

## MTH 1125 - Test #2

SUMMER 2018

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Name \_\_\_\_\_

### Instructions:

Show CLEARLY how you arrive at your answers.

1. Compute:  $\frac{d}{dx} [\tan(5x^3 + 8x^2)] =$

2. Suppose that  $x = \cos(t)$  and that  $t = y^2 - 2y + 3$ . Compute  $\frac{dx}{dy}$  using the Leibniz form of the Chain Rule.

3. Compute:  $\frac{d}{dx} [(5x^6 + 7x^4 + 13x^2)^{15}] =$

4. Compute:  $\int (5x^4 - 6x^2 + 4x + 5 + 3\sqrt{x}) dx =$

5. Given that  $8x^2 + 2x^3y^2 = 5y^3$ ; Compute  $y'$

6.  $f(x) = x^3 - 9x^2 + 24x + 2$

- i) Determine the intervals on which  $f(x)$  is increasing/decreasing
- ii) Identify all relative maximums and minimums

7.  $f(x) = 3x^{\frac{8}{3}} - 8x$

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8.  $f(x) = 2x^3 - 15x^2 + 36x + 6$  on the interval  $[-2, 3]$ . Find the absolute maximum and absolute minimum values.

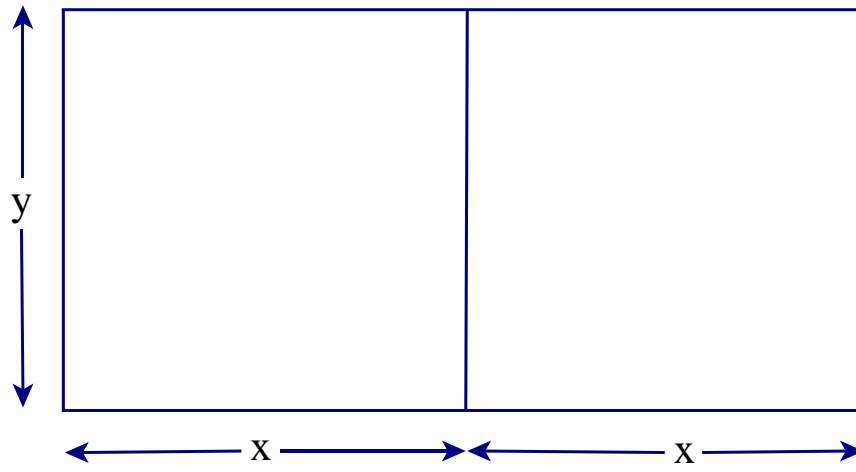
9. Compute:  $\int (4x^3 + 3x^2)^{10} (12x^2 + 6x) dx =$

10.  $f(x) = x^4 - 12x^3 + 48x^2 + 6x + 6 =$

i) Determine the intervals on which  $f(x)$  is concave up/concave down

ii) Identify all points of inflection

11. Farmer Joe has 900 ft of fence. He will use the fence to construct a rectangular pen. He will use some of the fence to partition the pen into two smaller pens of equal area and similar shape. What should the dimensions of the pen be so that the overall enclosed area is as large as possible?





12.  $f = \begin{cases} x^2 & \text{for } x < 2 \\ 4 & \text{for } x = 2 \\ \frac{x^2 - 2x}{x - 2} & \text{for } x > 2 \end{cases}$  Determine whether the function  $f(x)$  is continuous at the point  $x = 2$