

Name: _____

1. Compute the following derivatives.

(a) $\frac{d}{dx} \left(\sqrt{2x^2 - 5x + 9} \right)$

(b) $\frac{d}{dx} \left(\frac{x^2 e^{5x} - 1}{2 \cos(x)} \right)$

(c) $\frac{d}{d\theta} (\sec \theta - \tan \theta)^{3/2}$

(d) $\frac{d}{dt} \left(\frac{\arcsin(t^2)}{1-t} \right)$

2. What is the 509th derivative of $x^{250} + x$? Explain your answer.
3. How can I determine the 50th derivative of $\cos(x)$? What about $\sin(x)$? Explain your answer.
4. Squirrel (the cat) is running throughout the halls of LeConte. Her position (with respect to time t) is given by the following equation:

$$f(t) = e^{\cos(t)}$$

During the first six seconds that she begins running, when (if ever) is her velocity zero?



5. At the point where $x = -1$, the tangent to the graph of $y = ax^3 + bx^2 - x + b$ has the equation $y = -x + 1$. Find the value of a and the value of b .