

MATH 122 WORKSHEET 8

Show all work for full credit.

1. Find the derivative $f'(x)$.

$$f(x) = (x2^x + e^{x^2})^5$$

2. Find the derivative $f'(x)$.

$$f(x) = \frac{3^x(x^7 - x)}{(x^8 + 7x^2 - 5)}$$

3. Find the derivative $f'(x)$.

$$f(x) = \left(\frac{5x^3 - 7}{x^2 - x - 2} \right) \ln(6x^4 - 2x)$$

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4. Find where the function is increasing, decreasing, concave up, and concave down. Give your answers in interval notation.

$$f(x) = \frac{1}{4}x^4 - \frac{2}{3}x^3 - 2x^2 + 8x - 1$$

5. Identify the critical points of $f(x)$. Use the first derivative test to identify each as the location of a local maximum, local minimum, or neither.

$$f(x) = x^4 - 18x^2 + 17$$

6. Determine the global maximum and global minimum of $f(x)$ over the given interval.

$$f(x) = 3x^4 - 16x^3 + 18x^2 + 15 \quad \text{over } [-1, 4]$$