

# X100/11/01

---

NATIONAL TUESDAY, 6 MAY  
QUALIFICATIONS 9.00 AM – 9.45 AM  
2014

MATHEMATICS  
INTERMEDIATE 2  
Units 1, 2 and 3  
Paper 1  
(Non-calculator)

**Read carefully**

- 1 You may **NOT** use a calculator.
- 2 Full credit will be given only where the solution contains appropriate working.
- 3 Square-ruled paper is provided. If you make use of this, you should write your name on it clearly and put it inside your answer booklet.



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

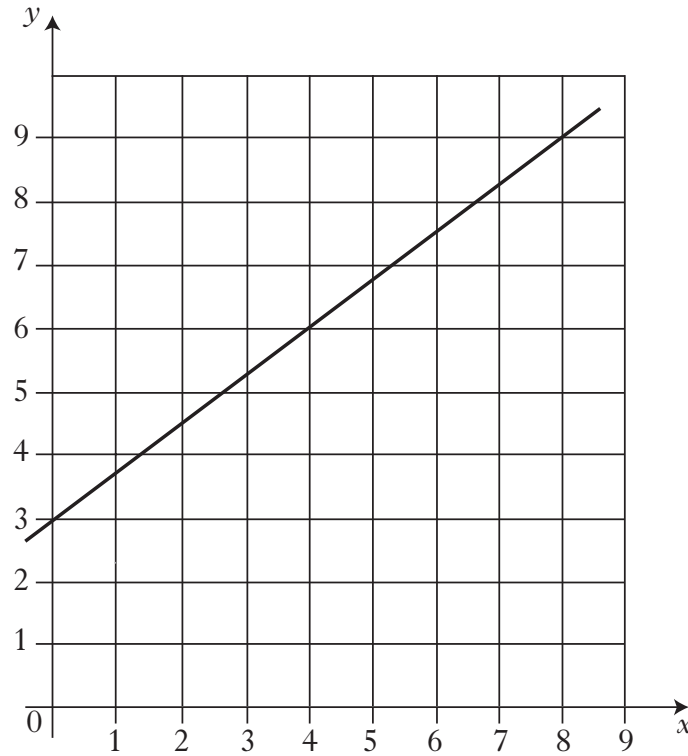
Volume of a cylinder:  $\text{Volume} = \pi r^2 h$

Standard deviation:  $s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}} = \sqrt{\frac{\sum x^2 - (\sum x)^2 / n}{n-1}}$ , where  $n$  is the sample size.

**ALL questions should be attempted.**

*Marks*

1.



Find the equation of the straight line shown in the diagram above.

**3**

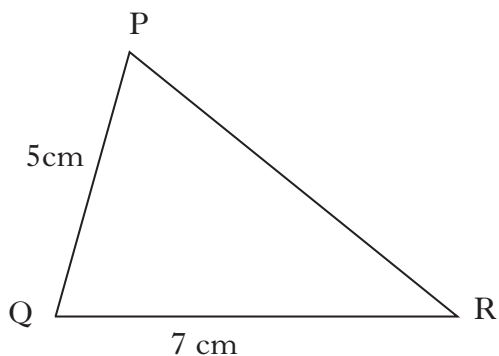
2. Multiply out the brackets and collect like terms.

$$(3x + 2)(x - 5) + 8x$$

**3**

**[Turn over**

3.



In triangle PQR,  $PQ = 5$  centimetres,  $QR = 7$  centimetres and  $\cos Q = \frac{1}{5}$ .

Calculate the length of side PR.

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

3

4. At a ski resort the temperature, in degrees Celsius, was recorded each day at noon for the first fortnight in February 2013.

0 -1 2 -5 4 2 -3 1 -4 8 -6 4 -2 1

(a) Calculate:

(i) the median temperature;

1

(ii) the lower quartile;

1

(iii) the upper quartile.

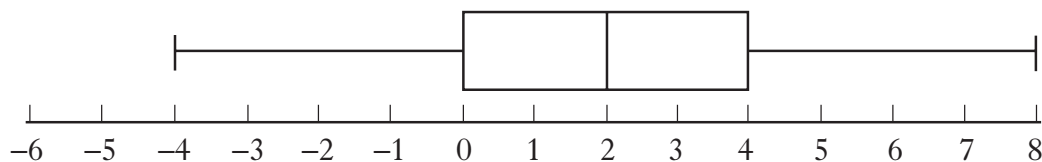
1

(b) Use the above data to construct a boxplot.

2

(c) The temperature, in degrees Celsius, was recorded at the same ski resort each day at noon for the first fortnight in February 2014.

The following boxplot was constructed.



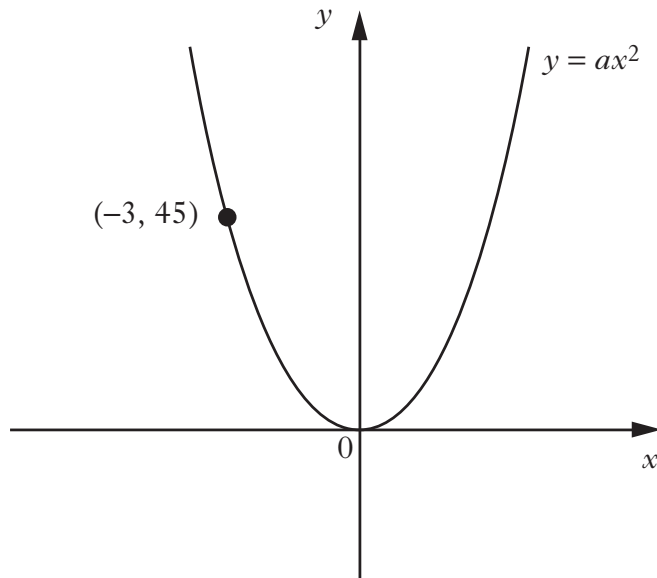
Compare the two boxplots and comment.

2

5. Express  $\sqrt{40} + 4\sqrt{10} + \sqrt{90}$  as a surd in its simplest form.

3

6. The diagram below shows part of the graph of  $y = ax^2$ .

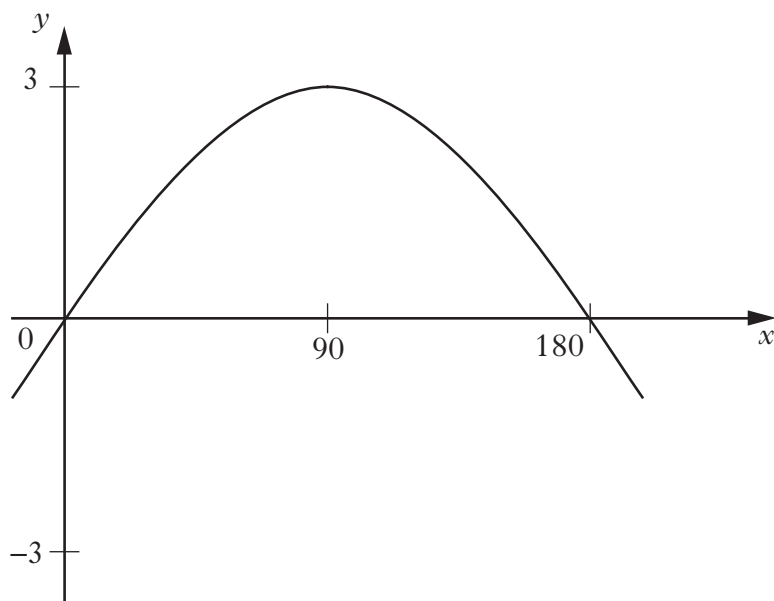


Find the value of  $a$ .

2

**[Turn over**

7.



Part of the graph of  $y = a \sin bx^\circ$  is shown in the diagram.

State the values of  $a$  and  $b$ .

2

8. A parabola has equation  $y = (x - 2)^2 - 5$ .

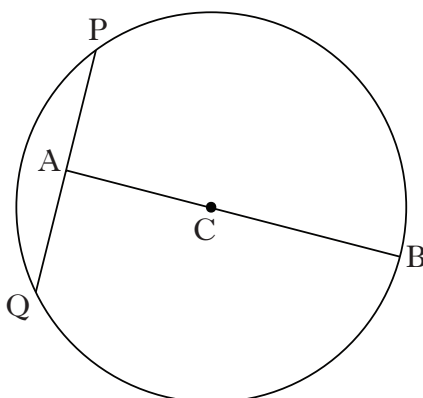
(a) Write down the coordinates of the turning point of the parabola.

2

(b) Does this parabola have a maximum or a minimum turning point?

1

9. The diagram below shows a circle, centre C.



The radius of the circle is 15 centimetres.

A is the mid-point of chord PQ.

The length of AB is 27 centimetres.

Calculate the length of PQ.

4

[END OF QUESTION PAPER]

**[BLANK PAGE]**