QUESTION 7.2

(a) (i) $x = 0$ ***(A1)(A1)***

Note: Award ***(A1)*** for $x =$ a constant, ***(A1)*** for the constant in their equation being 0.

(ii) -1.58 $(-1.58454...)$ ***(G1)***

Note: Accept –1.6, do not accept –2 or –1.59.

(iii) $(2.06, 4.49)$ $(2.06020..., 4.49253...)$ ***(G1)(G1)*** ***[5 marks]***

Note: Award at most ***(G1)(G0)*** if brackets not used.
Award ***(G0)(G1)*(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) $f'(x) = 2x - 2 - \frac{9}{x^2}$ ***(A1)(A1)(A1)(A1)*** ***[4 marks]***

Notes: Award ***(A1)*** for $2x$, ***(A1)*** for –2, ***(A1)*** for –9, ***(A1)*** for x^{-2}.
Award a maximum of ***(A1)(A1)(A1)(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) $f'(1) = \frac{2(1)^3 - 2(1) - 9}{(1)^2}$ ***(M1)***

$= -9$ ***(A1)(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.

continued…

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]***