



BOTSWANA EXAMINATIONS COUNCIL
Botswana General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

MATHEMATICS

0563/02

Paper 2

October/November 2015

2 hours

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments
Electronic calculator

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name in the spaces provided at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

If working is needed for any question it must be shown below that question. Omission of essential working will result in loss of marks.

Do **not** use staples, paper clips, highlighters, glue or correction fluid.

The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 75.

If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to three significant figures. Answers in degrees should be given to one decimal place.

In any question where the value of π is required, use the value from your calculator or take π as 3.142.

For Examiner's Use

This document consists of **12** printed pages.

Mathematical formulae for papers 1 and 2

Surface area and volume of solids

Name of solid	Total surface area	Volume
cone	$\pi r^2 + \pi rl$	$\frac{1}{3} \pi r^2 h$
pyramid		$\frac{1}{3}$ base area x height
sphere	$4\pi r^2$	$\frac{4}{3} \pi r^3$

Trigonometry

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

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

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

1 Gorata uses part of her monthly allowance to pay rent and buy groceries. She paid P2140 as rent. After paying rent, she had P6420 left.

(a) Calculate her monthly allowance.

Answer (a) P..... [2]

(b) Gorata used $\frac{1}{5}$ of her monthly allowance to buy groceries. Calculate the amount of money she used for groceries.

Answer (b) P..... [2]

(c) Express the total amount of money she used for rent and groceries as a fraction, in lowest terms, of her monthly allowance.

Answer (c) [3]

2 The total area of a country is 112 622 square kilometres. The population density of the country is 76 people per square kilometre.

Calculate an estimate for the total number of people in the country. Give your answer correct to 2 significant figures.

Answer [3]

3 An isosceles triangle is such that $AC = BC$ and has vertices $A(3, 4)$, $B(7, 4)$ and $C(5, 8)$.

(a) Calculate the length of AC .

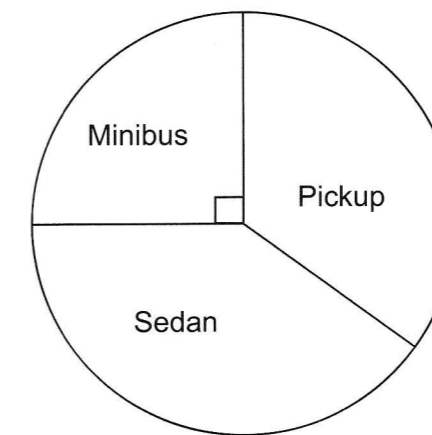
Answer (a) [2]

(b) The line of symmetry of the triangle meets the line AB at M .

What are the coordinates of M ?

Answer (b) (,) [2]

4 The pie chart below shows the number of vehicles sold in one year by a dealer. The types of vehicles sold are sedan, minibus and pickup. The total number of vehicles sold is 496 .



Calculate the number of minibuses sold in one year by the dealer.

Answer [2]

5. Express $\frac{6}{x} + \frac{5}{x-3}$ as a single fraction.

Answer [3]

6 The table below shows the number of candidates who obtained grades A, B, C and D in a national examination. The total number of candidates was 38 388 .

Grades	Number of candidates
A	595
B	15 042
C	17 755
D	4996

(a) Which grade was obtained by the most candidates?

Answer (a) [1]

(b) The candidates who obtained either grades A or B were all admitted at a college. Calculate, as a percentage, the number of candidates who were admitted at the college.

Answer (b)% [3]

7 Calculate the value of $\sqrt{\frac{8.33 - 3.75}{2.65 - 1.35}}$.

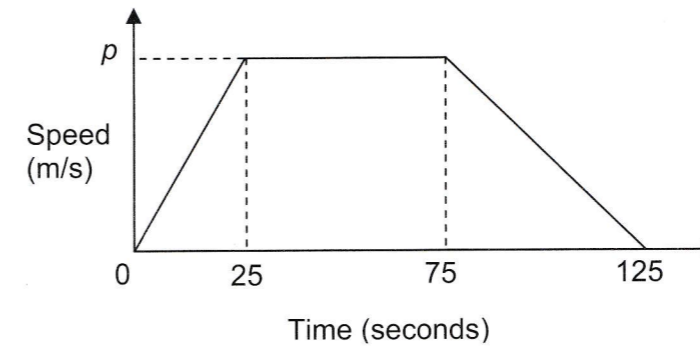
Give your answer correct to 2 decimal places.

Answer [2]

8 Solve the pair of simultaneous equations $x - 4y = 23$ and $y = 2x + 3$.

Answer $x = \dots\dots\dots y = \dots\dots\dots$ [3]

9 The diagram below shows the speed-time graph of a car starting from rest.



The car covered a total distance of 150 m in the first 25 seconds.

(a) Show that the value of p is 12 m/s.

Answer (a)

[2]

(b) Calculate

(i) the acceleration, in m/s^2 , of the car during the first 25 seconds,

Answer (b) (i) m/s^2 [2]

(ii) the total distance covered by the car in 125 seconds.

Answer (b) (ii) m [3]

10 Three power stations *K*, *L* and *M* are such that *K* is 60 km due north of *L*. *M* is on a bearing of 130° from *K* and 070° from *L*.

(a) Using the scale of 1 cm to represent 10 km, construct a scale diagram showing positions of the other two power stations. The position of the power station *L* is marked below. [3]



(b) Measure and write down the actual distance of the power station *M* from the power station *K*.

Answer (b)..... km [1]

(c) What is the bearing of *L* from *M*?

Answer (c)..... [2]

11 A company has 6 employees. The salaries of 5 of the employees are P2200, P1300, P800, P940 and P560 . When the 6th employee is included, the total monthly salaries of the employees becomes P7000 .

(a) Calculate the salary of the 6th employee.

Answer (a) P [2]

(b) The company is joined by 2 more employees whose salaries are of equal amounts. The mean salary of all 8 employees is P1100 .

Calculate the monthly salary of each of the new employees.

Answer (b) P..... [2]

12 A cuboid has a length of 25 cm, a width of 5 cm and a height of $(x - 2)$ cm.

(a) Write an expression, in terms of x , for the volume of the cuboid.

Answer (a) [1]

(b) The volume of the cuboid is 750 cm^3 .

(i) Form an equation, in terms of x , to represent this information.

Answer (b) (i) [1]

(ii) Solve the equation in (b)(i).

Answer (b) (ii) [2]

(c) Hence, or otherwise, calculate the height of the cuboid.

Answer (c)..... cm [2]

13 The point (2, -1) lies on the straight line $3y = x + d$.

(a) Calculate the value of d .

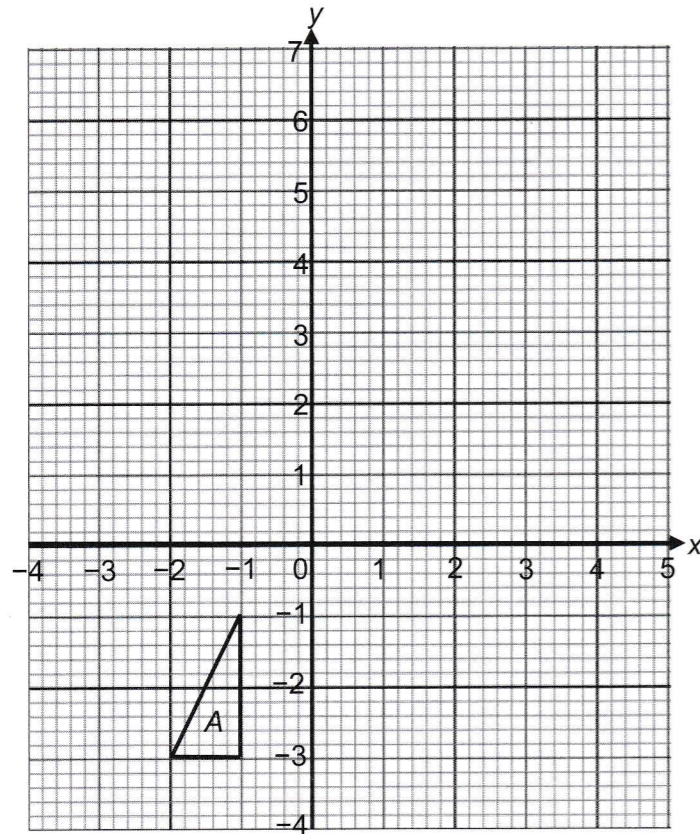
Answer (a) $d = \dots\dots\dots$ [2]

(b) Another straight line passes through the point (0, 5) and through the point (3, -4).

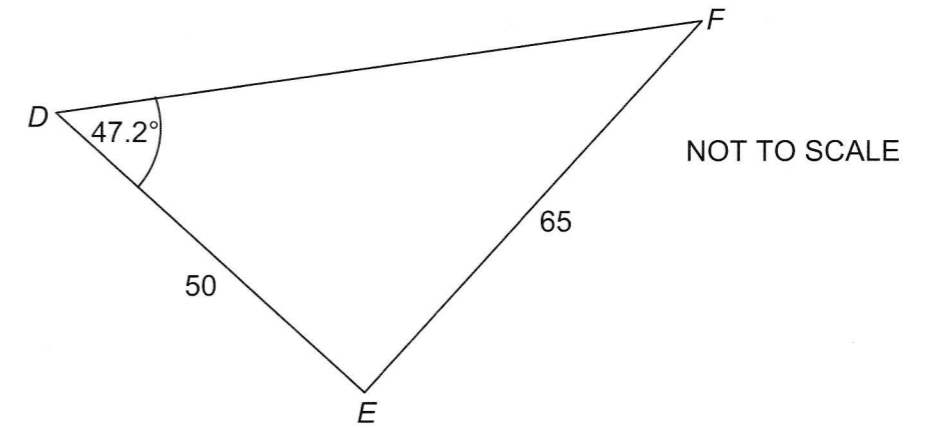
What is the equation of the line?

Answer (b)..... [2]

14 The diagram below shows triangle A. Draw the image of triangle A under an enlargement of scale factor -2, with centre (0, 0). [2]



15 The diagram below shows triangle DEF such that $DE = 50$ mm, $EF = 65$ mm and the size of $\hat{EDF} = 47.2^\circ$.



(a) Show that the size of $\hat{DFE} = 34.4^\circ$, correct to one decimal place.

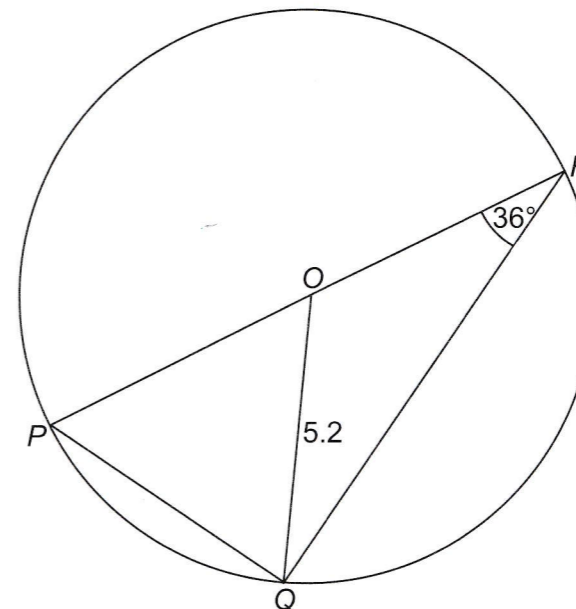
Answer (a)

[3]

(b) Calculate the area of triangle DEF.

Answer (b)..... mm² [2]

16 In the diagram below, the points P, Q and R lie on the circumference of a circle, centre O. The radius of the circle is 5.2 cm. The size of $\hat{ORQ} = 36^\circ$.



Calculate

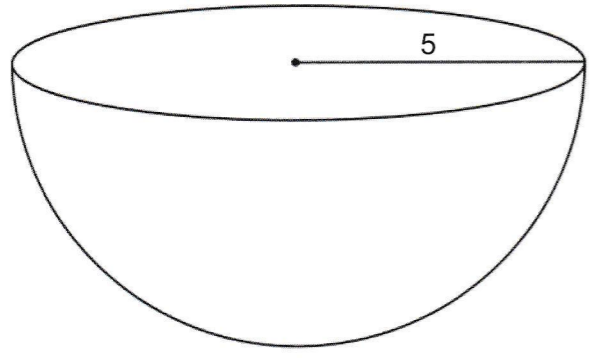
(a) the size of $\hat{O}PQ$,

Answer (a)..... [2]

(b) the length of the line segment PQ .

Answer (b) cm [2]

17 The diagram below shows a solid hemispherical wooden artefact of radius 5 cm.



(a) Calculate the volume of the artefact.

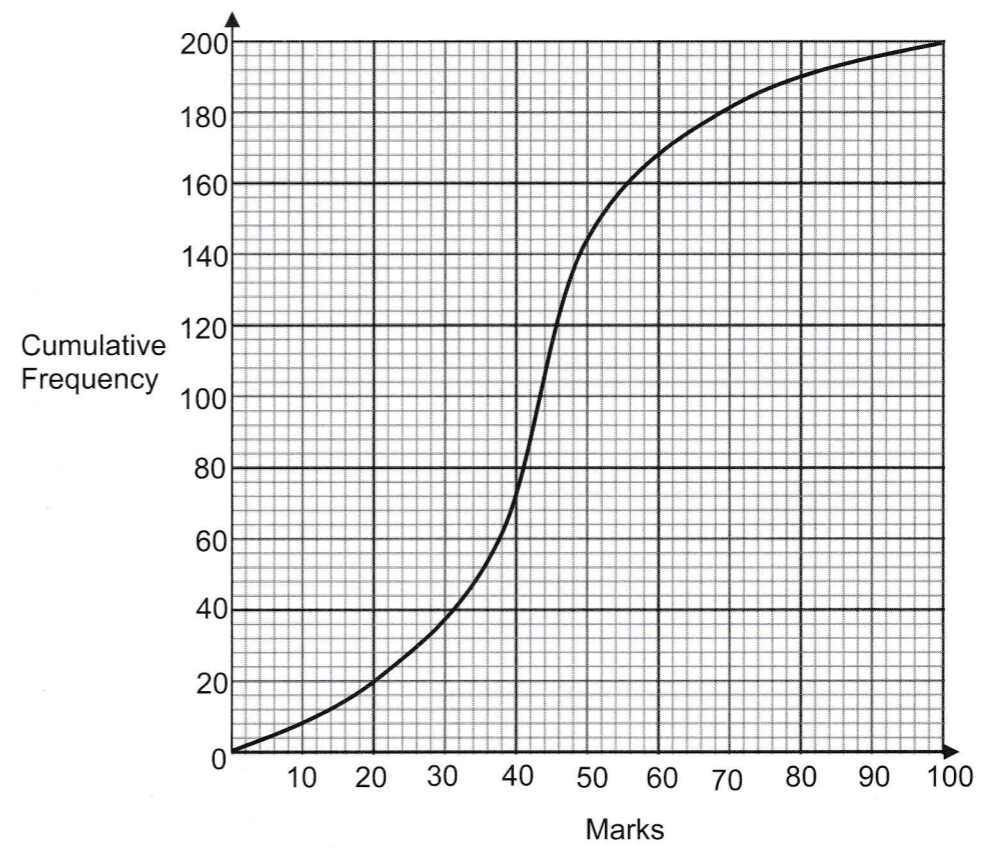
Answer (a) cm^3 [2]

(b) The entire surface area of the artefact is to be covered with clear varnish.

Calculate the total surface area to be covered with clear varnish.

Answer (b) cm^2 [3]

18 The cumulative frequency curve below represents the distribution of the marks of 200 students.



(a) Use the curve to estimate

(i) the median mark,

Answer (a) (i) [1]

(ii) the number of students who obtained at least 60 marks.

Answer (a) (ii) [2]

(b) What is the probability that a student chosen at random obtained at least 60 marks?

Answer (b) [1]

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