

Math 124 Quiz #7
November 12, 2008

Name: _____

Show all work.

1. (5 pts.) Differentiate the following. You do not need to simplify your answers.

(a) (3 pts.) $f(t) = \ln(t \cdot e^t) + 3 \arctan(4t)$

(b) (2 pts.) $y = x^{\sin x}$

2. (5 pts.) The position of an African swallow carrying a coconut (gripping it by the husk) is given by

$$s = t^3 - 6t^2 + 9t \quad \text{in feet at } t \text{ seconds for } t \geq 0.$$

(a) (2 pts.) What is the **speed** of the swallow at 2 seconds? (Include **units** in your answer.)

(b) (3 pts.) When is the swallow at rest? When is the swallow moving in the positive direction?

Note: Here are **some** derivative rules.

$$\frac{d}{dx}[\arcsin x] = \frac{1}{\sqrt{1-x^2}} \quad \frac{d}{dx}[\arctan x] = \frac{1}{1+x^2} \quad \frac{d}{dx}[\operatorname{arcsec} x] = \frac{1}{x\sqrt{x^2-1}} \quad \frac{d}{dx}[\log_a x] = \frac{1}{x \ln a} \quad \frac{d}{dx}[\ln x] = \frac{1}{x}$$