EXAMINATIONS COUNCIL OF SWAZILAND
in collaboration with
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
Swaziland General Certificate of Secondary Education

MATHEMATICS **6880/03**

Paper 3 Calculator Structured Questions (Extended) **October/November 2012**

2 hours

Additional Materials: Answer Paper
Graph Paper (2 sheets)
Electronic calculator
Geometrical instruments
Mathematical tables (optional)
Tracing paper (optional)

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READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
All working should be clearly shown. It should be done on the same sheet as the rest of the answer.
Marks will be given for working which shows that you know how to solve the problem even if you get the answer wrong.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

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 100.

This document consists of **8** printed pages.

1 **(a)** Theresa bought a camera in Botswana for P1500.00.
A year later its value had been reduced by 27%.

What was its new value? [2]

(b) Gift bought a video camera.
He later sold it for E2100.00 making a 65% profit.

How much did Gift pay for his camera? [2]

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2 **(a)** Simplify $\frac{3x+1}{x} - \frac{x+1}{2}$ writing your answer as a single fraction. [3]

(b) Simplify $\frac{x^2 - x - 2}{3x^2 - 6x}$. [3]

(c) $2h - k = -2$
$-h + 3k = 1$

(i) Write these equations in matrix form. [1]

(ii) Find the inverse of the 2 by 2 matrix. [2]

(iii) Hence solve the matrix equation to find the value of h and the value of k. [2]

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3 **(a)** Find the gradient of this line.

$$\frac{x - 7y}{5} = 11$$ [3]

(b) Rearrange this equation to make z the subject.

$$x = \frac{z - 7y}{5y + z}$$ [3]

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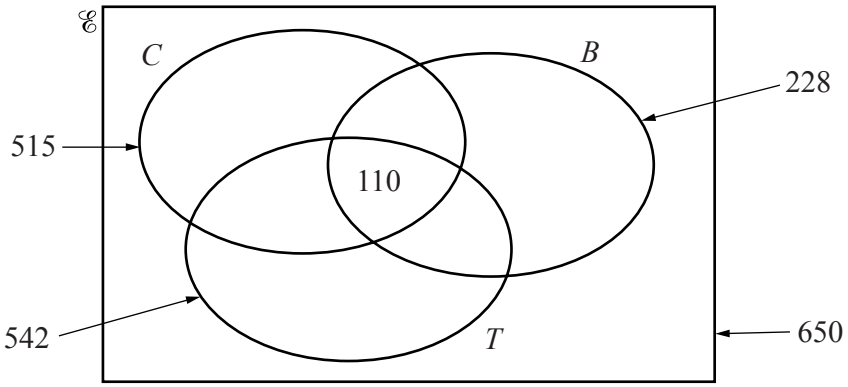
4 A survey was carried out to determine the number of people who owned a car (C), a television set (T) or a bicycle (B).
A total number of 650 people took part in the survey.
515 people had a car, 542 people had a television set and 228 people had a bicycle.

480 people had a television set and a car.
150 people had a television set and a bicycle.
125 people had a car and a bicycle.
110 people had a television set, a car and a bicycle.

(a) Copy and complete this Venn diagram to show this information.



[3]

(b) Find the number of people who had

(i) a television set and a car but not a bicycle, [1]

(ii) at least two of the items. [2]

(c) Work out $n(C \cup T \cup B)'$. [1]

(d) Find the probability that one of the 650 people, chosen at random, had only one of these items. [2]

5 **Answer the whole of this question on graph paper.**
Forty teachers were asked how much they spent on **air time** per week.
The following table shows their responses.

Amount spent (E*a*)	$20 \leqslant a < 25$	$25 \leqslant a < 30$	$30 \leqslant a < 35$	$35 \leqslant a < 40$	$40 \leqslant a < 45$
Number of Teachers	7	9	12	7	5

(a) Using a scale of 2 cm to 5 units on each axis, draw a frequency polygon to represent this information. [3]

(b) Calculate an estimate of the mean amount spent on air time by a teacher each week. [3]

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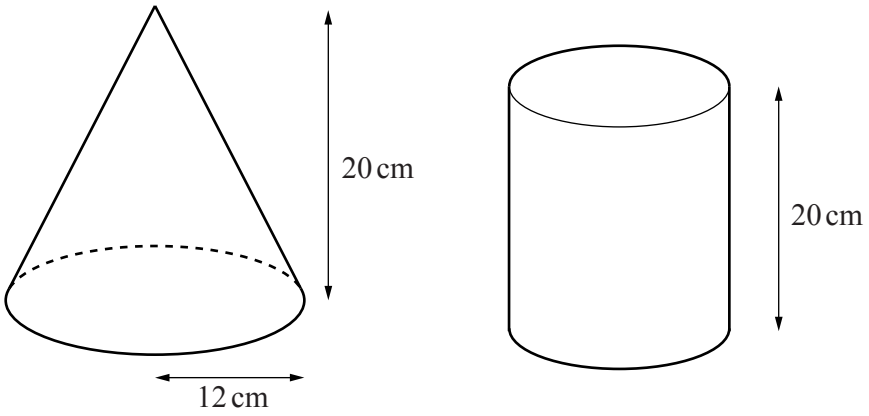
6 A solid cone shaped candle of height 20 cm and radius 12 cm is melted down and cooled to form a cylindrical candle of the same height.

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

NOT TO SCALE



(a) Work out the volume of the cone shaped candle. [2]

(b) What is the radius of the cylindrical candle? [3]

(c) Calculate the total surface area of the cylindrical candle. [4]

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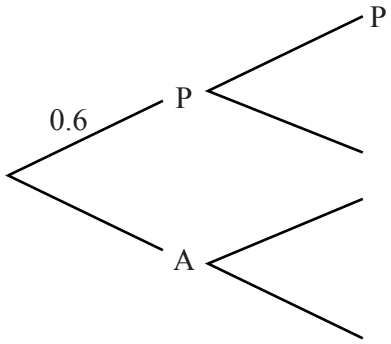
7 The probability that a head teacher is in the office at 12 noon on any school day is 0.6.
The outcome that he is in the office is (P), and that he is not in the office is (A).



(a) Copy and complete the probability tree diagram to show all the possible outcomes for **three** consecutive days. [3]

(b) Use your tree diagram to calculate the probability that

(i) the head teacher is in the office at 12 noon on all three days, [1]

(ii) the head teacher is in the office at 12 noon on at least one of the first two days, [2]

(iii) the head teacher is in the office at 12 noon on at least two of the three days. [3]

(c) What is the probability that the head teacher is in the office at 12 noon on the fifth day? [1]

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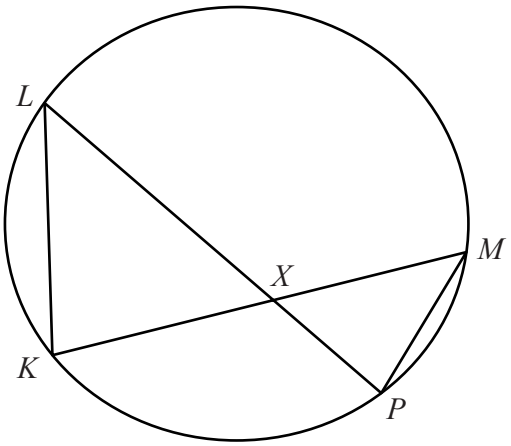
8 **(a)** K, L, M and P are points on the circumference of a circle.
KM and LP intersect at X.



NOT TO SCALE

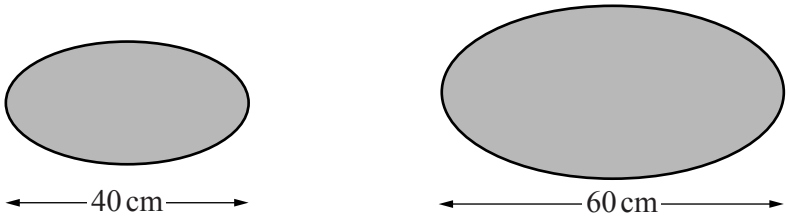
(i) Show that triangles KLX and PMX are similar. [2]

(ii) $LX = 26\,\text{cm}$, $MX = 10.4\,\text{cm}$ and $MP = 5\,\text{cm}$.

Calculate KL. [2]

(b) The diagrams below show the ends of two prisms. The prisms are similar.

NOT TO SCALE



(i) The area of the smaller prism is $\frac{1}{4}\text{m}^2$.

Calculate the area of the larger prism. [2]

(ii) The volume of the larger prism is $\frac{9}{8}\text{m}^3$.

Calculate the volume of the smaller prism. [2]

9 Two boys Sifiso and Alpheous were asked to paint lab stools and chairs.
Sifiso painted lab stools only and Alpheous painted chairs only.

(a) Sifiso paints one lab stool every x minutes.

Write down an expression, in terms of x, for the number of lab stools he paints in an hour. [1]

(b) Alpheous takes 2 minutes longer to paint a chair than Sifiso takes to paint a stool.

Write down an expression, in terms of x, for the number of chairs Alpheous paints in an hour. [1]

(c) Sifiso and Alpheous paint a total of 11 items in one hour.

Form an equation in x and show that it reduces to

$$11x^2 - 98x - 120 = 0.$$ [3]

(d) **(i)** Solve the equation $11x^2 - 98x - 120 = 0$. [4]

(ii) Hence find the number of chairs Alpheous painted. [1]

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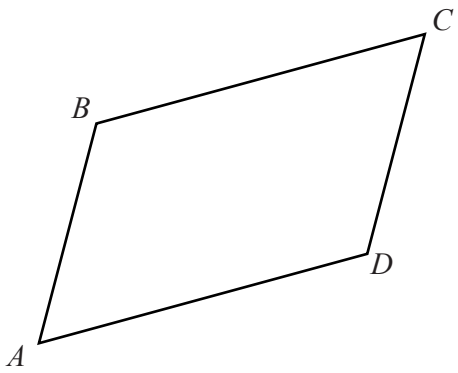
10 $ABCD$ is a parallelogram. $\overrightarrow{AD} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ and $\overrightarrow{AB} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$.



NOT TO SCALE

Find

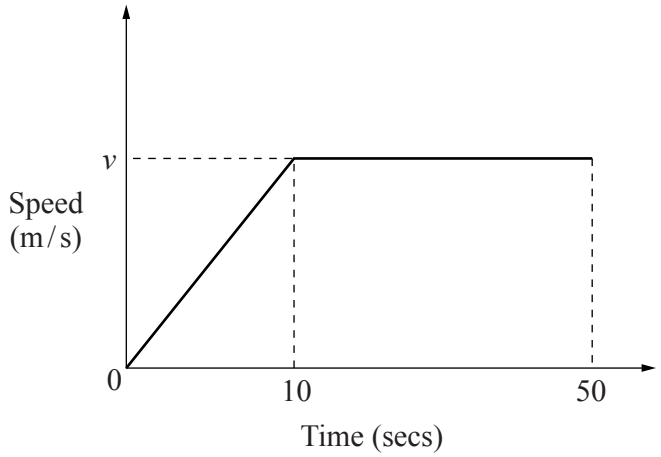
(a) $\overrightarrow{AC}$, [1]

(b) the magnitude of $\overrightarrow{AC}$, [2]

(c) angle ADC, [5]

(d) the area of triangle ABC. [3]

11



The diagram shows the speed-time graph of a moving object.

(a) Express, in terms of v, the acceleration of the object in the first ten seconds. [1]

(b) Given that the total distance in the first 50 seconds is 675 m, find the value of v. [3]

(c) Calculate the average speed in the first 30 seconds. [3]

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12 Answer the whole of this question on a sheet of graph paper.

In a youth rally, ribbons and pins were needed for the participants.
The leader decided to buy at least 20 ribbons and at least 40 pins.
A ribbon costs 60c and pins cost 40c each.
He wanted to spend no more than E48.

(a) Using x for the number of ribbons and y for the number of pins, form three inequalities to represent this information. [3]

(b) Using a scale of 1 cm to 10 units on both axes, draw a graph for the inequalities in **(a)**, by shading the unwanted region. [5]

(c) Use your graph to find the maximum number of pins he could buy. [1]
