MATH 101 QUIZ 3

1. Find the value c such that the line $y = cx + 3$ is tangent to the curve $y = 2\sqrt{x}$.

2. Differentiate the following functions.
   (1) $y = \frac{t^2 e^{-t}}{1+t}$.
   (2) $y = \sqrt{\frac{x}{2x+1}}$.

3. Evaluate
$$\lim_{x \to 0} \frac{\sin 2x \tan 5x}{x^2}.$$

4. Let $f(x) = g(x^2 g(x^2))$. Suppose that $g(1) = 1$ and $g'(1) = 3$. Find $f'(1)$.