



**Maths**  
**Leaving Certificate**  
**Ordinary Level**

**Past Exam Questions**  
**Marking Scheme on**  
**Numbering Systems**

### Q3 2013 Paper One Section A

#### Question 3

(25 marks)

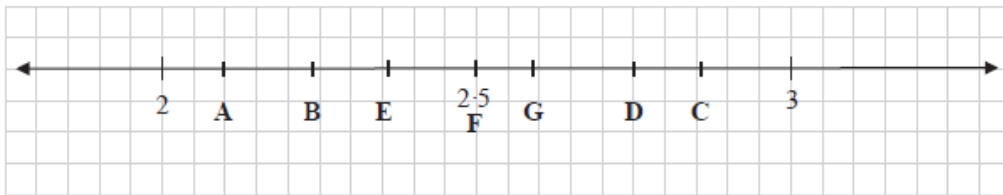
- (a) The mean distance from the earth to the sun is 149 597 871 km. Write this number in the form  $a \times 10^n$ , where  $1 \leq a < 10$  and  $n \in \mathbb{Z}$ , correct to two significant figures.

$$149\,597\,871 \approx 1.5 \times 10^8 \text{ km}$$

- (b) (i) Write each of the numbers below as a decimal correct to two decimal places.

	A	B	C	D	E	F	G
Number	2.1	$\sqrt{5}$	$\frac{243}{85}$	$\tan 70^\circ$	$\frac{3\pi}{4}$	250%	$\left(1 + \frac{1}{10}\right)^{10}$
Decimal Number	2.10	2.24	2.86	2.75	2.36	2.50	2.59

- (ii) Mark 5 of the numbers in the table on the number line below and label each number clearly.



- (c) Solve the equation  $27^{2x} = 3^{x+10}$ .

$$\begin{aligned}
 27^{2x} &= 3^{x+10} \\
 \Rightarrow (3^3)^{2x} &= 3^{x+10} \\
 \Rightarrow 3^{6x} &= 3^{x+10} \\
 \Rightarrow 6x &= x+10 \Rightarrow 5x = 10 \Rightarrow x = 2
 \end{aligned}$$

## Q2 2012 Paper One Section A

### Question 2

(25 marks)

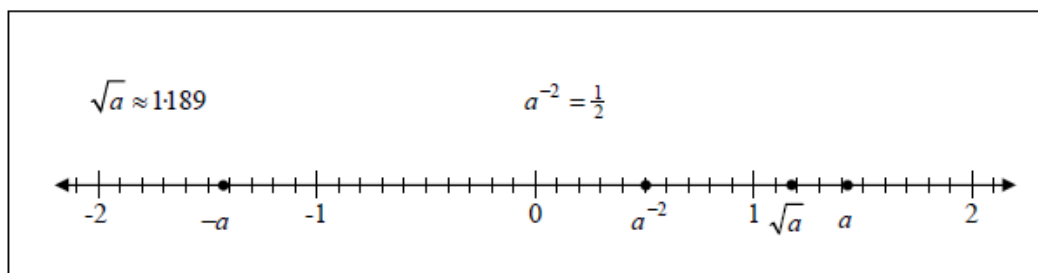
Let  $a = \sqrt{2}$ .

- (a) For each of the numbers in the table below, tick (✓) the correct box to say whether it is *rational* or *irrational*.

Number	rational	irrational
$a$		✓
$a-1$		✓
$(-a)^2$	✓	
$(a-2)^2$		✓
$1+a^2$	✓	

- (b) Show the following numbers on the number line below.

$$a, \quad -a, \quad \sqrt{a}, \quad a^{-2}$$



- (c) Verify that  $3 - \sqrt{2}$  is a root (solution) of the equation  $x^2 - 6x + 7 = 0$ .

$$x^2 - 6x + 7 = 0$$

$$(3 - \sqrt{2})^2 - 6(3 - \sqrt{2}) + 7 = 9 - 6\sqrt{2} + 2 - 18 + 6\sqrt{2} + 7$$

$$= 18 - 18 - 6\sqrt{2} + 6\sqrt{2} = 0$$

OR

$$x^2 - 6x + 7 = 0$$

$$\Rightarrow x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(7)}}{2} = \frac{6 \pm \sqrt{8}}{2} = \frac{6 \pm 2\sqrt{2}}{2} = 3 + \sqrt{2} \text{ or } 3 - \sqrt{2}$$