Dr Oliver Mathematics
Mathematics: National Qualifications N5
2023 Paper 1: Non-Calculator
1 hour

The total number of marks available is 40.
You must write down all the stages in your working.

1. Evaluate (2)

$$2\tfrac{1}{6} \div \tfrac{8}{9}.$$

   Give your answer in its simplest form.

2. Expand and simplify (3)
$$(x + 7)^2 + 6(x^2 - 10).$$

3. Solve, algebraically, the system of equations (3)
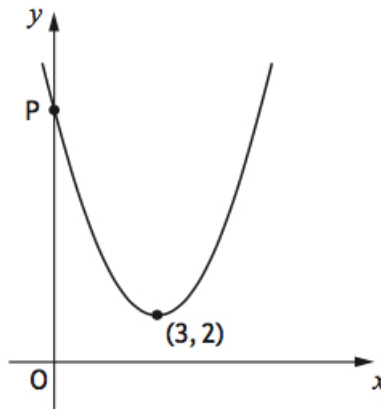
$$2x + 3y = 8$$
$$5x + 2y = -2.$$

4. The graph below shows part of a parabola of the form

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

(a) (i) State the value of a. (1)
    (ii) State the value of b. (1)

   P is the point $(0, c)$.
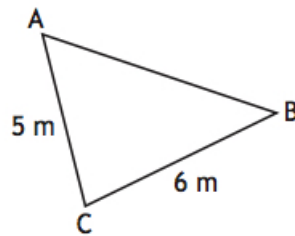
(b) Find the value of c. (1)

5. Determine the nature of the roots of the function (2)

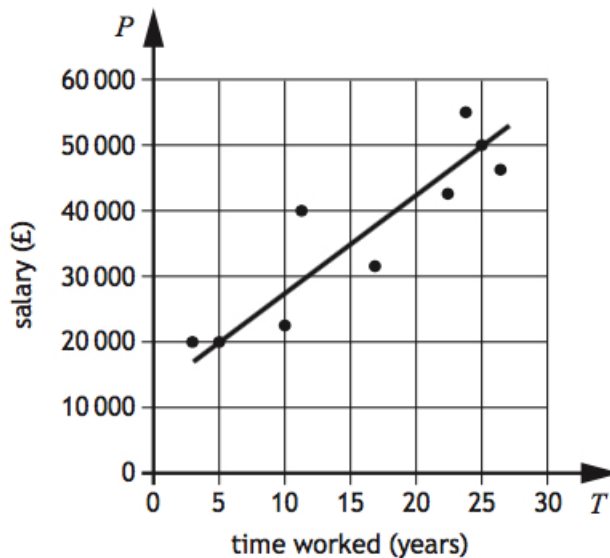$$\text{f}(x) = 4x^2 + 6x - 1.$$

6. In triangle ABC: (3)

   • $AC = 5$ metres,
   • $BC = 6$ metres, and
   • $\cos C = \frac{1}{5}$.

   Calculate the length of AB.

7. A business recorded the salaries of a sample of its employees and the length of time they have worked for the business.

   The scattergraph shows the relationship between their salary, P pounds, and the length of time, T years, they have worked.

A line of the best fit has been drawn.

(a) Find the equation of the line of best fit in terms of P and T. (3)
Give the equation in its simplest form.

(b) Use your equation from part (a) to estimate the salary of an employee who has (1)
worked for the business for 8 years.

8. Express (2)

$$\frac{12}{\sqrt{15}}$$

with a rational denominator.

Give your answer in its simplest form.

9. A magazine company conducted a survey of the ages of its readers.

A sample of ten readers' ages, in years, are shown below.

$$33 \quad 55 \quad 38 \quad 47 \quad 36 \quad 41 \quad 42 \quad 41 \quad 35 \quad 31$$

(a) Calculate the median and interquartile range of the ages of readers for this sample. (3)

A newspaper company also conducted a survey of the ages of its readers.

The median age of a sample of its readers was 41 years and the interquartile range was
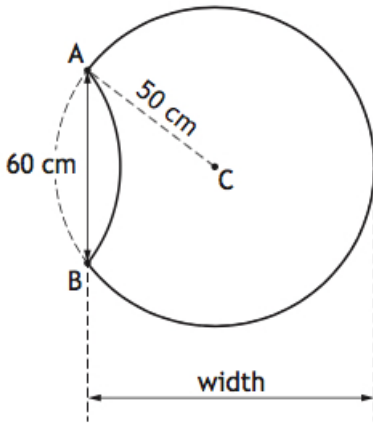9 years.

(b) Make two valid comments comparing the ages of the readers of the magazine and (2)
the ages of the readers of the newspaper.

10. Alan buys some identical paving slabs to make a path. (4)

Each slab is part of a circle.
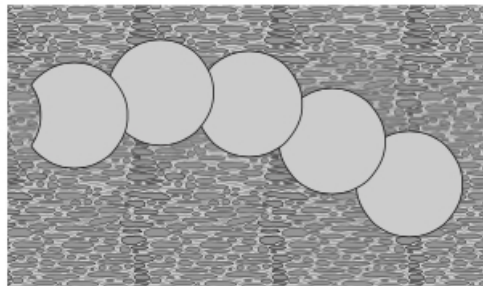
The diagram below shows a single slab.

The circle, centre C, has a radius of 50 centimetres.

Length AB is 60 centimetres.

Calculate the width of the paving slab.

11. Given that

$$\sin 30° = 0.5,$$

state the value of $\sin 330°$.
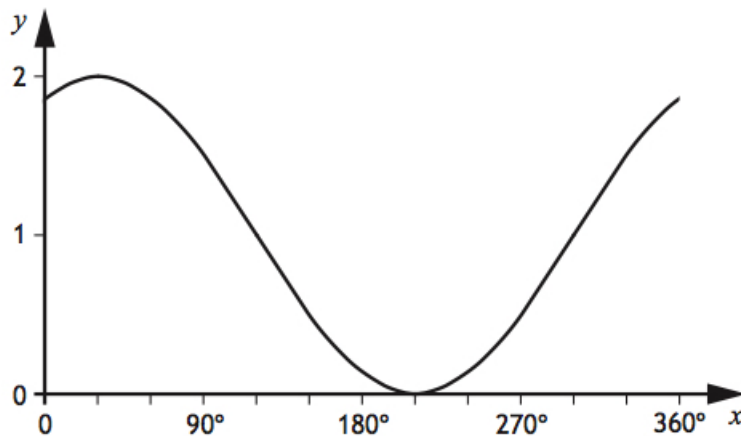
12. Simplify

$$\frac{5c^{-2}}{c^3 \times c^4}.$$

Give your answer with a **positive power**.

13. Part of the graph of

$$y = \cos(x + a)° + b$$

is shown.

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(a) State the value of a. (1)

(b) State the value of b. (1)

14. Solve, algebraically, the inequation (3)

$$\frac{x+1}{3} - 2 > \frac{3x}{5}.$$