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# MATH 122: GRADE THIS QUIZ (DERIVATIVES)

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 the page, give the total score out of 10.

1.  $f(x) = x^3 + 7x^2 - 3 + \sqrt{x}$

1

$$f'(x) = 3x^2 + 14x + 1 + \frac{1}{2}x$$

$$(-3)' = 0$$

$$(x^{1/2})' = \frac{1}{2}x^{-1/2}$$

2.  $g(x) = x^2 \ln(x)$

0

$$g'(x) = 2x \cdot \frac{1}{x} = 2$$

Product Rule!

$$2x \ln x + x^2 \cdot \frac{1}{x} = 2x \ln x + x$$

3.  $h(x) = e^{-x^2}$

2

$$h'(x) = -2x e^{-x^2}$$

4.  $p(x) = 2^x$

0

$$p'(x) = x 2^{x-1}$$

Power Rule does not apply when the variable is in the exponent

$$p'(x) = \ln(2) 2^x$$

5.  $q(x) = \sqrt{x^2 + \ln(3x+1)}$

1

$$q'(x) = \frac{1}{2} (x^2 + \ln(3x+1))^{-1/2} \cdot (2x + \frac{3}{3x+1})$$

$$(\ln(3x+1))' = \frac{1}{3x+1} \cdot 3$$

$$= \frac{3}{3x+1}$$