

» Marking Scheme: Trial 2009, 2U Question 1

MARKS

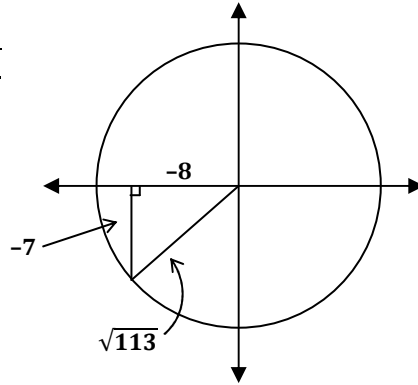
a) $\frac{e^3 - 2.1^2}{\sqrt{3.14 + 2.1}} = 6.8478901 \dots$

$= 6.8$ (2 significant figures)

1 for evaluation

b) Since $\tan \theta > 0$ and $\cos \theta < 0$, θ lies in the 3rd quadrant.

$$\begin{aligned} \operatorname{cosec} \theta &= \frac{1}{\sin \theta} \\ &= \frac{-\sqrt{113}}{7} \end{aligned}$$



1 for identifying correct quadrant (i.e. $\operatorname{cosec} \theta < 0$)

1 for magnitude of answer

c) $|4x - 15| \leq 3$

$$-3 \leq 4x - 15 \leq 3$$

$$12 \leq 4x \leq 18$$

$$3 \leq x \leq 4\frac{1}{2}$$

1 for $x \geq 3$

1 for $x \leq 4\frac{1}{2}$

d) $3y = \sin\left(2x - \frac{\pi}{4}\right)$

$$y = \frac{1}{3} \sin\left(2x - \frac{\pi}{4}\right)$$

\therefore Amplitude = $\frac{1}{3}$ and Period = $\frac{2\pi}{2} = \pi$

1 for period

1 for amplitude

e) $1.3 \times \text{cost price} = \67.60

$$\text{cost price} = \frac{\$67.60}{1.3}$$

$$\text{cost price} = \$52$$

1 for working

1 for correct price

f) $0 < \alpha < \pi$

However, since $\tan \alpha < 0$, $\frac{\pi}{2} < \alpha < \pi$ (i.e. 2nd quadrant).

$$\tan \alpha = -0.5$$

$$\alpha = \pi - 0.463 \dots$$

$$\alpha \approx 2.68 \text{ (2 decimal places)}$$

1 for correct value
in radians

g) Dot diagram:

11	21	31	41	51	<u>61</u>
12	22	32	42	<u>52</u>	62
13	23	33	43	53	<u>63</u>
14	24	34	44	54	<u>64</u>
15	<u>25</u>	35	45	55	65
<u>16</u>	26	<u>36</u>	<u>46</u>	56	66

1 for accurate
dot diagram

$$P(\text{digits can form a perfect square}) = \frac{8}{36}$$

$$= \frac{2}{9}$$

1 for correct
probability