Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2020

Mathematics

Unit M8 Paper 2
(With calculator)
Higher Tier

[GMC82]

PRACTICE PAPER

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

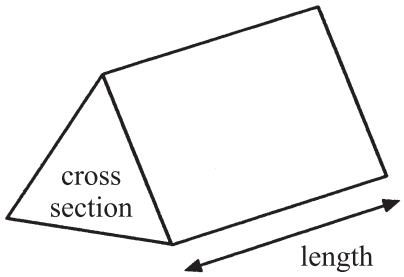
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all fourteen** 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

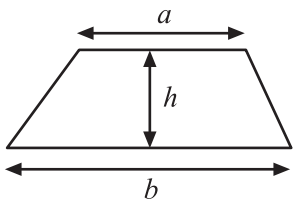
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

Volume of prism = area of cross section × length

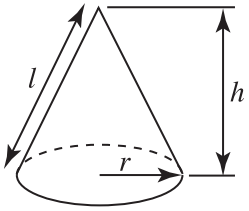


Area of trapezium $= \frac{1}{2}(a+b)h$



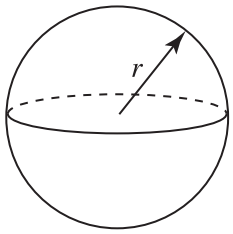
Volume of cone $= \frac{1}{3}\pi r^2 h$

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

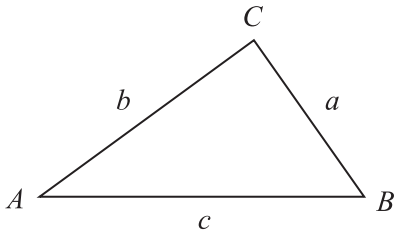


Volume of sphere $= \frac{4}{3}\pi r^3$

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

90 pupils audition for a part in the school play. 60 are girls.

The probability that a girl gets a part is 0.35 and the probability that a boy gets a part is 0.6

How many pupils are in the school play?

Answer _____ [4]

2 Solve $-9 \leq 3y \leq 6$ where y is an integer.

Answer $y =$ _____ [2]

3

Two boats are 40 km apart.

Boat Y is due east of boat X as shown in the scaled diagram below.

The scale used is 1 cm = 5 km

Lobster pots are placed in a region which is less than 25 km from boat X and less than 30 km from boat Y.

Using a ruler and compasses, show this region on the diagram by shading.

Boat X •

• Boat Y

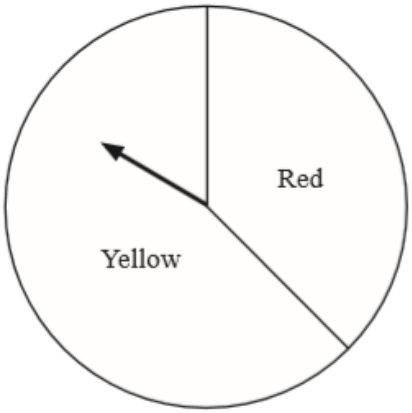
[3]

4 In a regular polygon the interior angle is five times larger than the exterior angle.

How many sides does the polygon have?

Answer _____ sides [3]

5 A spinner has a red sector and a yellow sector as shown.



The arrow is spun 1000 times.

The table shows the relative frequency of the arrow landing on red after different numbers of spins.

Number of spins	Relative frequency of red
50	0.44
100	0.37
200	0.34
500	0.31
1000	0.32

(a) In the first 200 spins, how many times had the arrow landed on red?

Answer _____ [2]

(b) Which relative frequency gives the best estimate of the probability of obtaining a red?

Explain your answer.

Answer _____ because _____

_____ [2]

6 3 teachers, 17 boys and 21 girls attend an Awards Ceremony.

One boy and one girl are to be chosen to collect an award.

How many ways can this be done?

Answer _____ [1]

7 The speed of light is approximately 2.9979×10^8 m/s.

The speed of sound is approximately 3.4×10^2 m/s.

Work out how many times faster the speed of light is than the speed of sound.

Give your answer in standard form, correct to 2 significant figures.

Answer _____[2]

8 (a) y is directly proportional to the cube of x.

$y = 960$ when $x = 4$

Express y in terms of x.

Answer _____ [2]

(b) Calculate the value of x when $y = 405$

Answer _____ [2]

9 The angle of elevation of the top of a vertical tower is 27°

From a point 30 metres closer, the angle of elevation is 36°

Calculate the height of the tower.

Answer _____m [5]

10 In March the probability of a dry day is $\frac{7}{10}$

If it is dry, the probability that I go for a walk is $\frac{3}{5}$

If it is wet, the probability that I go for a walk is $\frac{1}{5}$

(a) Draw a tree diagram to show all the probabilities.

[2]

(b) Calculate the probability that I go for a walk on a day in March.

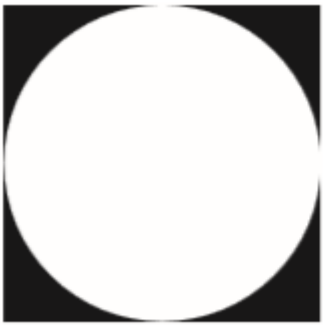
Answer _____ [2]

11 Find the equation of the tangent to the circle $x^2 + y^2 = 169$ at the point $(5, -12)$

Write your answer in the form $ax + by + c = 0$, where a, b and c are integers.

Answer _____ [5]

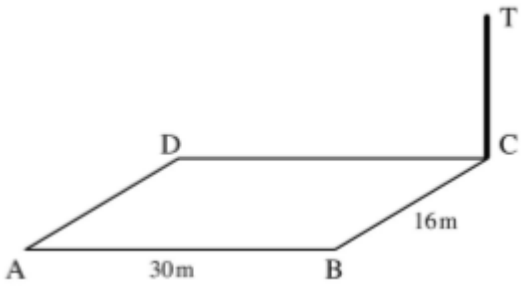
12 In a game, a dart is dropped at random onto a square board which has a circle inscribed in it as shown.



Find the probability that the dart lands on the shaded area.
Leave your answer in terms of π.

Answer _____ **[4]**

13



A tree stands at the corner C of a level, horizontal car park ABCD.

The tree is perpendicular to the car park.

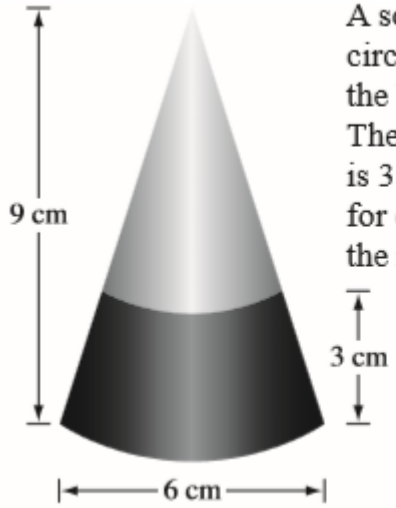
ABCD is a rectangle of length 30 m and breadth 16 m.

The angle of elevation of the top of the tree, T, from A is 21˚

Calculate the height of the tree, TC.

Answer _____ m [4]

14



A solid paper weight is made in the shape of a right circular cone. Its height is 9 cm and the diameter of the base is 6 cm.
The top section is glass and the base section, which is 3 cm high, is made of metal which weighs 14 g for each cubic centimetre. Calculate the weight of the metal in the base.

Answer _____ g [5]

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
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5	
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Total Marks	

Examiner Number