1.

$32 - 400x + 2000x^2 + \ldots$ A1 A1 A1

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2. a) ATTEMPTS TO FIND THE DISTANCE $|CP|$ M1

SIGHT OF $\sqrt{26}$ A1

$(x+2)^2 + (y-3)^2 = 26$ A1, A1

b) ATTEMPT TO FIND GRAD OF CP e.g. $\frac{8-3}{-3+2}$ M1

GIVES GRADING AS -5 A1

IMPLIES THAT GRADIENT OF $-\frac{1}{"-5"}$ IS NEEDED B1 ft

$y - 8 = \frac{1}{5}(x+3)$ & SIMPLIFIES TO THE CORRECT ANSWER M1

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3. $\log_5\left(\frac{4t+7}{t}\right)$ B1

$\frac{4t+7}{t} = 25$ O.E M1

ATTEMPTS SOLUTION M1

$t = \frac{1}{3}$ O.E A1

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4. a) $A = -2$ C.A.O B1

$n = 3$ C.A.O B1

b) $(210, 2)$ B1 B1

5. $a(1+r+r^2+r^3) = 1800$

or $\frac{a(1-r^4)}{1-r} = 1800$) M1

$ar^3 = 8a$ M1

$r = 2$ A1

$a(1+2+4+8) = 1800$ o.e

or $\frac{a(1-2^4)}{1-2} = 1800$ o.e) M1

GIVES OR IMPLIES "$a = 120$" A1

GIVES 240, 480, 960 AND 3 A1

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6. $-x^2+8x-2 = x^2-10x+26$ M1

SIMPLIFIES TO $x^2-9x+14$ o.e A1

FACTORIZES TO $(x-7)(x-2)$ M1

STATES 2 & 7 BOTH A1

$\int_2^7 -x^2+8x-2\,dx$

$\int_2^7 x^2-10x+26\,dx$) M1 M1 for each integral, B1 for their "2" & "7"

$-\frac{1}{3}x^3+4x^2-2x$ OR $\frac{1}{3}x^3-5x^2+26x$ M1

$\left(-\frac{343}{3}+196-14\right)-\left(-\frac{8}{3}+16-4\right)$ OR $\frac{203}{3}-\frac{28}{3}$

OR $\left(\frac{343}{3}-245+182\right)-\left(\frac{8}{3}-20+52\right)$ OR $\frac{154}{3}-\frac{104}{3}$) M1

$\frac{175}{3}$ OR $\frac{50}{3}$ A1

"$\frac{175}{3}-\frac{50}{3}$" OR STATES CORRECTLY $\frac{125}{3}$ A1

ACCEPT ALTERNATIVE (LAST 7 MARKS)

$\int_2^7 (-x^2+8x-2)-(x^2-10x+26)\,dx = \int_2^7 -2x^2+18x-28\,dx$ M1 M1 M1 A1

$= \left[-\frac{2}{3}x^3+9x^2-28x\right]_2^7 = \left(-\frac{686}{3}+441-196\right)-\left(-\frac{16}{3}+36-56\right) = \frac{49}{3}-\left(-\frac{76}{3}\right) = \frac{125}{3}$ M1 M1 A1

7. a) THICKNESS OF 0.4 B1

0 , 1.2 , 1.6 , 1.8330, 1.9596, 2 A1

"$\frac{0.4}{2}$"$\left[0+2+2(1.2+1.6+1.8330+1.9596)\right]$ "$\frac{0.4}{2}$ OR 2(----) M1 CORRECT STRUCTURE M1

A.W.R.T 3.04 A1

b) SIGHT OF 2×3 OR 6 M1

GIVES 9.04 A1

c) INCREASE & IMPLIES TRAPEZIUMS GO UNDER CURVE B1

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8 a) USE OF "$\frac{1}{2}R^2\theta$" E.g $\frac{1}{2}(4r)^2\theta$ OR $\frac{1}{2}(3r)^2\theta$ O.E M1

$50 = 8r^2\theta - \frac{9}{2}r^2\theta$ O.E A1

$P = 7r\theta + 2r$ M1

SUBSTITUTES & CORRECTLY DERIVES $P = 2r + \frac{100}{r}$ A1

b) I) $2 - 100r^{-2}$ M1

SETS AFTER "$2-100r^{-2}$" EQUAL TO ZERO M1

ATTEMPTS CORRECT SOLUTION M1

SIGHTS $\sqrt{50}$ OR $5\sqrt{2}$ A1

II) $200r^{-3}$ M1

$\frac{200}{(5\sqrt{2})^3} > 0$ + STATEMENT A1

c) SUBS AFTER "$\sqrt{50}$" INTO $2r + \frac{100}{r}$ M1

$20\sqrt{2}$ OR A.W.R.T 28 A1

9.

$\sqrt{3} + 2\sin 2y = 0$ OR $\sqrt{3} + \tan 2y = 0$ M1

$\sin 2y = -\frac{\sqrt{3}}{2}$ OR $\tan 2y = -\sqrt{3}$ M1

SIGHT OF $-\frac{\pi}{3}$ OR -60 B1

$2y = -60$ OR $2y = -\frac{\pi}{3}$ M1

$2y = 240$ OR $2y = \frac{4\pi}{3}$ M1

$\frac{5\pi}{6}$, $\frac{2\pi}{3}$, $\frac{\pi}{3}$ (-1 if degrees OR not in π) A1 A1 A1

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10. a) $10^2 = x^2 + 12^2 - 2 \times x \times 12 \times \cos\theta$ M1

$100 = x^2 + 144 - \frac{40}{3}x$ M1 M1

$3x^2 - 40x + 132$ M1

$(3x - 22)(x - 6)$ M1

Signs BOTH 6 & $\frac{22}{3}$ A1

$\frac{5.7}{\sin 20} = \frac{9.8}{\text{"}\sin\theta\text{"}}$ M1

$\text{"}\sin\theta\text{"} = 0.588\ldots$ M1

$\theta = \begin{matrix} 36 \\ 144 \end{matrix}$ A1, A1

$\theta' = \begin{matrix} 124 \\ 16 \end{matrix}$ A1 both