

Name: _____

Directions: Show all work. No credit for answers without work.

1. **[6 parts; 0.5 points each]** Find the derivative of the given functions. *In this question, you do not need to show your work.*

(a) $y = x^5$

(d) $f(r) = 3r^{\sqrt{2}}$

(b) $f(x) = x^2 + \frac{1}{x^3}$

(e) $y = 5^t + 2e^{3t} + e^2$

(c) $y = \sqrt{t}(t+1)$

(f) $g(s) = \ln(s) - e^s$

2. **[1 point]** Find the equation of the line tangent to the curve $f(x) = x^2 + \ln(x)$ at $x = 3$.

3. [4 parts; 1.5 points each] Find the derivative of the given functions.

(a) $f(t) = (t^3 + t)^{61}$

(c) $f(p) = 2^p \cdot \ln(3p + 4)$

(b) $f(x) = \ln(1 + e^{x^2})$

(d) $f(x) = \frac{x^2 + 1}{2x - 1}$