

1. $\frac{2}{3}x^3$ $+ 3x^{-2}$ $+ 2x^4$ (+c) A3

COEFFICIENTS MUST BE FULLY SIMPLIFIED

2. (a) $2x - 8\sqrt{x}$ A2

(b) $\sqrt{12}$ OR $\sqrt{75}$ RESULTING FROM $\sqrt{15} \times \sqrt{5}$ M1

$5\sqrt{3}$ OR $2\sqrt{3}$ RESULTING FROM $\sqrt{75}$ OR $\sqrt{12}$ M1

$3\sqrt{3}$ A1 dep

3. $A = 20$ A1

$B = 5$ A1

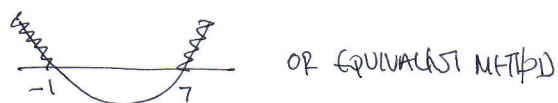
$C = -27$ A1

4. $b^2 - 4ac > 0$ OR $(m+3)^2 - 4 \times 1 \times (3m+4) < 0$ M1

$m^2 - 6m - 7 > 0$ M1

$(m+1)(m-7)$ B1

C.V. SEEN OR IMPLIED, -1 AND 7 A1



$m < -1$ OR $m > 7$ M1

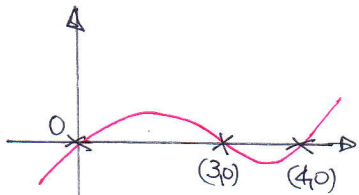
↑
ALLOW "AND"

DO NOT ALLOW ANSWER IN 2

DO NOT ACCEPT $-1 > m > 7$

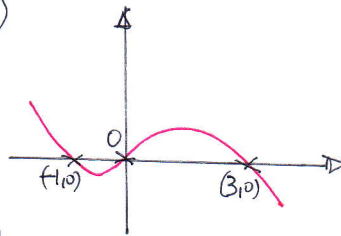
↑
A1 dep

5. (a)



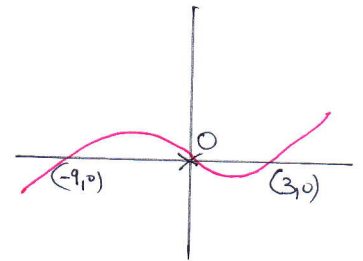
BI TWO CORRECT X INTERCEPTS
BI FIRST X INTERCEPT ALSO CORRECT

INCORRECT SHAPE B_0, B_0



BI CORRECT SHAPE (REFLECTION) IN Y
BI ALL 3 INTERCEPTS

INCORRECT SHAPE B_0, B_0



BI CORRECT SHAPE THROUGH O
BI CORRECT BOTH $(-1,0)$ & $(3,0)$

INCORRECT SHAPE B_0, B_0

6.

$$x = 3 - 2y$$

BI

$$4y^2 - (3 - 2y)^2 = 33$$

M1

OR

$$4y^2 - (9 - 12y + 4y^2) = 33$$

$$4y^2 - 9 + 12y - 4y^2 = 33 \quad \text{o.e.}$$

M1

$$12y = 42 \quad \text{o.e.}$$

M1

$$y = \frac{7}{2} \quad \text{C.A.O.}$$

A1

$$x = -4 \quad \text{C.A.O.}$$

A1

7. (a)

$$y = \frac{3}{2}x - \frac{1}{2} \quad \text{OR SKETCH OF } \frac{3}{2}$$

BI

$$\text{SKETCH OF } -\frac{2}{3}$$

BI

CORRECT USE OF

$$y - y_0 = m(x - x_0)$$

$$y + 1 = -\frac{2}{3}(x - 4)$$

M1

o.e.

$$2x + 3y = 5 \quad \text{o.e.}$$

A1

(b)

$$\text{SKETCH OF } (0, -\frac{1}{2}) \quad \text{OR } -\frac{1}{2}$$

BI

$$\text{SKETCH OF } (\frac{1}{3}, 0) \quad \text{OR } \frac{1}{3}$$

BI

$$\frac{1}{2} \times \frac{1}{3} \times \frac{1}{2} = \frac{1}{12}^* \quad \text{o.e.}$$

A1

8

$$288 = \frac{16}{2}(a+15)d \quad M1$$

$$a+15 = 36 \quad M1$$

$$a = 21 \quad A1$$

$$15 = 21 + 15d \quad M1$$

$$d = -\frac{2}{5} \quad 0.E \quad A1$$

$$21 + 10\left(-\frac{2}{5}\right) \quad 0.E \quad M1$$

$$17 \quad A1$$

ALTERNATIVE

$$15 = a + 15d \quad M1$$

$$288 = \frac{16}{2}(2a + 15d) \quad M1$$

SUBSTITUTION OR ELIMINATION
(CHECK) ATTEMPT M1

$$a = 21 \quad A1$$

$$d = -\frac{2}{5} \quad 0.E \quad A1$$

$$21 + 10\left(-\frac{2}{5}\right) \quad 0.E. \quad M1$$

$$17 \quad A1$$

9. (a)

$$a_3 = \frac{1}{2} \quad 0.E \quad A1$$

$$a_4 = 1 \quad 0.E \quad A1$$

$$a_5 = \frac{7}{5} \quad 0.E \quad A1$$

(b)

$$0 = 5 - \frac{18}{4+a_1} \quad \text{or} \quad \text{ATTEMPT TO REARRANGE FOR } a_1 \quad M1$$

$$18 = 5(4+a_1)$$

$$\text{or} \quad 18 = 20 + 5a_1 \quad M1$$

$$-\frac{2}{5} \quad A1$$

(c)

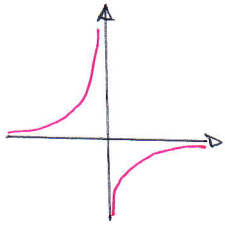
$$-\frac{2}{5} + (0) + \frac{1}{2} + 1 + \frac{7}{5} \quad 0.E$$

M1

$$\frac{5}{2} \quad 0.E$$

A1

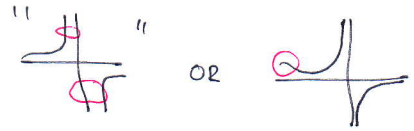
10. (a)



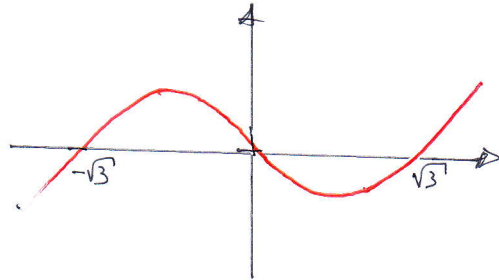
BI ANY RECIPROCAL START

BI CORRECT QUADRANTS

PENALTY (-1) FOR



(b)



BI CORRECT START
 BI THROUGH 0
 BI DEP $(\sqrt{3}, 0)$ $(-\sqrt{3}, 0)$ (BOTH)

(c) $x^3 - 3x = -\frac{2}{x}$

$x^4 - 3x^2 = -2$ OR $x^4 - 3x^2 + 2 = 0$

$(x^2 - 1)(x^2 - 2)$

$\pm 1 \pm \sqrt{2}$ C.A.O

M1

A1

M1

A1 ALL 4 CORRECT

11 (a) $(0, 3)$ seen A1

$\left(\frac{dy}{dx}\right) = 4x - 1$ BI

-1 OR 1 BI

(MUST BE IMPLIED AS GRADIENTS)

CORRECT USE OF $y - y_0 = m(x - x_0)$ OR EQUIVALENT
 $y - 3 = 1(x - 0)$ M1

$y = x + 3$ o.e. A1

(b) $2x^2 - x + 3 = x + 3$ M1

$2x(x - 1) = 0$ M1

$Q(1, 4)$ A2

(c) 3 IMPLIED AS GRADIENT BI

$y - 4 = 3(x - 1)$ o.e. M1

$y = 3x + 1$ o.e. A1

$R(0, 1)$ BI

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

AREA = \int * A1
 ← dep