**Grade this Quiz**   Name: _____

A student was asked to find the derivative of the following functions. Mark each answer as correct or incorrect. If the answer is wrong, explain to the student both what their error was and how to do the problem correctly. At the top of a page, give the total score out of 10.

1. Determine if the following statement is true or false. Provide an explanation by providing justification.

   If a function f is continuous, then the function is differentiable.

   False
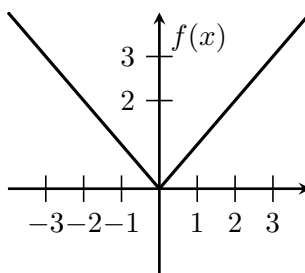
2. $g(x) = x^2 \sin(x)$

$$g'(x) = 2x \cos(x)$$

3. $h(t) = \tan^2(t)$

$$h'(t) = 2 \tan(t) \cdot \sec^2(t)$$

4. $m(x) = \tan(x^2)$

$$m'(x) = 2 \tan(x) \sec^2(x)$$

5. $n(x) = e^{\sec(x)}$

$$n'(x) = e^{\sec(x) \tan(x)}$$

1

6. $s(t) = \dfrac{\pi^3 - 4te^t}{t^2 + 1}$

$$s'(t) = \frac{(3\pi^2 - 4e^t)(t^2 + 1) - (\pi^3 - 4te^t)(2t)}{t^2 + 1}$$
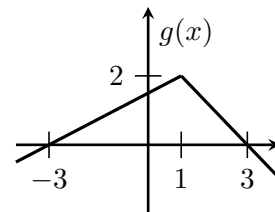
7. $p(q) = 2^q$

$$p'(q) = q \cdot 2^{q-1}$$

8. $l(x) = \sqrt{\cos(x^3)}$

$$l'(x) = \frac{1}{2\sqrt{\cos(x^3)}} \cdot 3x^2$$

9. $h(x)f(g(x))$

$$(h(x) \cdot f(g(x)))' = h'(x) \cdot f(g(x)) + h(x) \cdot f'(g(x)) \cdot (g'(x))$$

10. Find $h'(2)$. Assume $f(1) = 2, f(2) = 0, f'(1) = 3, f'(2) = 4$. $g(x)$ is given by the graph to the right.

(a) $h(x) = f(x)g(x)$

$$h'(2) = f'(2) \cdot g(2) + f(2) \cdot g'(2) = 4 \cdot 1 + 0 \cdot -1 = 4$$

(b) $h(x) = g(f(x))$

$$h'(2) = g'(2) \cdot f'(2) = -1 \cdot 4 = -4$$