N5

NATIONAL

QUALIFICATIONS

Mark

N5/I2

Mathematics

Paper 2

1 HOUR 30 MINUTES

(Calculator)

Prelim Practice I

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. A number of years ago the value of a second-hand car was determined to be £5900.

For the next two years, it **depreciated** in value by 12% each year.

The following year, it **appreciated** in value by 7%.

Determine the new value of the car. **3**

2. Solve the inequation $4 + \frac{x-2}{3} \leq 6$. **3**

3. A function is defined as $f(x) = 7 - 3x$.

Given $f(t) = 10$, determine the value of t. **2**

4. A straight line is represented by the equation $x + 2y = 6$.

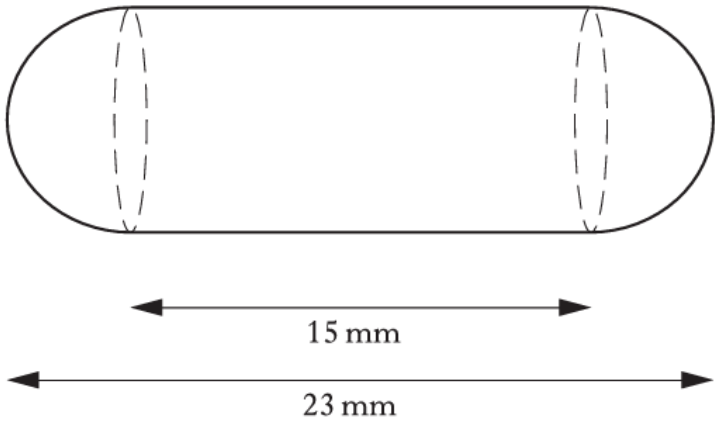
a) Find the gradient of this line. **2**

b) Write down the coordinates of the point where this line crosses the y-axis. **1**

5. Express in its simplest form $y^8 \times (y^3)^{-2}$ **2**

6. A health food shop produces cod liver oil capsules for its customers.

Each capsule is in the shape of a cylinder with hemispherical ends as shown below.



The total length of the capsule is 23 millimetres and the length of the cylinder is 15 millimetres.

Calculate the volume of the cod liver oil capsule.

Give your answer correct to two significant figures. **5**

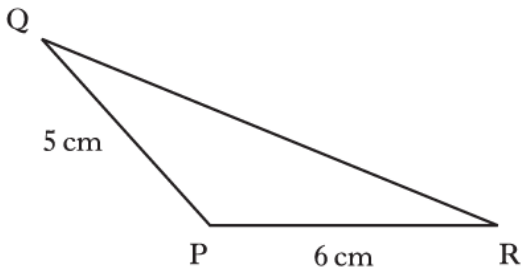
7. Expand and simplify $(2x-1)(x^2+5x-3)$ **3**

8. Make r the subject of $V=\frac{4}{3}\pi r^3$ **3**

9. Simplify $\frac{x^2-49}{x^2+6x-7}$ **3**

10. Solve the equation $x(x-5)=14$ **3**

11. In triangle PQR

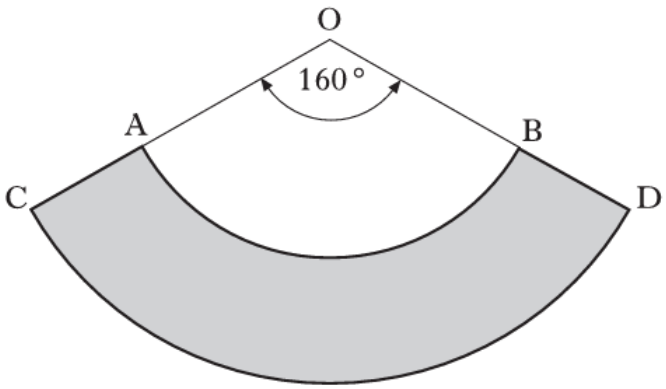


- PQ = 5 centimetres
- PR = 6 centimetres
- Area of triangle PQR = 12 square centimetres
- Angle PQR is **obtuse**

Calculate the size of angle QPR **4**

12. A pet shop manufactures protective dog collars.

In the diagram below the shaded area represents one of these collars.



AB and CD are arcs of the circles with centres at O.

The radius of the smaller circle, OA, is 10 inches.

The radius of the larger circle, OC, is 18 inches.

Angle AOB is 160°.

Calculate the area of the collar. **4**

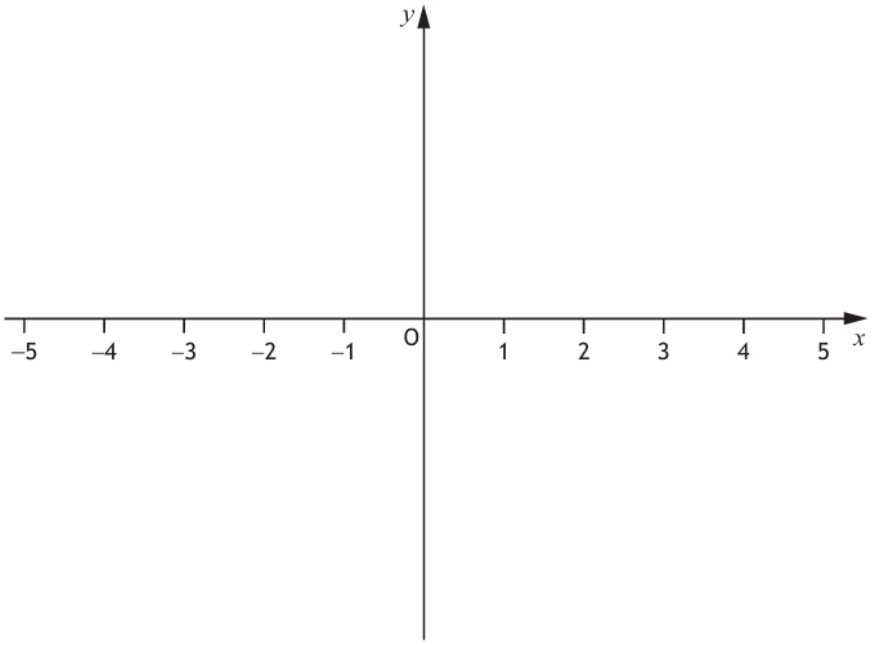
13. Simplify $\sqrt{49x} - 2\sqrt{9x} + \sqrt{x}$.

Give your answer in the form $a\sqrt{x}$. **3**

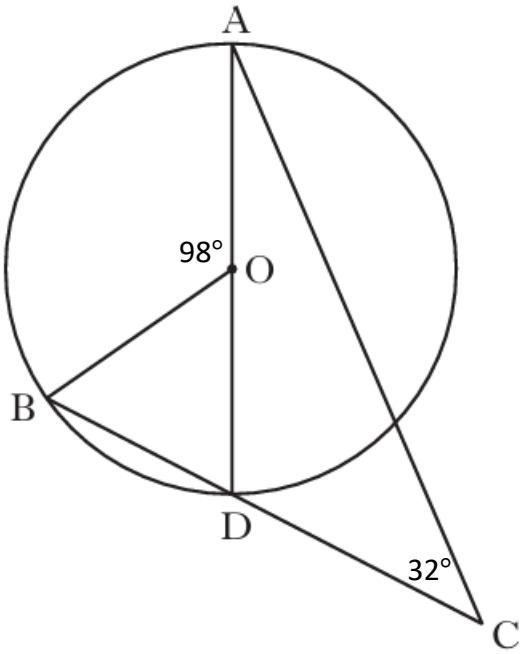
14. Sketch the graph of $y = x^2 - 2x - 3$ showing:

- The point at which the graph intersects the y-axis.
- The points at which the graph intersects the x-axis.
- The turning point of the graph.

Use the axes provided. An additional diagram, if required, can be found at end. **4**



15.



AD is a diameter of a circle, centre O.

B is a point on the circumference of the circle.

The chord BD is extended to point C, outside the circle.

Angle BOA = 98°.

Angle DCA = 32°.

The radius of the circle is 7 centimetres.

Calculate the length of AC. **5**

[END OF QUESTION PAPER]

Additional diagram for question 14.