

NAME: \_\_\_\_\_

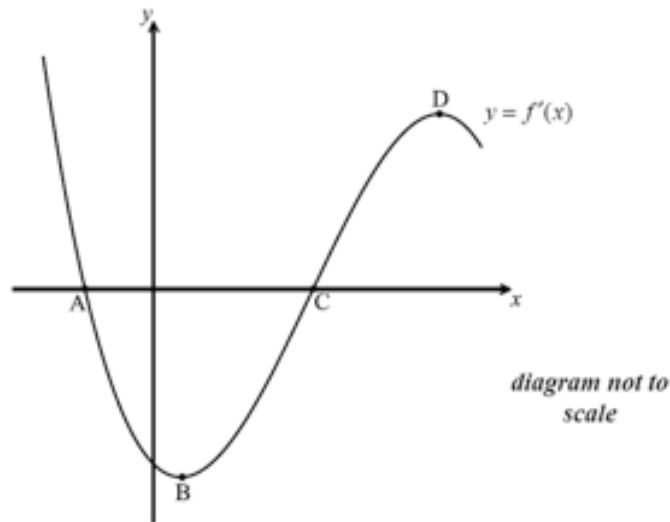
DATE: 10/24/2017

**ASSIGNMENT: Points of Inflection with Minima and Maxima**

**DIRECTIONS:** When  $f'(x) = 0$ , the tangent is horizontal. When  $f''(x) = 0$ , there is a point of inflexion (sic).

[Maximum mark: 7]

The diagram shows part of the graph of  $y = f'(x)$ . The  $x$  – intercepts are at points A and C. There is a minimum at B and a maximum at D.



- Write down the value of  $f''(x)$  at B. [1 marks]
- Write down the range values between A and D for which  $f''(x)$  is decreasing. [1 marks]
- Which points A, B, or D corresponds to a maximum on the graph of  $f(x)$ ? [1 marks]
- Explain why D corresponds to a point of inflexion on the graph of  $f(x)$ . [1 marks]
- On the same graph above, draw the sketch of  $f(x)$ . [3 marks]

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2.) A graph of the derivative of  $f(x)$  is given on the interval  $(-5, 15)$  showing zeroes at  $-3, 4$  and  $12$ , maxima at  $1$  and  $12$  and a minimum at  $8$ , the largest absolute value of the function occurring at  $1$ .

- (a) Write down the  $x$ -value of any local maximum or minimum of  $f$ .
- (b) Write down the  $x$ -value of any points of inflection on the graph of  $f$ .
- (c) Write down the intervals where the graph of  $f$  will be concave up.

[Maximum mark: 9]

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3.) Given  $f(x) = \frac{4x}{e^x}$ , determine  $f''(x)$ . [3 marks]

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4.) For the function,  $f(x) = x^4 - 2x^3 + 5x - 1$ , **find** the points of inflection and **explain** whether  $x = 2$  lies in the region of the curve that is concave up or concave down.

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