

Name: _____ / 25

Please circle your instructor's name: Leah Berman Jill Faudree James Gossell

There are 25 points possible on this quiz. Any outside materials (textbook, course notes, calculator) are not allowed. **For full credit, show all work in a way someone else can follow it.**

1. (12 points) Compute the derivatives of the following functions:

(a) $f(x) = \frac{x + \arcsin(3x)}{5}$

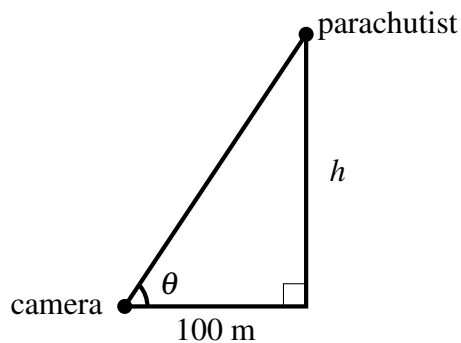
(b) $g(x) = 5^{2x} - 3x^2$

(c) $y = e^{-x} \sin(x^2)$

(d) $s(t) = \ln\left(\sqrt{t^2 + t}\right)$

2. (6 points) Use implicit differentiation to find $\frac{dy}{dx}$ for $x + \cos(xy) = y^2 + x^2$.

3. (7 points) A camera at ground level is 100 meters from the landing site of a parachutist who is landing vertically. Let h be the height of the parachutist above the ground and let θ be the angle of elevation formed between the camera lens and the ground. (See figure.)



- (a) Find an equation relating h and θ and solve it for θ .

- (b) Find $\frac{d\theta}{dh}$. (Your answer should use part (a) and should be in terms of h .)

- (c) What are the **units** of $\frac{d\theta}{dh}$?