MATH 2554 **Calculus I** **Fall 2019**

Drill Handout Sections 3.5 and 3.6 October 3, 2019 Name:_____

(1) Evaluate the following limits:

$$\lim_{x\to 0}\frac{\sin 2x}{\tan 6x} \text{ and } \lim_{x\to 0}\frac{1-\cos^2 x}{x}$$

(2) Find the derivatives of the following functions:

$$g(x)=\frac{\sec x}{1+\tan x} \text{ and } h(x)=\csc^2 x$$

(3) Find the second derivative of $f(x)=e^x\sin x$.

(4) A stone is thrown vertically upward from the edge of a cliff on Earth with an initial velocity of 16 ft/s from a height of 32 ft above the ground. The height (in feet) of the stone above the ground t seconds after it is thrown is $s(t)=-16t^2+16t+32$.

(a) Determine the velocity v of the stone after t seconds.

(b) When does the stone reach its highest point?

(c) What is the height of the stone at the highest point?

(d) When does the stone strike the ground?

(e) On what intervals is the speed increasing?