N5

NATIONAL

QUALIFICATIONS

Mark

N5/H2

Mathematics

Paper 2

(Calculator)

1 HOUR 30 MINUTES

Prelim Practice H

Fill in these boxes and read what is printed below

Forename(s)

Surname

Teacher

Total Marks - 50

Attempt ALL questions.

You may use a calculator.

To earn full marks you must show your working in your answers.

State the units for your answer where appropriate.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use **blue** or **black** ink.

Before leaving the examination room you must give this book to the Invigilator; if you do not, you may lose all the marks for this paper.

FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc\cos A$ or $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

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

Volume of a sphere: $V = \dfrac{4}{3}\pi r^3$

Volume of a cone: $V = \dfrac{1}{3}\pi r^2 h$

Volume of a pyramid: $V = \dfrac{1}{3}Ah$

Standard deviation: $s = \sqrt{\dfrac{\sum(x - \bar{x})^2}{n - 1}}$

or $s = \sqrt{\dfrac{\sum x^2 - \dfrac{(\sum x)^2}{n}}{n - 1}}$, where n is the sample size.

Total marks — 50
Attempt ALL questions

1. Alastair buys an antique chair for £600.

It is expected to increase in value at the rate of 4.5% each year.

How much is it expected to be worth in 3 years? **3**

2. A rugby team scored the following points in a series of matches.

13 7 0 9 7 8 5

(a) For this sample calculate the mean and standard deviation. **4**

The following season the team appoints a new coach.

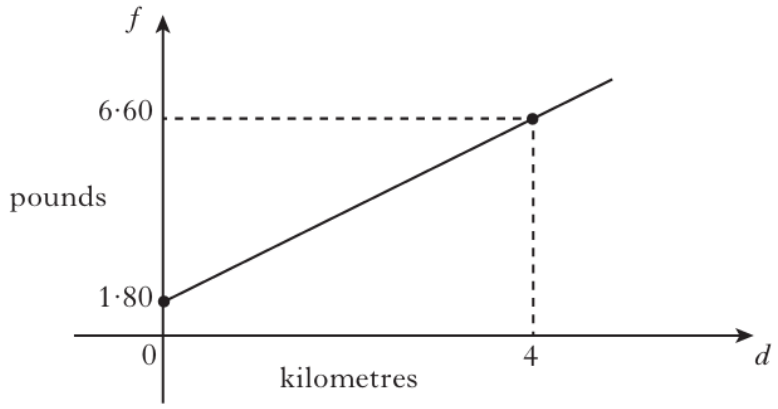
A similar series of matches produces a mean of 27 and a standard deviation of 3.25.

(b) Make two comments about the performance of the team under the new coach. **2**

3. A taxi fare consists of a call out charge of £1.80 plus a fixed cost per kilometre.

A journey of 4 kilometres costs £6.60.

The straight line graph below shows the fare, f pounds, for a journey of k kilometres.



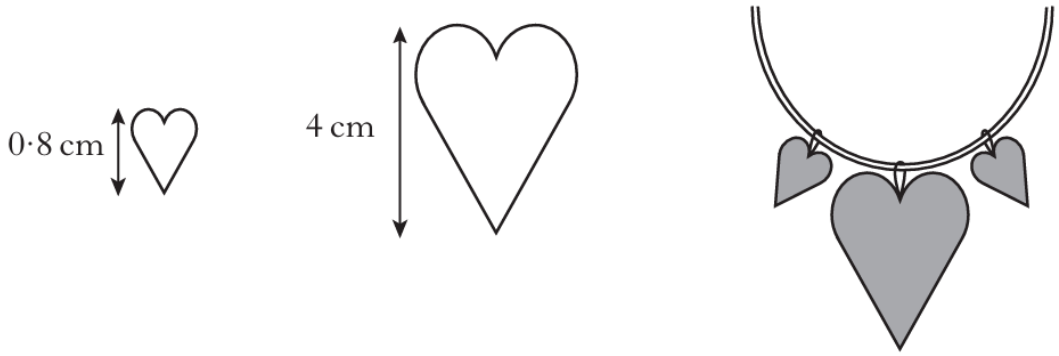
a) Find the equation of the straight line. **3**

b) Calculate the fare for a journey of 7 kilometres. **2**

4. Simplify $\frac{5x^2 \times 6x^{-4}}{20x^{-3}}$ **3**

5. Solve $h^2 - 2h - 24 = 0$ **2**

6. A necklace is made of beads which are mathematically similar.



The height of the smaller bead is 0.8 centimetres and its area is 0.6 square centimetres.

The height of the larger bead is 4 centimetres.

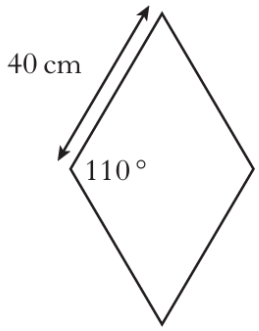
Calculate the area of the larger bead. **3**

7. The price for Paul's summer holiday is £894.40.

This includes a 4% booking fee.

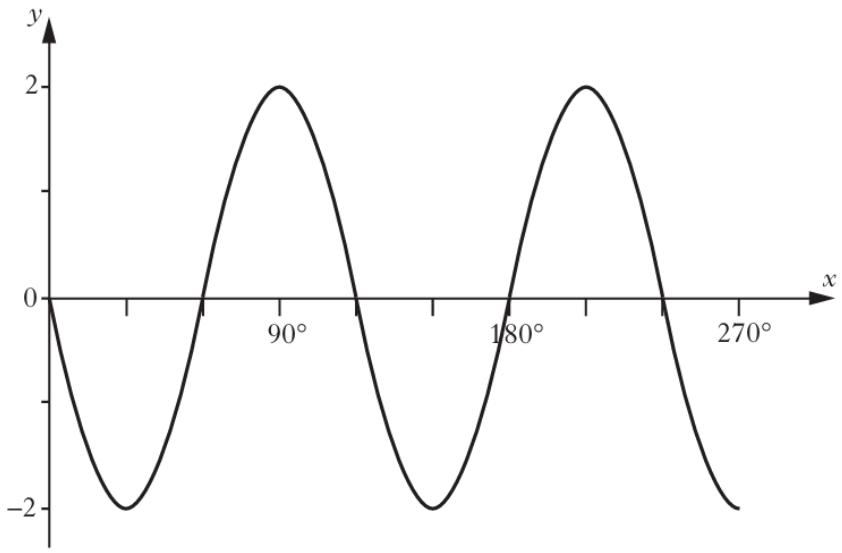
Calculate the price of the holiday without the booking fee. **3**

8. Paving stones are in the shape of a rhombus.



Find the area of one paving stone. **4**

9. Part of the graph of a trigonometric function is shown below.



State the period of the function, in degrees. **1**

10. A mug in the shape of a cylinder has a volume of 400 cubic centimetres.

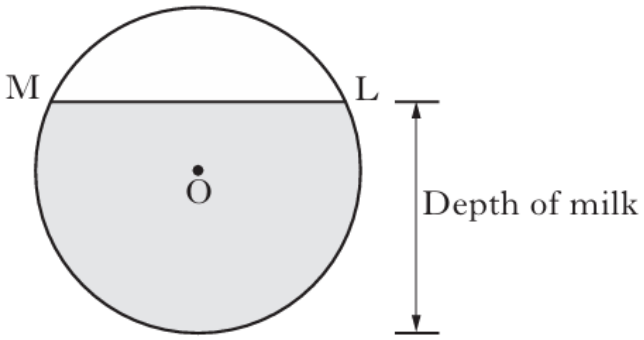
Its diameter is 7.6 centimetres.

Calculate the height of the mug.

Give your answer correct to two significant figures. **3**

11. The diagram below shows the circular cross-section of a milk tank.

[Turn over



The radius of the circle, centre O, is 1.2 metres.

The width of the surface of the milk in the tank, represented by line ML, is 1.8 metres.

Calculate the depth of the milk in the tank. **4**

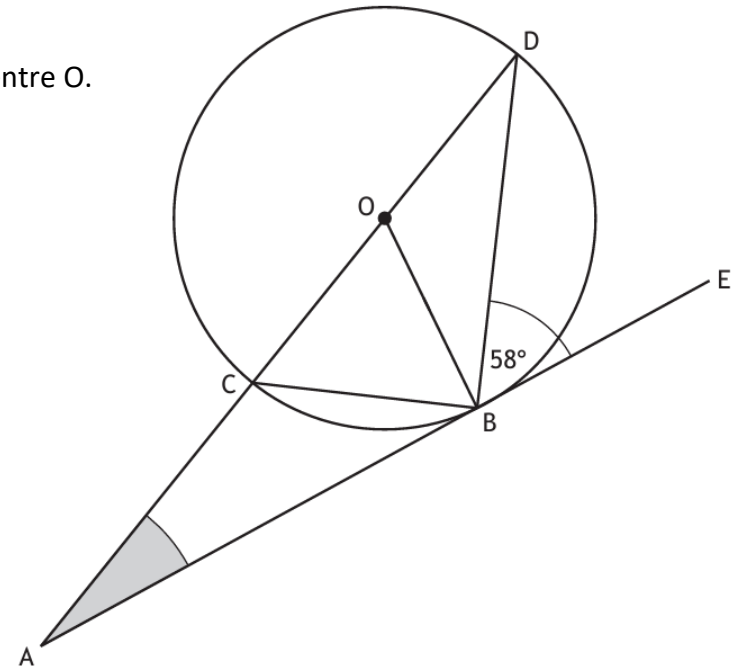
12. A straight line has equation $2x + 3y = 12$.

a) Find the gradient of the line. **2**

b) The line crosses the y-axis at the point $(0, c)$. Find the value of c. **1**

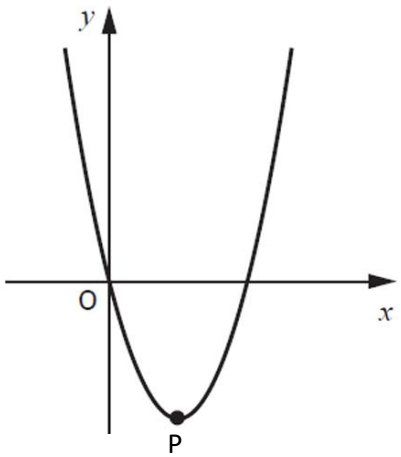
13. In the diagram show below:

- ABE is a tangent to the circle centre O.
- Angle DBE is 58°



Calculate the size of angle CAB. **3**

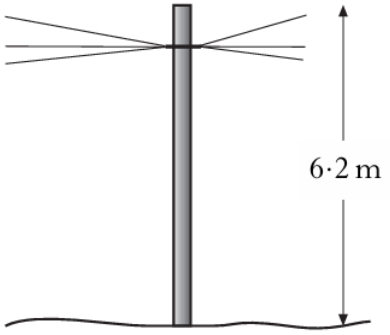
14. Part of the graph of $y = x(x - 6)$ is shown below.



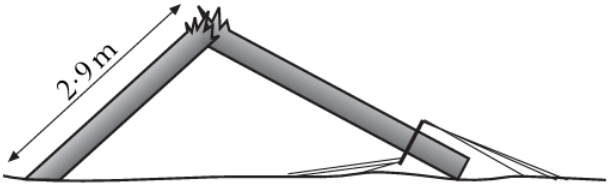
Find the coordinates of the minimum turning point of the graph, shown as point P. **2**

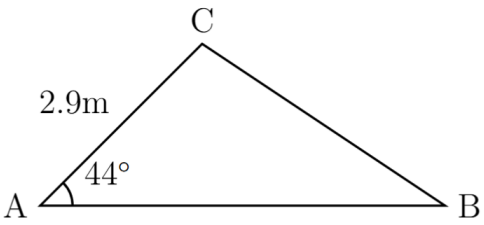
[Turn over

15. A telegraph pole is 6.2 metres high.



The wind blows the pole over into the position shown below.





- AC is 2.9 metres
- Angle CAB is 44°

Calculate the size of angle ABC. **4**

[END OF QUESTION PAPER]