Name: _____ _____ **/ 20**

There are 20 points possible on this quiz. No aids (book, calculator, etc.) are permitted. Show all work for full credit.

1. [10 points] For each function below, find its derivative. You do not need to simplify your answer.

a. $y = 2x^{3/4} + \pi^2$

b. $f(x) = \dfrac{1}{2x^2} - x^e$

c. $g(t) = e^t(\sqrt{t} + 2t)$

d. $y = \dfrac{2-3x}{e^x + x}$

e. $h(x) = \dfrac{2}{1+x^2}$

2. [5 points] The radius of a balloon being inflated is described by the function

$$r(t) = 2 + 5t^{\frac{1}{3}}$$

where r is measured in centimeters and t in seconds.

a. What is the radius of the balloon at time $t = 1$? Include **units** in your answer.

b. What is the rate of change of the radius at time $t = 1$? Include **units** in your answer.

3. [5 points] Find the equation of the tangent line to the curve $\quad y = \dfrac{3}{x} + 6 \quad$ at $\quad x = -2.$