

Name _____

No calculators allowed!

1. (6 points) Find derivatives of each of the following functions.

(a) $f(t) = 10t^4 - 5t^3 + 12t - 83$

(b) $g(x) = 6 \ln(x) - 5e^x + 4^x$

(c) $y = \frac{5}{x^3} + \frac{2}{3\sqrt{x}}$

2. (2 points) Find the equation of the line tangent to the graph of $f(x) = x^3 - 3$ at $x = 2$.

3. (2 points) The Red-Cockaded Woodpecker is a bird which was put on the endangered species list in 1970. Suppose that the population of these birds is approximated by $f(t) = 10000e^{-0.01t}$, where t is measured in years since 1970. You will need to use the fact that $e^{-0.35} \approx 0.7046880897$.

(a) Approximately how many of these woodpeckers were living in the year 1970?

(b) Approximately how many of these woodpeckers are living today, 35 years later?

(c) How quickly is the population changing today?