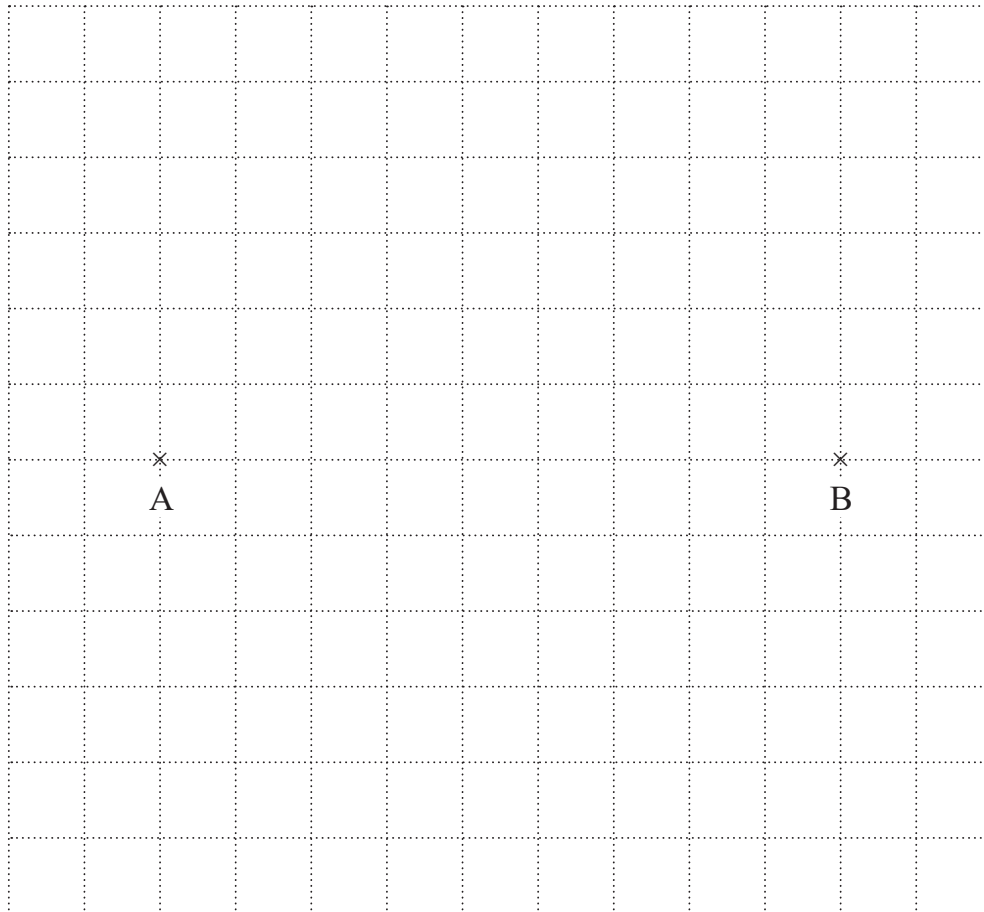
Answer _____ [1]



5 Two transmitters are located at points A and B, 9 metres apart.

The best reception is an area which is less than 6 metres from A and closer to B than to A.

Shade this area on a scale drawing below, using a scale of 1 cm to 1 metre.



[3]

[Turn over



6 John earns $\pounds x$ per hour on Fridays and $\pounds y$ per hour on Saturdays.

In March he worked 20 hours on Fridays, 12 hours on Saturdays and earned $\pounds 322$

In April he worked 16 hours on Fridays, 10 hours on Saturdays and earned $\pounds 262$

Use simultaneous equations to find the values of x and y .

Answer $x =$ _____

$y =$ _____ [5]



7 £3000 is invested at 2% compound interest per annum.

(a) Explain why the formula for the value, £ V , after n years is given by

$$V = 3000(1.02)^n$$

[2]

(b) Calculate the value after 6 years.

Answer £ _____ [1]

(c) After how many years was the value £3247.30 to the nearest penny?

Answer _____ [2]

(d) Write the formula for the value £ V , after n years, if the £3000 investment decreased at a rate of 2% per annum.

Answer _____ [1]

[Turn over

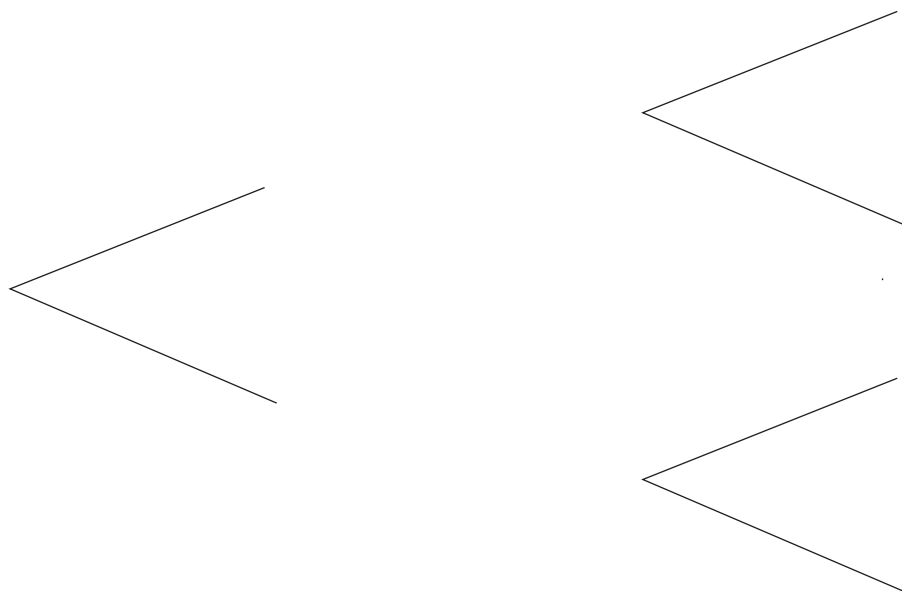


8 The probability of Fran's team scoring first in a game is 0.75

If they score first, the probability that they will win the game is 0.8

If they do not score first, the probability that they will win the game is 0.4

(a) Show this information on the tree diagram.



[3]

(b) Fran's team will play 50 games this season.

Use your tree diagram to predict how many games they will win.

Show your working clearly.

[3]



9 The lengths of the sides of a triangle are 6 cm, 7 cm and 8 cm.

Calculate the three angles in the triangle.

Answer _____[°], _____[°], _____[°] [6]

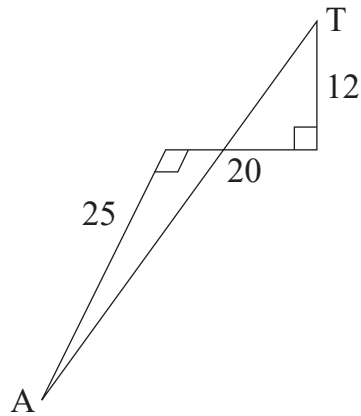
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10



From a point A, a pylon is 25 m north and 20 m east.
The pylon is 12 m high.

(a) Calculate the distance AT, where T is the top of the pylon.

Answer _____ m [3]

(b) Calculate the angle of elevation of T from A.

Answer _____ ° [3]



11 A bag contains 40 marbles. x of these are white.

One marble is taken at random and then, without replacement, a second marble is taken at random.

The probability that neither of these is white is $\frac{5}{12}$

(a) Show that $x^2 - 79x + 910 = 0$

[4]

(b) Hence, calculate the probability that both marbles taken are white.

Answer _____ [3]



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Question Number	Marks
1	
2	
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8	
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11	

Total Marks	
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Examiner Number

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