1. SIGHT OF -75 B1

$5y = -40°$ ... M1

$y = -8°$ ... M1

$28°$, $64°$ A1, A1

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2. $8p + q - 148$ M1

$-\frac{27}{8}p + q - 57$ M1

"$8p + q - 148$" = "$-\frac{27}{8} + q - 57$" M1 dep

ATTEMPTS A SOLUTION (AT LEAST ONE SIGNIFICANT STEP) TO GET AN EQUATION IN p M1

SHOWS CORRECTLY $p = 8$ A1

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3. a) "$\frac{a}{2} = 5$" OR SIMILAR M1

$a = 10$ A1

b) COMPLETES THE SQUARE IN x & y GOOD ATTEMPT (MAY APPEAR IN a) M1 M1 (full simplification)

SHOWS 49 M1

STATE RADIUS $= 7$ A1

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4. a) $1 + \frac{5}{2}x + \frac{45}{16}x^2 + \frac{15}{8}x^3$ A1 A1 A1 M1 FOR KNOWLEDGE OF METHOD

b) INDICATES $x = 0.1$ B1

SHOWS $1 + \frac{5}{2}(0.1) + \frac{45}{16}(0.1)^2 + \frac{15}{8}(0.1)^3$ OR $1 + \frac{1}{4} + \frac{9}{320} + \frac{3}{1600}$ M1

SHOWS CONVINCINGLY $\frac{32}{25} = 1.28$ A1

5. a) $10 + 20 + 40 + 80 + 160 = 310$

OR $\frac{10 \times (2^{-1})}{2-1} = 310$) M1

$\frac{310}{10} = 31$ A1

b) $2097510 = \frac{10(2^n - 1)}{2-1}$ O.E M1

$2097151 = 2^n - 1$

OR $2^n = 2097152$) M1

$\log 2^n = \log 2097152$ M1

$n = \frac{\log 2097152}{\log 2}$ M1

$n = 21$ A1

ALLOW TRIAL & IMPROVEMENT IF STEPS ARE SHOWN

---

6. a) $7^x = 10$

$\log 7^x = \log 10$ M1

$x \log 7 = \log 10$ M1

$x = 1.18$ c.a.o A1

b) $(\log_2 y)^2 = 9$ DON'T ALLOW $\log_2 y^2$ M1

$\log_2 y = \begin{matrix} 3 \\ -3 \end{matrix}$ BOTH ALLOW RECOVERY FROM $\log_2 y^2$ M1

Shows 8 A1

$\frac{1}{8}$ A1

7. a) $\left(\frac{dC}{dV} =\right) 200V^{-2} + \frac{2}{25}$ M1 ATTEMPTS DIFFERENTIATION
M1 CORRECTLY DIFFERENTIATES

SETS EQUAL TO ZERO M1

SOLVES EQUATION E.g. $2V^2 = 5000$ M1

$V = 50$ A1

b) SIGHT OF $400V^{-3}$ M1

SIGHT OF $\frac{40}{50^3}$ OR $\frac{40}{125000}$ O.E >0 A1

+ CONCLUSION

c) $\frac{200}{50} + \frac{2\times50}{25}$ M1

£8 A1

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8. $\frac{1}{2}r^2 \times \frac{\pi}{6}$ M1

$\frac{\pi r^2}{12}$ A1

$\frac{1}{2}a^2 \sin\frac{\pi}{6}$ M1

$\frac{1}{4}a^2$ A1

$\frac{1}{4}a^2 = \frac{1}{2} \times \frac{\pi r^2}{12}$ OR SIMILAR M1

LEADING TO SIMPLIFIES TO $\sqrt{\frac{\pi}{6}}r$ A1

9. STATES/IMPLIES $A(8,0)$ B1

COMPLETES THE SQUARE, USES CALCULUS, OR USES SYMMETRY TO FIND THE x COORD OF M B1

SEEN OR IMPLIED $M(4,16)$ A1

"$\frac{1}{2} \times 4 \times 16$" $= 32$ M1

$\int_0^4 8x - x^2 \, dx$ M1 M1 (1 mark is for limits)

$4x^2 - \frac{1}{3}x^3$ M1

$64 - \frac{64}{3} = \frac{128}{3}$ M1

"$\frac{128}{3}$" + "32" OR SEEN $\frac{224}{3}$ A1

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10 a) $120°$ B1

b) $A=1, B=2, C=3$ B1 B1 B1

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11. a) ATTEMPTS TO FIND y VALUES AT REGULAR INTERVALS M1

SEEN 4 OUT OF $1, 1.4142, 1.6325, 1.8226, 2$ A1

$\frac{0.25}{2}\left[1+2+2(1.4142+1.6325+1.8226)\right]$ M3

A.W.R.T 1.59 A1

b) I) $1.59 + (3 \times 1)$ M1 MUST CONVINCE

4.59 A1

DO NOT ACCEPT JUST +3

II) $2^{\sqrt{x}} \times 2^3$ OR $8x$ M1

A.W.R.T 12.7 A1

FOR PART (b) DO NOT ACCEPT RECALCULATION