Test #1 (Part 1, No Calculator)

Name: _____

Math 160, Prof. Beydler

Thursday, September 27, 2018

Directions: Show all work. No calculator, books, or notes. 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. When you're finished with Part 1, please turn it in, take a bathroom break, get your calculator out, and start Part 2. Good luck!

1. (3 points) Suppose $f(x) = \sqrt{2x+1}$. Find $\frac{f(x+h)-f(x)}{h}$ and simplify by canceling the factor of h.
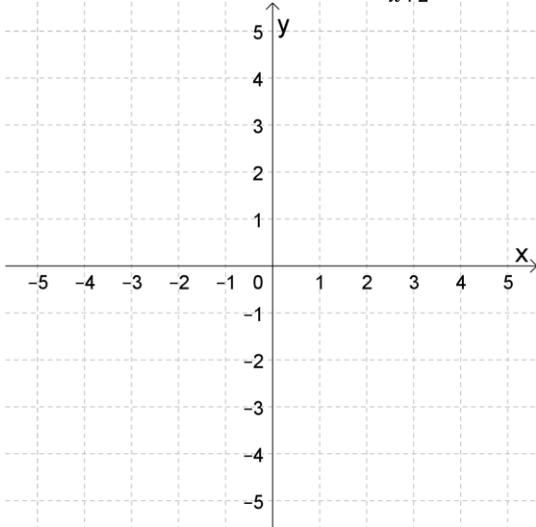
Answer: $\frac{f(x+h)-f(x)}{h} =$ _____

2. (1 point) Find the domain of $f(x) = \frac{\sqrt{x-2}}{x-3}$.
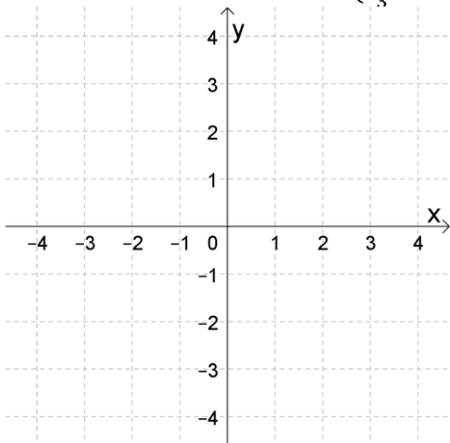
Answer: _____

3. (1 point) Determine whether $f(x) = x^3 + 2x$ is even, odd, or neither. Be sure to show how you got your answer by the definition of even/odd.

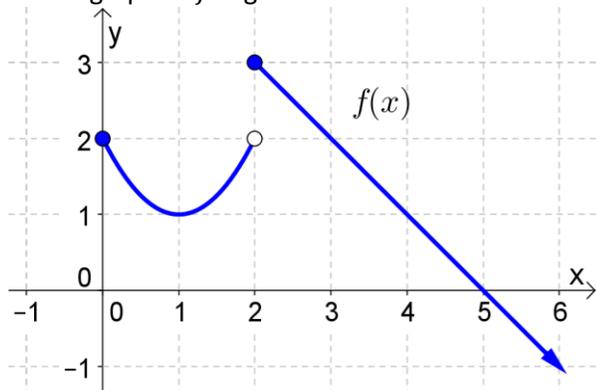Circle one: even   odd   neither

4. (2 points) Graph $f(x) = 2 - \frac{1}{x+2}$. Be sure to describe the transformations to the basic function.

5. (3 points) Graph $g(x) = \begin{cases} \sqrt{-x} + 2 & \text{if } x < 0 \\ 3 & \text{if } x = 0 \\ \frac{1}{3}x + 1 & \text{if } x > 0 \end{cases}$

6. The graph of f is given below.

a) (2 points) Determine the intervals on which f is increasing and decreasing.

Increasing: _____

Decreasing: _____

b) (2 points) Find all local maxima and minima. Write your answers in the form $f(123) = 456$.

Local maxima: _____

Local minima: _____

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

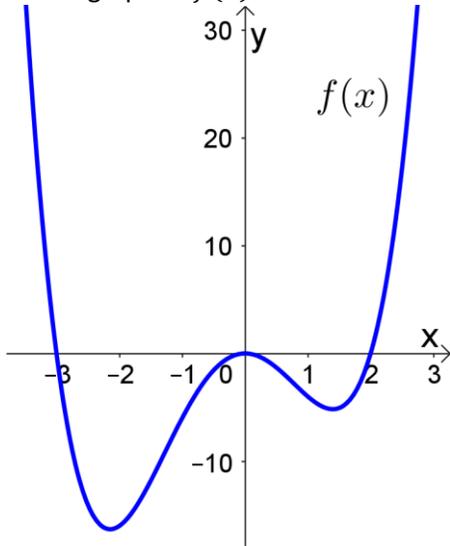Absolute maximum: _____   Absolute minimum: _____

d) (1 point) Find the domain of f. Domain: _____

e) (1 point) Find the range of f. Range: _____

7. (2 points) Divide using <u>long division</u>: $\dfrac{2x^5 - x^4 - 4x^2 - 2x + 3}{x^3 + 2x - 1}$

Answer: $\dfrac{2x^5 - x^4 - 4x^2 - 2x + 3}{x^3 + 2x - 1} =$ _____

8. The graph of $f(x)$ is shown below.

a) (1.5 points) Find the zeros of f, and for each zero determine if the multiplicity is even or odd.

Answer: _____

b) (1 point) How many turning points does f have?   Turning points: _____

c) (1 point) What is the smallest possible degree of f?   Smallest possible degree: _____

d) (1 point) Determine the end behavior of f.

As $x \to \infty$, $f(x) \to$ _____

As $x \to -\infty$, $f(x) \to$ _____

9. (2 points) Find the slant asymptote of $g(x) = \dfrac{x^3 - 2x^2 + 6x - 15}{x^2 + 4}$.

Slant asymptote: $y =$ _____

10. (1 point) Fill in the blank: The Remainder Theorem say that if a polynomial $P(x)$ is divided by $x - c$, then the remainder is the value _____.