



# Mathematics

## National 5 Practice Paper D

### Paper 2

Duration - 1 hour and 30 minutes

Total marks - 50

- You may use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

- Q1. The average Scottish house price is £153 100.  
The average price is expected to rise by 2.5% per month.  
What will the average Scottish house price be in 3 months?  
Give your answer correct to three significant figures. 3

- Q2. The heights, in millimetres, of six seedlings are given below.

15    18    14    17    16    19

- (a) Calculate:
- (i) the mean; 1
  - (ii) the standard deviation; 3
- of these heights.  
Show clearly all your working.
- (b) Later the same six seedlings are measured again.  
Each has grown by 4 millimetres.
- State:
- (i) the mean; 1
  - (ii) the standard deviation; 1
- of these new heights.

- Q3. Solve algebraically the equation

$$4 \sin x^\circ + 1 = -2 \qquad 0 \leq x < 360. \qquad 3$$

Q4. A sports centre charges different entrance fees for adults and children.

- (a) One evening 14 adults and 4 children visited the sports centre.  
The total collected in entrance fees was £55.00.

Let  $x$  pounds be the adult entrance fee and  $y$  pounds be the child's entrance fee.

Write down an equation in  $x$  and  $y$  to describe the above information.

1

- (b) The following evening 13 adults and 6 children visited the sports centre.  
The total collected in entrance fees was £54.50.

Write down a second equation in  $x$  and  $y$ .

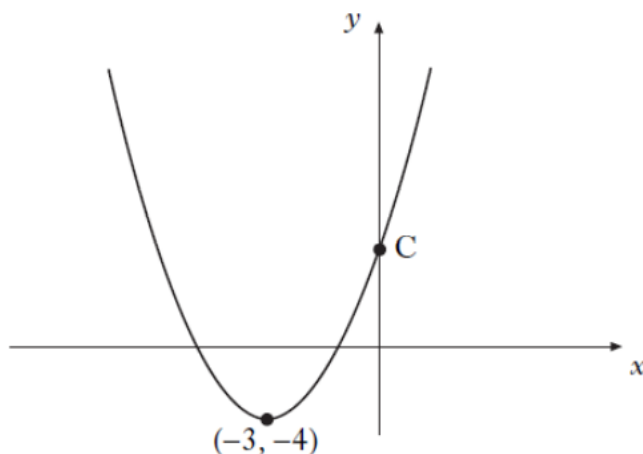
1

- (c) Calculate the entrance fee for an adult and the entrance fee for a child.

4

Q5. The diagram below shows part of a parabola with equation of the form

$$y = (x + a)^2 + b.$$



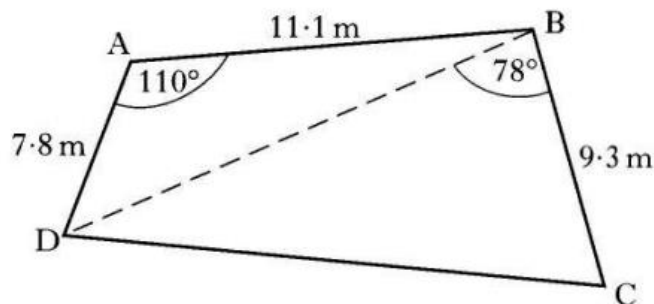
- (a) Write down the equation of the axis of symmetry of the graph.
- (b) Write down the equation of the parabola.
- (c) Find the coordinates of C.

1

2

2

Q6. A garden, in the shape of a quadrilateral, is represented in the diagram.



Calculate:

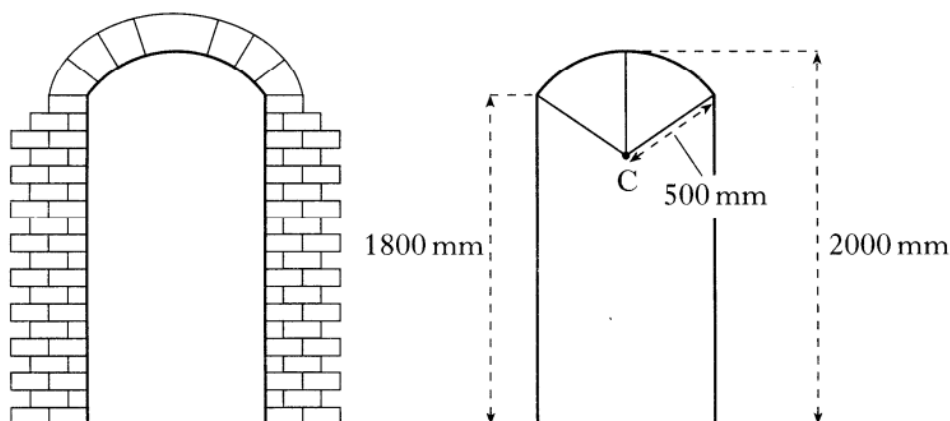
- (a) the length of the diagonal BD;  
Do not use a scale drawing.
- (b) the area of the garden.

3

Q7. The curved part of a doorway is an arc of a circle with radius 500 millimetres and centre C.

The height of the doorway to the top of the arc is 2000 millimetres.

The vertical edge of the doorway is 1800 millimetres.



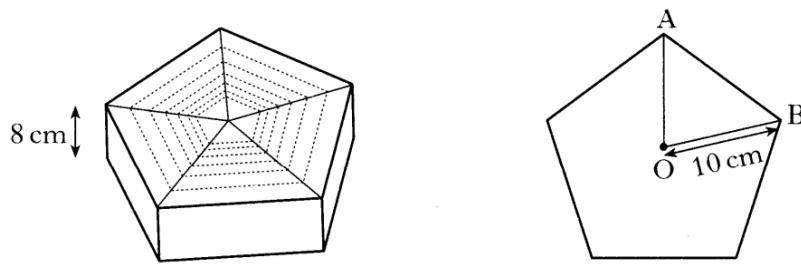
Calculate the width of the doorway.

5

Q8. Find the values of  $k$  such that the equation  $2x^2 - kx + 2 = 0$  has equal roots.

4

Q9. A gift box, 8 centimetres high, is prism shaped.



The uniform cross-section is a regular pentagon.

Each vertex of the pentagon is 10 centimetres from the centre  $O$ .

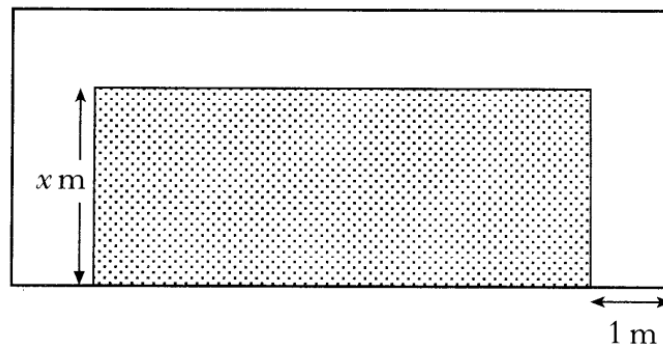
Calculate the volume of the box.

5

Q10. Express  $\frac{4}{x+3} + \frac{3}{x}$ ,  $x \neq -3$ ,  $x \neq 0$ , as a fraction in its simplest form.

3

Q11. A rectangular lawn has a path, 1 metre wide, on 3 sides as shown.



The breadth of the lawn is  $x$  metres.

The length of the lawn is three times its breadth.

The area of the lawn equals the area of the path.

(a) Show that  $3x^2 - 5x - 2 = 0$ .

3

(b) Hence find the **length** of the lawn.

4

[End of question paper]