

## LC 2013 (SET D): PAPER 1

### QUESTION 3 (25 MARKS)

#### Question 3 (a)

**SCIENTIFIC NOTATION**

$$a \times 10^n, 1 \leq a < 10, n \in \mathbb{Z}$$

Ex.  $2.3 \times 10^{-5}$

$$\begin{aligned} &149\,597\,871 \text{ km} \\ &= 149\,597\,871.0 \text{ km} \\ &= 1.49\,597\,871 \times 100\,000\,000 \text{ km} \\ &= 1.49\,597\,871 \times 10^8 \text{ km} \\ &\approx 1.5 \times 10^8 \text{ km} \end{aligned}$$

**USING YOUR CALCULATOR**

Input the number  
Press **Shift** followed by **Mode**  
Press **7**: Sci  
Press **2** (two significant figures)  
Press **=**

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

**MARKING SCHEME NOTES**

**Question 3 (a) [Scale 5B\* (0, 2, 5)]**

**2:** • Either  $a$  (unrounded) or  $n$  correct

\* Penalise one mark for incorrect or omitted round-off, provided full marks otherwise

#### Question 3 (b) (i)

	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

**USING YOUR CALCULATOR**

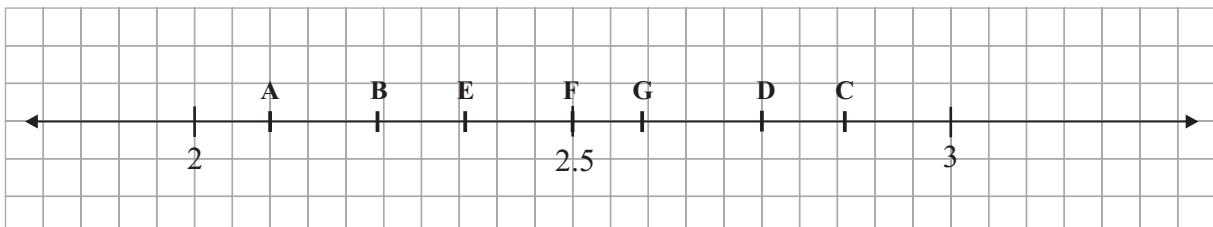
Input the number  
Press **Shift** followed by **Mode**  
Press **6**: Fix  
Press **2** (two decimal places)  
Press **=**

**NOTE:** When you input the fraction  $\frac{243}{85}$  and press the equal sign, the answer appears as a fraction.

Press the **S ⇌ D** button to change this fraction to a decimal.

Press the **S ⇌ D** button again to fix it to two decimal places.

#### Question 3 (b) (ii)



**MARKING SCHEME NOTES**

**Question 3 (b) (i) [Scale 5C (0, 2, 4, 5)]**

**2:** • One or two numbers only (other than A) written correctly

**4:** • Three, four or five numbers only (other than A) written correctly

**Question 3 (b) (ii) [Scale 5C (0, 2, 4, 5)]**

**2:** • One or two numbers only plotted correctly

**4:** • Three or four numbers only plotted correctly

**Question 3 (c)**

$27^{2x} = 3^{x+10}$  ← Get the same base on each side.

$$(3^3)^{2x} = 3^{x+10} \quad \boxed{(a^m)^n = a^{mn}}$$

$3^{6x} = 3^{x+10}$  ← Equate the powers.

$$\therefore 6x = x + 10$$

$6x - x = 10$  ← Bring the  $x$  terms to the left.

$5x = 10$  ← Divide both sides by 2.

$$x = \frac{10}{5} = 2$$

**MARKING SCHEME NOTES**

**Question 3 (c) [Scale 10C (0, 3, 7, 10)]**

**3:**

- Some work of merit with indices
- Some work of merit in solving linear equation
- Solves the equation  $2x = x + 10$  correctly
- Correct answer without work shown

**7:**

- Correct equation in indices set up but fails to finish correctly
- Incorrect equation in indices but solves “equation of indices” correctly

**NOTE:** Correct answer by trial and improvement, shown for both sides, award full credit