1. a) $\int 3x^2 + kx + 7 \, dx$ B1

$y = x^3 + \frac{1}{2}kx^2 + 7x + C$ MA3 −1 eeoo (inc y=...)

$-9 = -1 + \frac{1}{2}k - 7 + C$
$6 = 8 + 2k + 14 + C$ } EITHER M1

SOLVES THE EQUATIONS M1

$k = -10$ $C = 4$ OR $y = x^3 - 5x^2 + 7x + 4$ A1 A1

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2. a) ATTEMPT AT GRADIENT $\frac{8-0}{10-6}$ M1

$y = "2"(x-6)$ OR $y - 8 = "2"(x-10)$ M1

$y = 2x - 12$ C.A.O A1

b) M(3, 0) N(5, 4) B1 B1

c) $\frac{1}{2} \times 6 \times 8$ M1

$\frac{1}{2} \times 3 \times 4$ M1

18 C.A.O A1

ALTERNATIVE
SIGHT OF 56, 14, 8, 10, 16 (ANY TWO) M1 M1

18 C.A.O A1

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3. $\frac{3}{2} + \frac{9 - \sqrt{17} + 9 + \sqrt{17}}{4} = \frac{3}{2} + \frac{18}{4}$ M1

ANSWER = 6 A1

81 − 17 B1

$\frac{3}{2} \times \frac{64}{16}$ M1

CONVINCINGLY OBTAINS 6 A1

4. a) 10^{2x} OR y^2 B1

$\frac{1}{10} \times 10^x$ OR $\frac{1}{10}y$ B1

$y^2 - 10001 \times \frac{1}{10}y + 100 = 0$ OR $y^2 - \frac{10001}{10}y + 100 = 0$ M1A1

GIVES $10y^2 - 10001y + 1000 = 0$ A1 (dependent on this M1)

b) $(10y - 1)(y - 100)$ M1

$y = \frac{1}{10}$, 100 BOTH A1

$x = -1$ $x = 3$ A1 A1

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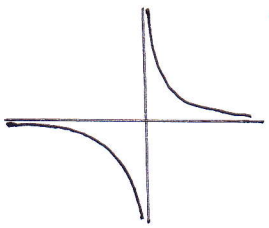
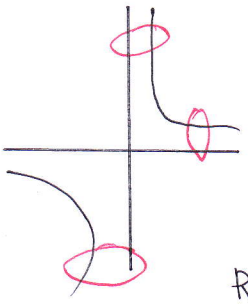
5 a) VERTICAL STRETCH OR HORIZONTAL STRETCH A1

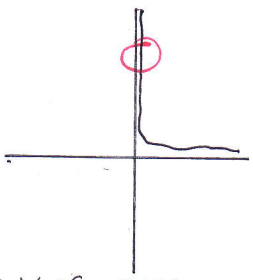
(SCALE) FACTOR 2 A1 dependent

b)



B1





RENARDE ANY OF THESE

ASYMPTOTES $x = 0$ OR y AXIS B1

$y = 0$ OR x AXIS B1

c) $k - 2x = \frac{2}{x}$ B1

$kx - 2x^2 = 2$ OR $2x^2 - kx + 2 = 0$ M1

$(-k)^2 - 4 \times 2 \times 2 = 0$ OR $k^2 - 4 \times 2 \times 2 = 0$ M1 $b^2 - 4ac$ dep

M1 $= 0$ dep

$k^2 = 16$ M1A1

$k = \pm 4$ both

6. a) $1+q = 1+p+10$ M1 BOTH LHS & RHS OF EITHER EQUATION

(OR $4+q = 4p+20$) M1 APPEARING AS AN EQUATION

$q = p+10$ MA1 BOTH EQUATIONS

$q = 4p+22$ MA1 SOLUTION

$p = -4$ A1

$q = 6$ A1

b) $A(1,7)$ A1

$B(4,10)$ A1 (IGNORE CASES)

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7. $u_{n+1} = 2^{n+1} + 4(n+1)$ B1

$(u_{n+1} =) 2 \times 2^{n} + 4n + 4$ M1

$(u_{n+1} =) 2[u_n - 4n] + 4n + 4$ M1

$u_{n+1} = 2u_n - 4n + 4$ A1

$u_1 = 6$ MUST APPEAR B1

8. $(V=)\ p^2 - 2pqt + q^2t^2$ B1

$\left(\frac{dv}{dt}=\right)\ -2pq + 2q^2t$ M1 M1

$(p-q)^2 = q$ or $q = p^2 - 2pq + q^2$ M1

$p - q = \pm 3$ A1

$-6 = -2pq + 2q^2$ M1

$(p-q)q = 3$ M1

$q = 1$ A1

$p = 4$ A1

~~$q = -1$~~ ~~$p = -4$~~ MUST APPEAL DISCARDED A1
(AT LEAST ONE OF THEM)

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9. $50 = t + (n-1)t$ M1 STRUCTURE
A1 ALL CORRECT

SOLVES FOR n M1

$n = \frac{50}{t}$ A1

"$\frac{50}{t}$" $\left[\frac{t + 50}{2}\right]$ M1 STRUCTURE
A1 ALL CORRECT

CONVINCINGLY & CORRECTLY ARRIVES AT
THE ANSWER GIVEN $25 + \frac{1250}{t}$ MA1

10. $2.5 = 4 - \frac{1}{4}(x-4)^2$ M1

$(x-4)^2 = 6$ OR $x^2 - 8x - 10$ M1

$x - 4 = \pm 6$ OR COMPLETES SQUARE AGAIN! OR QUADRATIC FORMULA M1

$4 \pm \sqrt{6}$ A1

$2\sqrt{6}$ C.A.O (ACCEPT $\sqrt{24}$) A1