

Name:

Math 115 Exam 2

October 22, 2013

1) Calculate f' for the following functions.

a) (6 points) $f(x) = x^9 \sin(x)$.

b) (8 points) $f(x) = \tan(13x^2 + 1)$.

2) If $\cos(x^3y) + y = 1$, find the equation of the tangent line to the graph at the point $(\pi, 0)$.

3) Sasquatch has been spotted in the wild by a team of Bigfoot hunters (they can't tell the difference). From a deer tower 20 feet in the air, they shine a spotlight onto Sasquatch, who immediately begins to run in the opposite direction from the light. Sasquatch is 8 feet tall and runs at a rate of 45 feet per second.

a) (2 points) If the searchlight is 23 feet from Sasquatch initially, how far away from the searchlight is he after 3 seconds?

b) (8 points) The spotlight throws Sasquatch's shadow in front of him. Draw a picture representing the scenario, labeling your variables.

c) (12 points) How fast is Sasquatch's shadow lengthening 3 seconds after he was spotted?

4) Evaluate the following limits.

a) (8 points) $\lim_{\theta \rightarrow 0} \frac{\sin(7\theta^2)}{11\theta^2}$

b) (10 points) $\lim_{x \rightarrow 28} \frac{\sqrt[3]{x-1} - 3}{x-28}$