_____ / 30 total points

Test #3

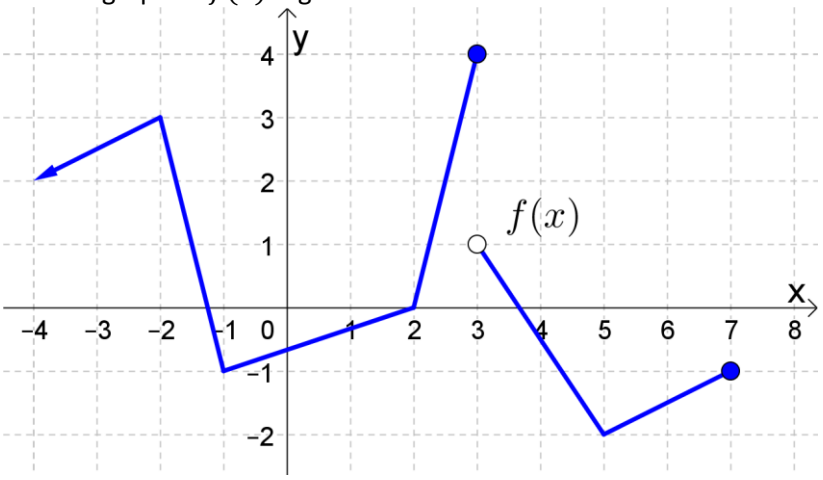
Name: _____

Math 18, Prof. Beydler

Monday, November 19, 2018

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. Good luck!

1. The graph of $f(x)$ is given below.



a) (1 point) Determine the intervals of x on which $f(x)$ is increasing, decreasing, and constant. If none, write "none".

Increasing: _____

Decreasing: _____

Constant: _____

b) (1 point) Find all local maxima and minima (write answers in the form $f(123) = 456$).

Local maxima: _____

Local minima: _____

c) (1 point) Find the absolute maximum and absolute minimum of $f(x)$ (write answers in the form $f(123) = 456$). If none, write "none".

Absolute maxima: _____

Absolute minima: _____

2. (3 points) Solve the following inequality.

$\frac{x+3}{2x^2-x-3} \leq 0$

Answer: _____

3. Find all x-values where $f(x) = 0$ or $f(x)$ is undefined. If none, write "none".

a) (3 points) $f(x) = 2 - e^{-x}$

$f(x) = 0$: _____

$f(x)$ is undefined: _____

b) (3 points) $f(x) = \ln(x^2 - 9)$

$f(x) = 0$: _____

$f(x)$ is undefined: _____

c) (3 points) $f(x) = 2x^{1/3} + 4x^{-2/3}$

$f(x) = 0$: _____

$f(x)$ is undefined: _____

4. Solve the following equations.
   a) (3 points) $x - 3x \ln x = 0$

Answer: _____

b) (3 points) $5 - \frac{3}{x} - \frac{2}{x^2} = 0$

Answer: _____

5. (3 points) Simplify the left side of the equation and then solve.

$$\frac{x^3 \cdot \frac{1}{2}(x+2)^{-1/2} - 3x^2(x+2)^{1/2}}{x+2} = 0$$

Answer: _____

6. (3 points) Find the distance from the point $(2, 0)$ to the ellipse $x^2 + \frac{y^2}{4} = 1$ as a function of x only. Be sure to simplify your function.

Distance as a function of x: _____

7. (3 points) A right circular cylinder is inscribed in a cone with height 6 and base radius 3. Find a single-variable function that models the volume of the cylinder.

Volume of cylinder: _____