N5

NATIONAL

QUALIFICATIONS

Mark

N5/G2

Mathematics

Paper 2

(Calculator)

1 HOUR 30 MINUTES

Prelim Practice G

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.

MARKS

Total marks — 50
Attempt ALL questions

1. The value of an antique watch appreciates in value by 2.4% each year.

In 2024 it was worth £3,700.

How much will it be worth in 2028? **3**

2. $E = mc^2$

Find the value of E when $m = 3.6 \times 10^{-2}$ and $c = 3 \times 10^{8}$.

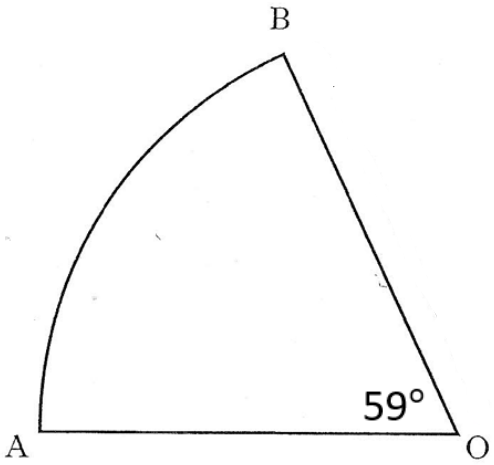
Give your answer in **scientific notation.** **3**

3. Expand fully and simplify $x(x-1)^2$. **2**

4. A sector of a circle, centre O, is shown below.

The diameter of the circle is 12.6 centimetres.

Angle AOB is 59°.



Calculate the area of the sector. **3**

5. Change the subject of the formula $p = q + 2r^3$ to r. **3**

6. Simplify $\frac{x^2-49}{x^2-5x-14}$ **3**

7. The marks of a group of students in their October tests are as follows:

41 56 68 59 43 37 70 58 61 47 75 66

a) Calculate the median and the interquartile range. **3**

The teacher arranges extra homework classes for the students before the next test in December.

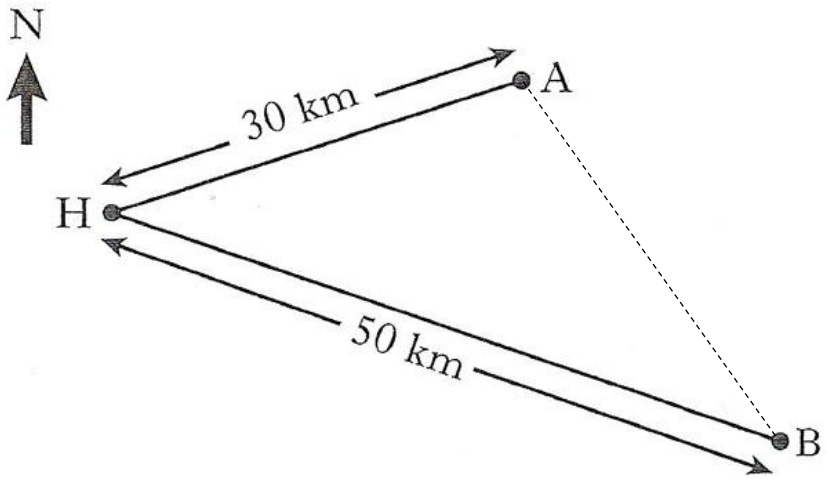
In this test, the median is 67 and the interquartile range is 14.

b) Make **two** comments comparing the marks in the October and December tests. **2**

8. Two yachts leave from harbour H to search for a whale after a reported sighting.

Yacht A sails for a distance of 30 kilometres and stops.

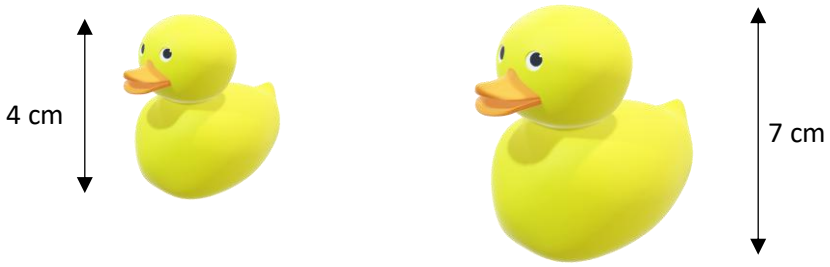
Yacht B sails for a distance of 50 kilometres and stops.



Triangle HAB, shown in the diagram, encloses an area of 360 square kilometres.

Calculate the size of angle AHB, giving your answer correct to **three significant figures**. **4**

9. The two rubber ducks below are solid and mathematically similar.



The smaller duck has a height of 4 centimetres, and the larger duck has a height of 7 centimetres.

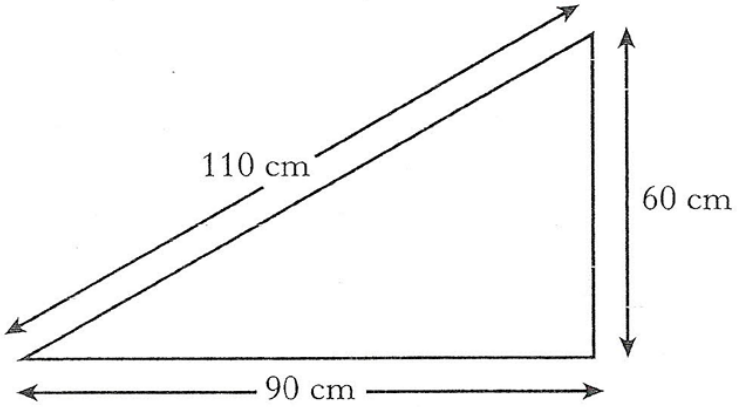
The smaller duck has a volume of 50 cubic centimetres.

Calculate the volume of the larger duck. **3**

10. After a 7% pay increase, the salary of an office worker is £38,520 per year.

Calculate the salary of the office worker before the pay increase. **3**

11. A triangular paving slab has measurements as shown.

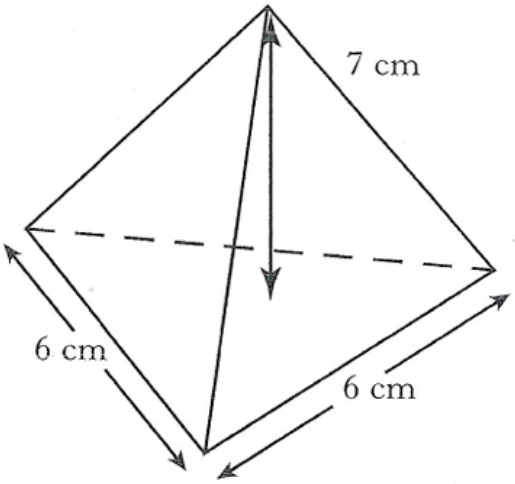


Is the slab in the shape of a right angle?

Show your working. **3**

12. Solve $\frac{4-3x}{2} - 1 > 7$ **3**

12. The diagram below shows a pyramid.



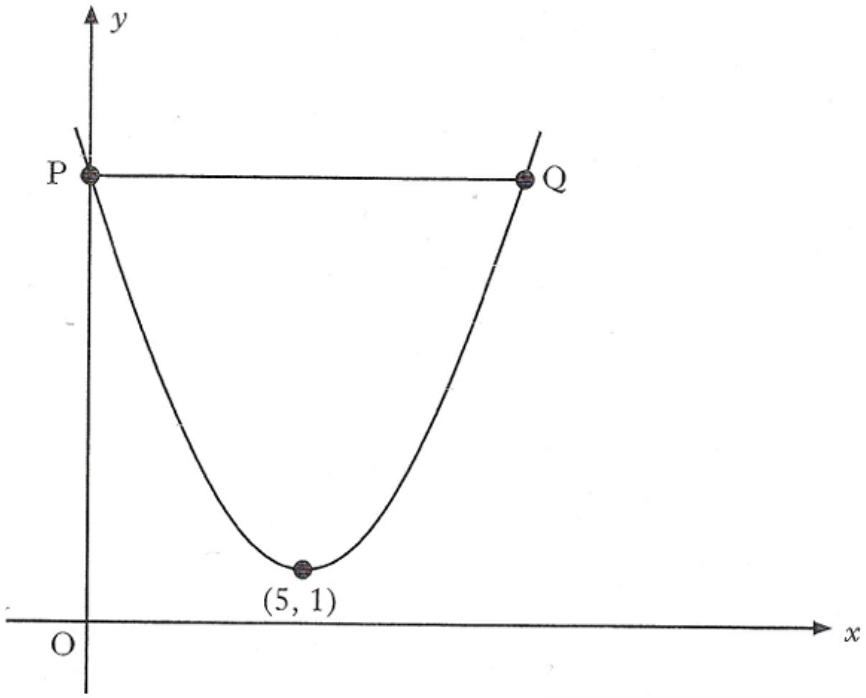
The base of the pyramid is an **equilateral** triangle of side length 6 centimetres.

The height of the pyramid is 7 centimetres.

Calculate the volume of the pyramid. **4**

13. The graph below shows part of a parabola with the equation

$$y = x^2 - 10x + 26$$



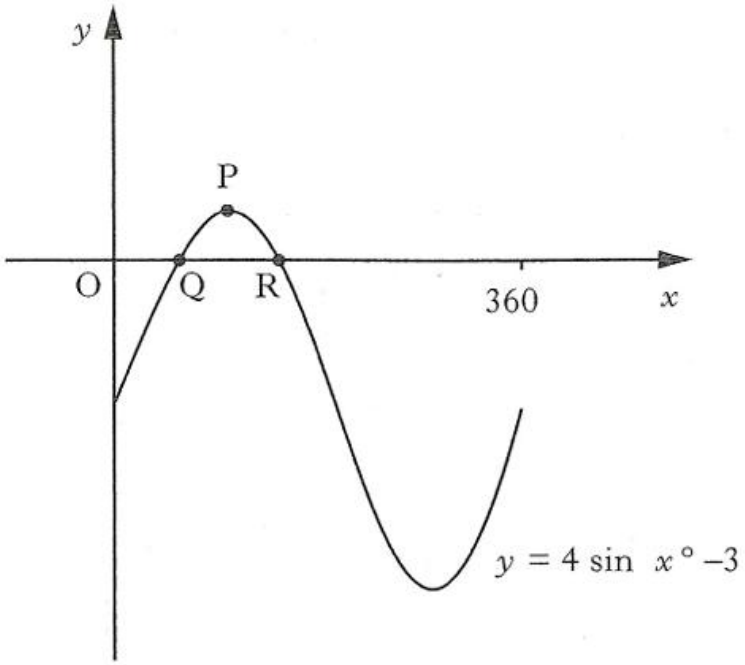
The parabola has a minimum turning point at $(5,1)$, and line PQ is horizontal.

a) State the equation of the axis of symmetry of the parabola. **1**

b) Determine the coordinates of the y-intercept of the parabola, P. **2**

c) Hence, or otherwise, find the coordinates of the point Q. **2**

14. Part of the graph of $y = 4\sin x° - 3$ is shown below.



The graph cuts the x-axis at the points Q and R.

P is the maximum turning point.

a) Write down the coordinates of P. **2**

Point Q has coordinates $(49°, 0)$, when measured to the nearest degree.

b) State the coordinates of point R. **1**

[END OF QUESTION PAPER]