

Name:

Test 2 – Math 50 – Spring 2010 – Jason Grout

Write the best answer to each question in the box provided. For multiple choice and true/false questions, put your answer in the blank next to the question number. Show your work.

1. Fill in each box with the correct answer. (1pt each)

$$D_x(x^n) = \boxed{}$$

$$D_x(\sin x) = \boxed{}$$

$$D_x(a^x) = \boxed{}$$

$$D_x(\cos x) = \boxed{}$$

$$D_x(e^x) = \boxed{}$$

$$D_x(\tan x) = \boxed{}$$

$$D_x(\ln |x|) = \boxed{}$$

$$D_x(\cot x) = \boxed{}$$

$$D_x(\sec x) = \boxed{}$$

$$D_x(\csc x) = \boxed{}$$

2. True/False: Write “True” if the statement is true or “False” if the statement is false. (5pts each)

(a) _____ A function that is differentiable must be continuous and a function that is continuous must be differentiable.

(b) _____ The function $f(x) = |x|$ is differentiable everywhere.

3. Find each derivative with respect to x . Write your answers in the boxes provided.
(6pts each)

(a) $\sqrt[3]{x} \cos x$

(b) $\frac{x^2 + 1}{\ln x}$

(c) $3^{\sin x}$

(d) $\sqrt{1 + e^{5x}}$

(e) $f(x) = (\tan x)^{x^2}$

4. (6pts) Suppose $y + e^y = x^2$. Calculate $\frac{dy}{dx}$. Hint: your answer can contain both y and x variables.

5. (6pts) Calculate the equation of the tangent line to the function $f(x) = \ln(8x^2)$ at $x = -1$.

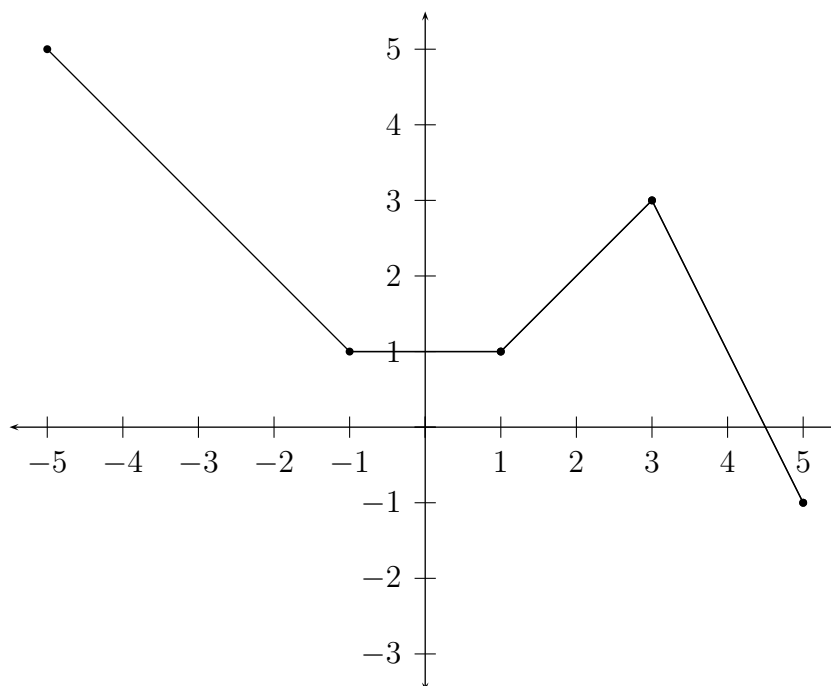
6. Answer the following:

(a) (4pts) State the definition of the derivative of $f(x)$.

(b) (6pts) Use the definition of the derivative to calculate the derivative of

$$f(x) = x^2 - 3.$$

7. (6pts) The graph of $f(x)$ is shown below. Sketch on the same axes the graph of the derivative of $f(x)$.



8. (6pts) The radius of a circle is increasing at the rate of 2 feet per minute. Find the rate of change of the area when the radius is 3 feet. Include units in your answer.