

### QUESTION 7.2

(a) (i)  $x = 0$

(AI)(AI)

**Note:** Award (AI) for  $x = a$  constant, (AI) for the constant in their equation being 0.

(ii)  $-1.58$  ( $-1.58454\dots$ )

(GI)

**Note:** Accept  $-1.6$ , do not accept  $-2$  or  $-1.59$ .

(iii)  $(2.06, 4.49)$  ( $2.06020\dots, 4.49253\dots$ )

(GI)(GI) [5 marks]

**Note:** Award at most (GI)(G0) if brackets not used.  
Award (G0)(GI)(ft) if coordinates are reversed.

**Note:** Accept  $x = 2.06$ ,  $y = 4.49$ .

**Note:** Accept 2.1, do not accept 2.0 or 2. Accept 4.5, do not accept 5 or 4.50.

(b)  $f'(x) = 2x - 2 - \frac{9}{x^2}$

(AI)(AI)(AI)(AI) [4 marks]

**Notes:** Award (AI) for  $2x$ , (AI) for  $-2$ , (AI) for  $-9$ , (AI) for  $x^{-2}$ .  
Award a maximum of (AI)(AI)(AI)(A0) if there are extra terms present.

(c)  $f'(x) = \frac{x^2(2x-2)}{x^2} - \frac{9}{x^2}$

(M1)

**Note:** Award (M1) for taking the correct common denominator.

$$= \frac{(2x^3 - 2x^2)}{x^2} - \frac{9}{x^2}$$

(M1)

**Note:** Award (M1) for multiplying brackets or equivalent.

$$= \frac{2x^3 - 2x^2 - 9}{x^2}$$

(AG) [2 marks]

**Note:** The final (M1) is not awarded if the given answer is not seen.

(d)  $f'(1) = \frac{2(1)^3 - 2(1) - 9}{(1)^2}$   
 $= -9$

(M1)

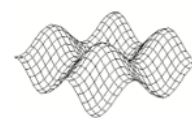
(AI)(G2) [2 marks]

**Note:** Award (M1) for substitution into **given** (or their correct)  $f'(x)$ .  
There is no follow through for use of their incorrect derivative.

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*Question 7.2 continued*

(e)  $\frac{1}{9}$  (A1)(ft) [1 mark]

**Note:** Follow through from part (d).

(f)  $y - 8 = \frac{1}{9}(x - 1)$  (M1)(M1)

**Notes:** Award (M1) for substitution of their gradient from (e), (M1) for substitution of given point. Accept all forms of straight line.

$y = \frac{1}{9}x + \frac{71}{9}$  ( $y = 0.111111...x + 7.88888...$ ) (A1)(ft)(G3) [3 marks]

**Note:** Award the final (A1)(ft) for a correctly rearranged formula of their straight line in (f).  
Accept  $0.11x$ , do not accept  $0.1x$ .  
Accept  $7.9$ , do not accept  $7.88$ . do not accept  $7.8$ .

(g)  $-2.50, 3.61$  ( $-2.49545..., 3.60656...$ ) (A1)(ft)(A1)(ft) [2 marks]

**Notes:** Follow through from their line  $L$  from part (f) even if no working shown.  
Award at most (A0)(A1) (ft) if their correct coordinate pairs given.

**Note:** Accept  $-2.5$ , do not accept  $-2.49$ . Accept  $3.6$ , do not accept  $3.60$ .

**Total [19 marks]**