MEMORANDUM

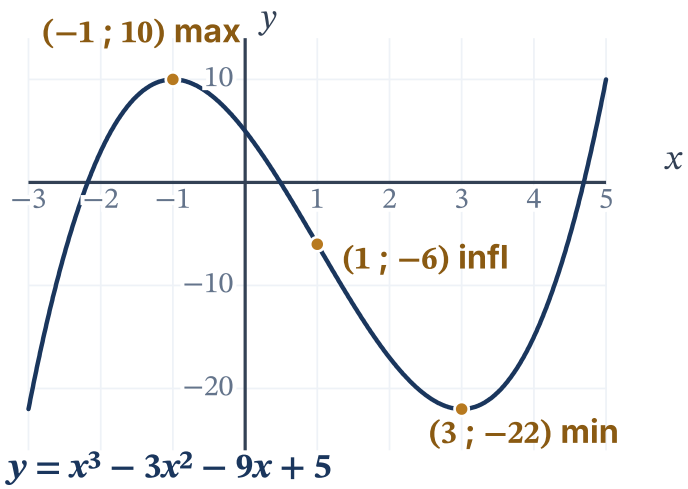
Name: ..... Class: .....

Date: .....

MARK ____ / 18

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 Determine the y-intercept of $f(x) = x^3 - 3x^2 - 9x + 5$. (1)



$f(0) = \mathbf{5}$ ✓ (1)

2 Determine the coordinates of the stationary points of $f(x) = x^3 - 3x^2 - 9x + 5$. (4)

$f'(x) = 3(x - 3)(x + 1) = 0 \rightarrow$ **(−1 ; 10) and (3 ; −22)** ✓✓✓ (4)

3 State, with a reason, which stationary point is the local maximum. (2)

(−1 ; 10), because $f''(-1) = -12 < 0$ (concave down). ✓✓ (2)

4 Determine the coordinates of the point of inflection. (3)

$f''(x) = 6x - 6 = 0 \rightarrow x = 1 \rightarrow$ **(1 ; −6)** ✓✓✓ (3)

5 For which values of x is f decreasing? (2)

$\mathbf{-1 < x < 3}$ ✓✓ (2)

6 For which values of x is f concave up? (2)

$f''(x) > 0 \rightarrow \mathbf{x > 1}$ ✓✓ (2)

7 Where does the point of inflection of a cubic always lie relative to the turning points? **(1)**

> Exactly **midway between them.** ✓ (1)

8 Determine the stationary points of $g(x) = x^3 - 12x$. **(3)**

> $g' = 3x^2 - 12 = 0 \rightarrow x = \pm 2 \rightarrow$ **(2 ; −16) and (−2 ; 16)** ✓✓✓ (3)

TOTAL: 18 marks

© Danemathics — free to print and share for classroom use.