1.

STATES OR IMPLIES A(2,0) B1

$x^2 - 14x + 33 = 0$ o.e. M1

STATES OR IMPLIES B(11,0) A1

$\frac{1}{2} \times 3 \times 12$ or 18 B1

$$\int_5^{11} -x^2 + 14x - 33 \, dx$$ M1 LIMITS, M1 INTEGRAL

$-\frac{1}{3}x^3 + 7x^2 - 33x$ MA1

$[\ldots] - [\ldots]$ M1 ft

72 A1 c.a.o

"72" + "18" or 90 A1 ft

2.

(4,3) B1 B1

RADIUS = 5 B1

3.

a) $1 + 10x + 40x^2 + 80x^3 + 80x^4 + 32x^5$ MA3 -1 eeoo

b) $1 - 10x + 40x^2 - 80x^3 + 80x^4 - 32x^5$ A1 ft

c) $20x + 160x^3 + 64x^5 = 64x$ M1

$16x^4 + 40x^2 - 11 = 0$ MA1

FACTORIZES OR USES QUADRATIC FORMULA M1

$x^2 = \frac{1}{4}$ IGNORE EXTRAS M1

$x = \pm\frac{1}{2}$ c.a.o A1

4. USE OF $\log_x 4 = \dfrac{1}{\log_4 x}$ B1

$y^2 - y - 2 = 0$ OR SIMILAR M1

"y" $= \begin{cases} -1 \\ 2 \end{cases}$ MA1

$x = \begin{cases} 1/4 & \text{A1} \\ 16 & \text{A1} \end{cases}$

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5. a) $\dfrac{3x+2}{2x+4} = \dfrac{x^2-11}{3x+2}$ B1

$(3x+2)^2 = (2x+4)(x^2-11)$ M1

SIMPLIFIES CORRECTLY TO THE ANSWER GIVEN A1

b) SUBSTITUTES $x=6$ & OBTAINS 0
OR SHOWS $(x-6)(2x^2+7x+8)$ M1

ATTEMPT DISCRIMINANT M1

OBTAINS & STATES NEGATIVE (-15) & CONCLUDES A1

c) $\dfrac{16(1.25^8-1)}{1.25-1}$ M1 STRUCTURE ft
A1 ALL CORRECT

A.W.R.T 317 A1

6. FACTORIZES $\tan^2\theta$ OR CONVERTS INTO SINES & COSINES M1

$(2\sin\theta+1)(\sin\theta+1)$ M1

$\sin\theta = 0$ OR $\sin^2\theta = 0$, $\sin\theta = -\frac{1}{2}$, $\sin\theta = -1$

OR

$\tan\theta = 0$ OR $\tan^2\theta = 0$, $\sin\theta = -\frac{1}{2}$, $\sin\theta = -1$ MA

$\theta = 0, 180, 210, 330°$ A3 (−1 each error, omission, or extras)

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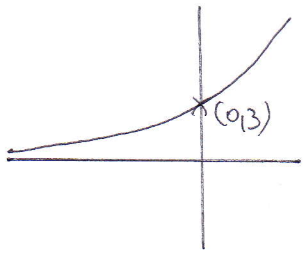
7. a) REFLECTION, IN THE y AXIS B1 A1 dep

b)



SHAPE B1

(0,3) B1

c) $\left(\frac{1}{2}\right)^x = 3\times 2^x$ OR $\frac{1}{2^x} = 3\times 2^x$ M1

$\frac{1}{3} = 2^{2x}$ OR $\frac{1}{y} = 2^x$ MA1

$\frac{1}{\sqrt{3}} = 2^x$ OR $2^x = \frac{\sqrt{3}}{3}$ OR $y = 3\times\frac{1}{y}$ MA1

$y = \sqrt{3}$ A1 dep

ALTERNATIVE

$\left(\frac{1}{2}\right)^x = 3\times 2^x$ OR $\frac{1}{2^x} = 3\times 2^x$ M1

USES LOG CORRECTLY MA1

SHOWS $x = -\frac{\log 3}{\log 4}$ OR $x \approx -0.79248\ldots$ MA1

$y = \sqrt{3}$ A1 c.a.o

8. $\pi r^2 h = 16\pi$ OR $r^2 h = 16$ B1

$2\pi r^2 + 2\pi r h$ M1 M1

SUBS $h = \frac{16}{r^2}$ OR SIMILAR M1

OBTAINS $A = 2\pi r^2 + \frac{32\pi}{r}$ o.e A1

ATTEMPTS DIFFERENTIATION OF "THEIR" A M1 ft

$4\pi r - \frac{32\pi}{r^2}$ A1

SOLVES FOR ZERO M1 ft.

$r = 2$ A1 c.a.o.

$h = 4$ A1 c.a.o

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9. $\frac{1}{2} \times 12^2 \times \frac{2\pi}{3} = 48\pi$ M1 A1

$(A\hat{B}E =) \pi - \frac{2\pi}{3} = \frac{\pi}{3}$ B1

$\sin \frac{\pi}{3} = \frac{\text{"}r\text{"}}{12}$ M1

"r" $= 6\sqrt{3}$ A1

$\frac{1}{4}\pi(\text{"}6\sqrt{3}\text{"})^2 = 27\pi$ M1 A1

USE OF PYTHAGORAS E.g $x^2 + (\text{"}6\sqrt{3}\text{"})^2 = 12^2$ M1

$x = 6$ A1

$\frac{1}{2} \times \text{"}6\text{"} \times \text{"}6\sqrt{3}\text{"} = 18\sqrt{3}$ M1 A1

"$18\sqrt{3}$" + "48π" − "27π" M1

CORRECTLY ARRIVES $3(7\pi - 6\sqrt{3})$ A1