Math 18 - Test #3 Info and Review Exercises

Fall 2018, Prof. Beydler

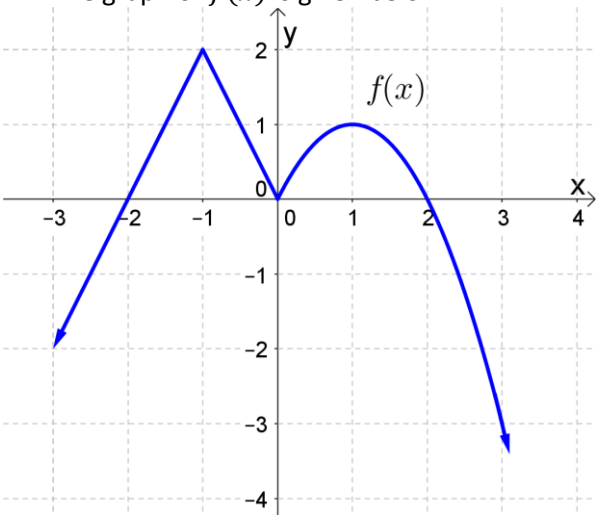
Test Info

- Date: Monday, November 19, 2018
- Will cover worksheets H through J.
- You'll have 1 hour to finish the test.
- For this test, you'll need a **scientific calculator**.
- No notes, no books, no phones, no smart watches during the test.
- There will be a seating chart for the test.
- Where to get help as you're studying:
    - Office hours
    - TMARC, LAC, or other tutoring centers
    - E-mail me at dbeydler@mtsac.edu

Review Exercises

Note: If you write up the answers to all of the review exercises listed below, and hand them in at the test, you can earn up to 2% extra credit towards your test (depending on neatness and completeness)! It is important to understand that these review exercises are not guaranteed to cover all of the potential problems on the test. Please review the worksheets to fully prepare for the test.

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



a) Determine the intervals of x on which $f(x)$ is increasing, decreasing, and constant (if any).

Increasing: _____

Decreasing: _____

Constant: _____

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

Local maxima: _____

Local minima: _____

c) Find the absolute maximum and absolute minimum of $f(x)$, if any (write answers in the form $f(123) = 456$).

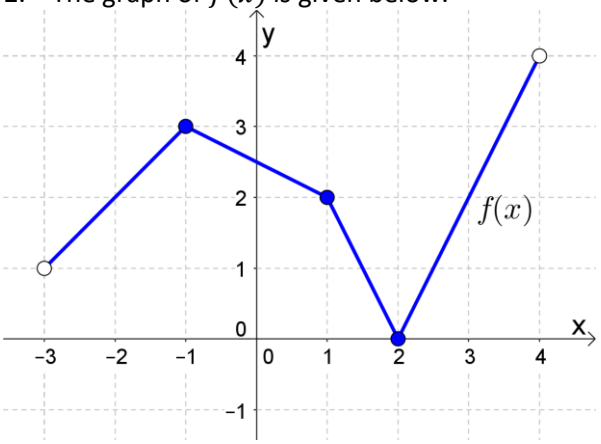
Absolute maxima: _____

Absolute minima: _____

d) Find the values of x for which $f(x) = 0$.

$x =$ _____

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



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Local maxima: _____

Local minima: _____

c) Find the absolute maximum and absolute minimum of $f(x)$, if any (write answers in the form $f(123) = 456$).

Absolute maxima: _____

Absolute minima: _____

d) Find the values of x for which $f(x) = 2$.

$x =$ _____

e) Find the domain of $f(x)$.

Domain: _____

f) Find the range of $f(x)$.

Range: _____

3. Solve the following inequality.

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

4. Solve the following inequality.

$\frac{x^3+x}{(x-2)^2} < 0$

5. Find all x-values where $f(x) = 0$ or $f(x)$ is undefined.
   a) $f(x) = e^{-3x} - 2$

b) $f(x) = \ln(x^2 - 4)$

c) $f(x) = 2x^2e^{-x} + xe^{-x} - 3e^{-x}$

d) $f(x) = \frac{3x^2-x}{(x^2+1)(2x+1)}$

e) $f(x) = 3x^{2/3} - 6x^{-1/3}$

f) $f(x) = \sqrt{x^2 - x - 6}$

6. Solve the following equations.
   a) $3x + 2x \ln x = 0$

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

c) $x^{-2/3} - 4x^{-8/3} = 0$

7. Simplify the left side of the equation and then solve.

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

b) $\frac{(x+1)^3(4)-3(x+1)^2(4x-3)}{(x+1)^4} = 0$

8. A rectangle is inscribed in a semicircle of radius r. Find a function that models the area of the rectangle in terms of its height y and the radius r of the semicircle.

9. Find the distance from the point $(3, 1)$ to the parabola $f(x) = 2 - x^2$ as a function of x only. Be sure to simplify your function.

10. A right circular cylinder is inscribed in a cone with height 4 and base radius 3. Find a single-variable function that models the surface area of the cylinder.

11. A 5000-square-foot rectangular plot of land is going to be divided into three equal-sized, adjacent playgrounds (see diagram). Find the number of feet of fencing required as a function of x. (Note: there is only one fence between the playgrounds, not two.)