1. a) $512 + 2304x + 4608x^2 + 5376x^3$ B4

b) $1 - \frac{1}{4}x + \frac{1}{64}x^2$ B1

$36, -1152, 5376$ A2 -1 eeoo

4260 A1

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2. $\frac{1.25}{2}[9 + 13 + 2 \times (17 + 25 + 21)]$ M1 M1 M1

92.5 c.a.o A1

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3. a) $3 \times 4^3 - 2 \times 4^2 - 12 \times 4 + 8$ or $192 - 32 - 48 + 8$ M1

120 c.a.o A1

b) $(x-2)(3x^2+4x-4)$ M2 [1 MARK $(x-2)$(ANY QUADRATIC)]

$(x-2)(3x-2)(x+2)$ M1

$x = 2, -2, -2$ A2 -1 eeoo

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4. (a) SLANT OF $\sqrt{10}$ OR ATTMPT TO FIND AC OR ATTMPT TO FIND BC M1

$(x+1)^2 + (y-2)^2 = 10$ A1 A1 A1

b) $(-2, 4)$ B1

GRADIENT OF $AB = \frac{1}{2}$ B1

$y - 4 = -2(x+2)$ or $y = -2x$ M1 CORRECT USE OF LINE FORMULA WITH $(-2,4)$
M1 ft CORRECT GRADIENT

5. a) $(\sqrt{13})^2 = 1^2 + 4^2 - 2\times1\times4\times\cos\theta$ OR SIMILAR M1

$8\cos\theta = 4$ OR SIMILAR M1

$\cos\theta = \frac{1}{2}$ o.e & conclusion "$\theta = \frac{\pi}{3}$" A1

b) $\frac{1}{2}\times1^2\times\frac{\pi}{3}$ M1

$\frac{\pi}{6}$ A1 (MUST BE OBVIOUS THIS IS THE AREA OF SECTOR)

$\frac{1}{2}\times4\times1\times\sin\frac{\pi}{3}$ M1

$\sqrt{3}$ A1 (MUST BE OBVIOUS THIS IS THE AREA OF THE TRIANGLE)

"$\sqrt{3}$" − "$\frac{\pi}{6}$" OR 1.21 A1

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6. $\log_a x^2$ B1

$\log_a\left(\frac{x^2}{x-4}\right)$ OR $\log_a\left(\frac{x^2}{18}\right)$ OR $\log_a(18(x-4))$ B1

$x^2 = 18(x-4)$ OR $x^2 - 18x + 72$ OR SIMILAR A1

$(x-6)(x-12)$ M1

$x < \begin{matrix}6\\12\end{matrix}$ BOTH A1

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7. a) $-3x^2 + 18x - 15$ M1

$-3x^2 - 18x - 15 = 0$ A1

$(x-1)(x-5)$ M1

$(1,-20)$ $(5,12)$ A1 A1 (Allow 1 mark for $x = <\begin{matrix}1\\5\end{matrix}$ BOTH)

b) $-6x + 18$ B1

$-6\times1 + 18$ OR $12 > 0$ so "$(1,-20)$" IS MIN A1

$-6\times5 + 18$ OR $-12 < 0$ so "$(5,12)$" IS MAX A1

c)

$x < 1$ B1

$x > 5$ B1

(DO NOT ALLOW "COMBINED")

8. $3x = 48$ B1

$3x = 132$ B1

16, 136, 44, 164 A3 -1eeoo

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9. a)(I) SIGHT OF 1.02 (MAY APPEAR IN PART (a II)) B1

5×1.02^9 M1

5.975... A1

(II) $\frac{5(1-1.02^{10})}{1-1.02}$ OR SIMILAR M1

54.749... A1

b) $\frac{5(1-1.02^n)}{1-1.02} \leqslant 360$ B1

SIMPLIFIES WITH AT LEAST ONE SIGNIFICANT STEP M1

COMPLETES CORRECTLY A1

(WATCH FOR MISTAKES IN THE DIRECTION OF INEQUALITIES OR "FUDGES")

c) USE OF logs M1

$n \log(1.02) \leq \log 2.44$ M1

STATES 45 AS FINAL ANSWER A1

OR $1.02^{45} = 2.4378...$ B1

$1.02^{46} = 2.4866...$ B1

STATES $n = 45$ A1

10. $x^2 - 11x - 28 = 0$ M1

Shows $x = 4$ AND/OR 7 A1

$(x-3)(x-8)$

OR IMPLIES THAT $(3,0)$ IS THE x INTERCEPT A1

$\int_3^4 -x^2 + 11x - 24\,dx$ M1 M1 $= \ldots$ $-\frac{1}{3}x^3 + \frac{11}{2}x^2 - 24x$ A1 $= \frac{13}{6}$ A1

Show AREA OF $4\square_4$ IS 16 B1

GIVES FINAL ANSWER AS $\frac{83}{6}$ OR EQUIVALENT
OR SHOWS $16 - \frac{13}{6}$ A1