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|  | Unit 3  Semester 1 2019  Mathematics Methods Test 1  **Applications of differentiation**  **Name** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    **Total time allowed: 55 minutes. Total marks: 57 marks**  **Section One: Calculator-free**  Time allowed for this section: 31minutes  Total marks for this section: 31 marks  **Materials allowed for this section:**  SCSA Formula Sheet (provided)  **Instructions to candidates**  Show all of your working clearly. Your working should be in sufficient detail to allow your answers to be checked readily and for marks to be awarded for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks. If you repeat any question, ensure that you cancel the answer you do not wish to have marked. |

1. [ 3, 3, 3, 3 = 12 marks]

Differentiate the following with respect to x. Do not simplify. (Except to change all negative indices to positive)



2. [4 marks]

Find the gradient of the curve at the point where

3. [10 marks]

Locate and identify any stationary points and any points of inflection for the function .

Using any additional information sketch the function on the given axes.



4. [2, 3 = 5 marks]

The displacement of a body x metres from an origin at time t seconds is given by x =  Find

(a) the initial velocity of the body

(b) The acceleration of the body when its velocity is zero.