MTH 1125 - Test #2

SUMMER 2015

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Instructions:

Show CLEARLY how you arrive at your answers.

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

2. Suppose that $x=\sin(t)$ and that $t=8y^4$. Compute $\frac{dx}{dy}$ **using the Liebniz form** of the Chain Rule.

3. Compute: $\frac{d}{dx}\left[\left(4x^6+6x^4+24x\right)^{15}\right]=$

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

5. Given that $x^4+3x^3y^3=2y^2$; Compute y'

6. $f(x) = x^3 + 3x^2 - 9x + 4$

i) Determine the intervals on which $f(x)$ is increasing/decreasing

ii) Identify all relative maximums and minimums

7. $f(x) = 3x^{\frac{2}{3}} - 2x$

i) Determine the intervals on which $f(x)$ is increasing/decreasing

ii) Identify all relative maximums and minimums

8. $f(x) = x^3 + 3x^2 - 24x + 6$ on the interval $[-3, 3]$. Find the absolute maximum and absolute minimum values.

9. Compute: $\int \left(8x^3 + 6x^2\right)^{10} \left(2x^2 + x\right) dx =$

10. $f(x) = x^4 + 2x^3 - 36x^2 + 12x + 12$

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

ii) Identify all points of inflection

11. A rectangle is inscribed within triangle AOB, such that:

i) The base of the rectangle rests on the positive x-axis

ii) One side of the rectangle borders the positive y-axis

iii) The vertex of the rectangle that is opposite the origin lies on the graph of $y = -\frac{1}{2}x + 4$

What should the value of x be so that the inscribed rectangle has the largest area possible?