

[C056/SQP105]

---

Intermediate 2  
Mathematics

Time: 45 minutes

NATIONAL  
QUALIFICATIONS

Specimen Question Paper 1 (Units 1, 2, 3)  
Non-calculator Paper

- 1 Answer as many questions as you can.
- 2 Full credit will be given only where the solution contains appropriate working.
- 3 **You may NOT use a calculator.**
- 4 Square-ruled paper is provided.

## FORMULAE LIST

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

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

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

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

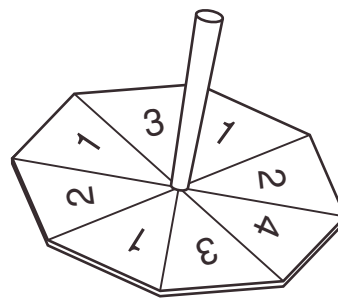
Volume of a sphere:  $\text{Volume} = \frac{4}{3}\pi r^3$

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

Volume of a cylinder:  $\text{Volume} = \pi r^2 h$

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

1. A spinner has eight edges numbered as shown in the diagram.  
When it is spun it comes to rest on one edge.  
What is the probability that it comes to rest on an even number?



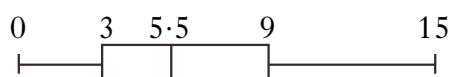
(2)

2. Factorise

$$x^2 - 7x - 8.$$

(2)

3. (a) The boxplot, drawn below, shows the daily rainfall (in millimetres) recorded over a number of days.

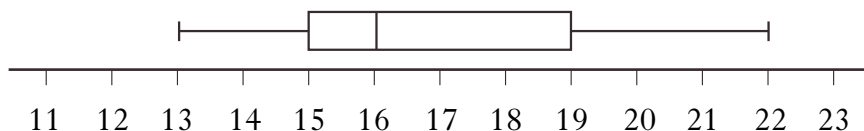


State the upper and lower quartiles.

(1)

- (b) The daily rainfall (in millimetres) for a town was recorded over **seven** days.

The boxplot, shown below, was drawn for this data set.

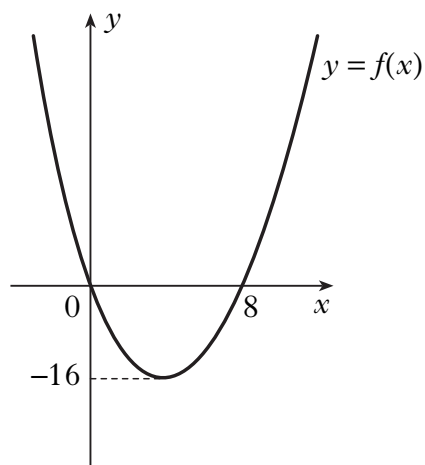


Write down a possible data set which fits this boxplot.

(3)

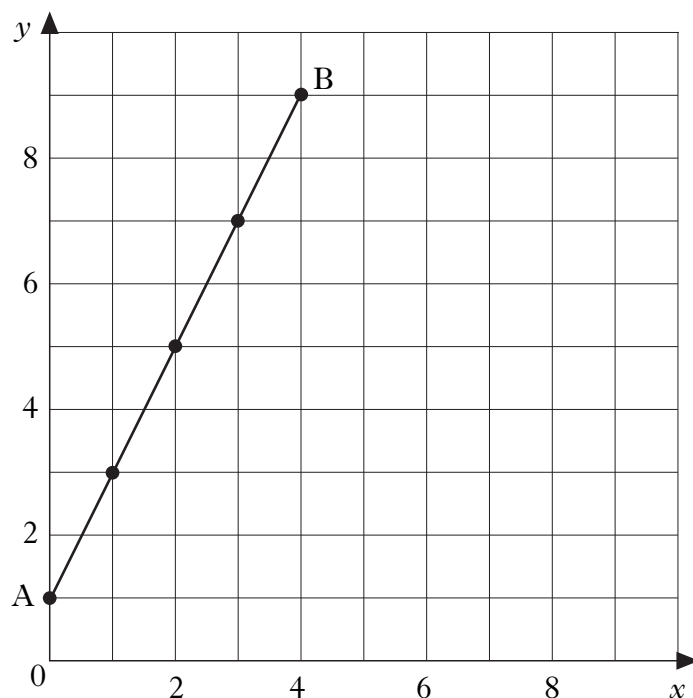
4. The diagram opposite shows the graph of  $y = f(x)$ .

Write down the equation of the graph in the form  $y = (x + a)^2 + b$ .



(2)

- 5.



(3)

Find the equation of the straight line AB.

6. A district council decided to plant maple and rowan trees on a piece of ground with area 0.25 hectares.

The trees were planted using a recommended spacing of 720 per hectare.

- (a) Let  $m$  be the number of maple trees and  $r$  the number of rowan trees planted.

Write down an equation in  $m$  and  $r$  which satisfies the above condition. (2)

- (b) The district council spent £1500 on the trees.

Each maple tree cost £9 and each rowan tree cost £7.50.

Write down an equation in  $m$  and  $r$  which satisfies this condition. (2)

- (c) How many trees of each kind did the council plant? (3)

7. (a) Express  $\frac{3}{\sqrt{5}}$  as a fraction with a rational denominator. (2)

- (b) Express  $\frac{b^{\frac{1}{2}} \times b^{\frac{3}{2}}}{b}$  in its simplest form. (2)

- (c) Express as a single fraction in its simplest form

$$\frac{5}{x} - \frac{3}{(x-2)}, x \neq 0 \text{ or } x \neq 2. \quad (3)$$

[END OF QUESTION PAPER]