

Name: **KEY**

Do the following problems. Show your work for full credit.

1. (5 points) Find y' for the function

$$y = \tan^5(3x).$$

$$\text{Now } y = (\tan(3x))^5.$$

$$\text{So } y' = 5(\tan(3x))^4(\tan(3x))'$$

$$= 5(\tan(3x))^4 \sec^2(3x)(3x)'$$

$$= 5(\tan(3x))^4 \sec^2(3x)(3)$$

$$= 15 \tan^4(3x) \sec^2(3x)$$

2. (5 points) Find an equation for the tangent line to

$$y = (1 + x)^6 \quad \text{at the point } (1, 64).$$

An equation for the tangent line is

$$y - 64 = y'(1)(x - 1).$$

$$\text{Now } y' = 6(1 + x)^5(x + 1)'$$

$$= 6(1 + x)^5(1) = 6(1 + x)^5.$$

Thus, $y' = 6(1 + x)^5$ and $y'(1) = 6(1 + 1)^5 = 6(2^5) = 6(32) = 192$. From $y - 64 = y'(1)(x - 1)$ with $y'(1) = 192$, we have

$y - 64 = 192(x - 1)$. So, $y - 64 = 192x - 192$. Hence $192x - y = 128$ is the required equation.