1. SIGHT OF $x^{\frac{1}{2}}$ & $x^{-\frac{1}{2}}$ B1

$4x^{\frac{3}{2}} - 12x^{\frac{1}{2}}$ M1

CORRECT METHOD E.g $(108-36)-(4-12)$ OR $72+8$ M1

80 c.a.o A1

---

2. a) $2(-2)^3 - 7(-2)^2 - 5(-2) + 4$ OR $-16-28+10+4$

OR SENSIBLE ATTEMPT ON DIVISION M1

-30 c.a.o A1

b) $2\times4^3 - 7\times4^2 - 5\times4 + 4$ OR $128-112-20+4$

(DO NOT ACCEPT DIVISION HERE) M1

OBTAINS ZERO + CONCLUSION A1

c) $(x-4)(2x^2+bx+c)$ M1

$(x-4)(2x^2+x-1)$ M1

$(x-4)(2x-1)(x+1)$ A1

---

3 a) $\frac{1}{6}$ o.e B1

b) $\dfrac{90}{1-\text{"}\frac{1}{6}\text{"}}$ M1

108 c.a.o A1

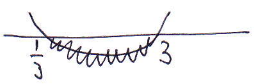
---

4. $3x^2-10x+3$ B1

$3x^2-10x+3<0$ OR $f'(x)<0$ B1

$(3x-1)(x-3)$ M1

SIGHT OF 3 & $\frac{1}{3}$ AS "CRITICAL VALUES" A1



OR EQUIVALENT METHOD M1

$\frac{1}{3}<x<3$ OR $\frac{1}{3}\leq x\leq 3$ A1

dep

5. USE OF $1 - \cos^2 3x$ (MUST BE IN $3x$) B1

SIMPLIFIES TO 3 TERM QUADRATIC e.g. $3\cos^2 3x + 7\cos 3x + 2$ M1 dep

$(3\cos 3x + 1)(\cos 3x + 2)$ OR SIMILAR IMPLIED FACTORIZATION M1

SIGHT OF $-\frac{1}{3}$ AND -2 A1

SIGHT OF 109.47... A1

SIGHT OF 250.53... A1

36.5°, 156.5°, 83.5° A2 −1 eeoo

---

6. a) SIGHT OF "$\tan\theta$" OR $\tan\theta = \frac{2.2}{0.9}$ M1

1.18247... A1

$\pi - 2 \times$ "1.18247..." M1 dep

SHOWS 0.7766 A1

b) USE OF PYTHAGORAS M1

SIGHT OF 2.37697 A1

"2.37697" × 0.7766 M1

A.W.R.T 8.05 c.a.o A1

c) $\frac{1}{2} \times (\text{"}2.376...\text{"})^2 \times 0.7766$ OR 2.194... M1

$\frac{1}{2} \times 0.9 \times 2.2$ OR 0.99 M1

A.W.R.T 4.17 − 4.18 A1

7. $\frac{1}{2} \times 3 \times 18$ OR 27 M1

SIGHT $\int_{-1}^{2} 18 - x - x^4 \, dx$ B1

$18x - \frac{1}{2}x^2 - \frac{1}{5}x^5$ (ALLOW ONE ERROR) M1

$\left(36 - 2 - \frac{30}{5}\right) - \left(-18 - \frac{1}{2} + \frac{1}{5}\right)$ OR $\frac{138}{5} - \left(-\frac{183}{10}\right)$ M1

$\frac{459}{10}$ OR 45.9 A1

$\frac{189}{10}$ OR 18.9 A1

---

8. $1 + nkx + \frac{1}{2}n(n-1)k^2x^2$ O.E. M2

ATTEMPTS SOLUTION OF $\frac{1}{2}n(n-1) = 120$ M1

$n = 16$ SEEN A1

$nk = 40$ B1

$k = \frac{5}{2}$ O.E A1 ft from "their n"

---

9. $\frac{\log_4(x-4)}{\log_4 16}$ B1

IMPLIES $\log_4 16 = 2$ B1

$2\log_4 x - \log_4(x-4) = 2$ M1

$\log_4\left(\frac{x^2}{x-4}\right)$ A1

$\frac{x^2}{x-4} = 16$ M1

$x^2 - 16x + 64$ A1

$(x-8)^2$ M1

$x = 8$ C.A.O A1

10. a) $(4,2)$ B1

ATTEMPT TO FIND DISTANCE FROM "THEIR C" TO ANY CORNER M1

$\sqrt{10}$ A1

b) "ATTEMPTS" $|SR|$ OR $|PQ|$ (OR THEIR MIDPOINTS) M1

SHOWS $\sqrt{20}$ OR $2\sqrt{5}$ A1

$(x-4)^2+(y-2)^2 = 5$ A1 A1

11.

$\frac{dy}{dx} = 3x^2+2ax+b$ B1

$-5 = (-1)^3+a(-1)^2+b(-1)-10=-5$ O.E B1

$3(-1)^2+2a(-1)+b=0$ O.E B1

OR
$a-b=6$
$2a-b=3$ A1

SOLVES AND OBTAINS $a=-3$, $b=-9$ both A1

ATTEMPT TO FACTORIZE E.g $(x+1)(x-3)$ M1

$Q(3,-37)$ A1

$\frac{d^2y}{dx^2} = 6x-6$ M1

$\left.\frac{d^2y}{dx^2}\right|_{x=3} = 12 > 0$ & STATES (LOCAL) MIN A1