

NAME: _____ PERIOD: _____

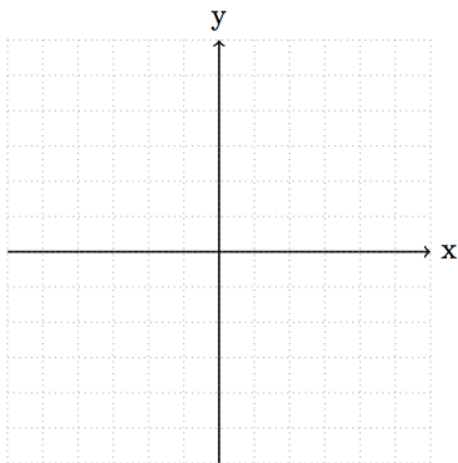
CE MATH 1050 – CHAPTER 3.3-5.3 EXAM 2013

NO CALCULATOR

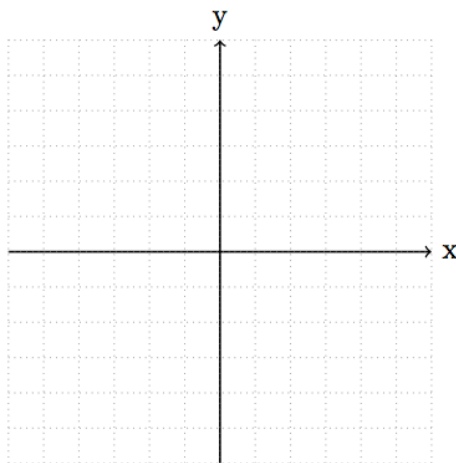
- Neatly write your solutions directly on the exam paper. If a solution requires more space than given, you may continue on the back of the page. Work on scratch paper will not be graded.
 - *To receive full credit you must show all necessary work and provide clear explanations.*
 - Books, notes, **calculators**, phones, and computers, cell phones, and other internet-enabled devices are **NOT** allowed.
 - When you have completed this section, please return it to the proctor and get the calculator section of the Exam
1. Find the equation for the Horizontal or oblique asymptote of the following function $r(x) = \frac{x^3 + x}{x^2 - 4}$
2. For the polynomial $p(x) = (x-1)^2(x+2)^3(x-3)$, answer the following:
- Find all the zeros of $p(x)$
 - For each zero of $p(x)$ above, state whether the graph of $p(x)$ touches or crosses the x-axis at that zero.
 - Describe the end behavior of $p(x)$. Note: there are many correct ways to describe end behavior. Please write your description in the way that you are most comfortable with.

3. For each of the functions below, graph the basic function (for example $y = x^2$). Then use the techniques of shifting, compressing, stretching and/or reflecting to graph each function. Label at least two points on each graph, and any asymptotes. You do NOT need to label the intercepts.

(a) $g(x) = 3\sqrt{-x} - 2$

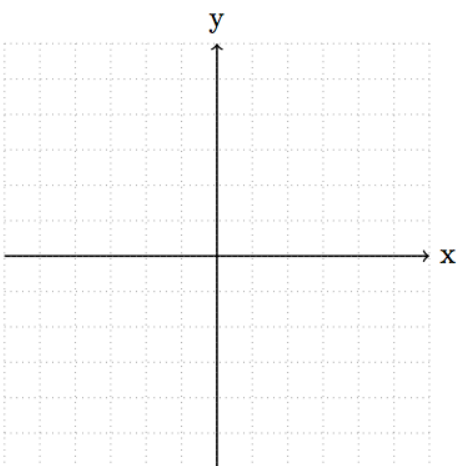


Basic Function

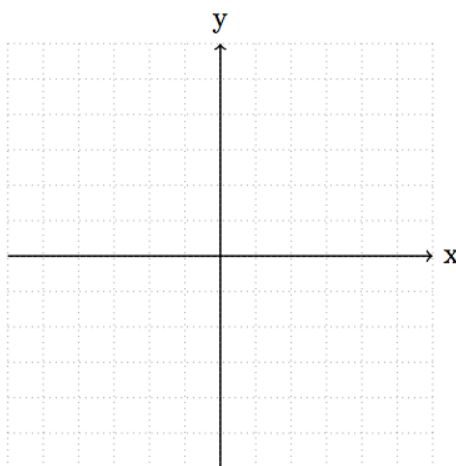


$g(x) = 3\sqrt{-x} - 2$

(b) $f(x) = -(x + 3)^2 + 2$

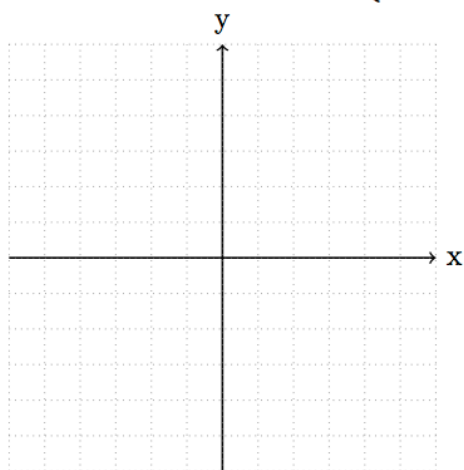


Basic Function

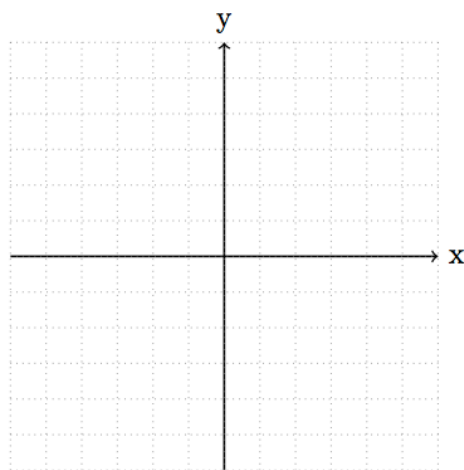


$f(x) = -(x + 3)^2 + 2$

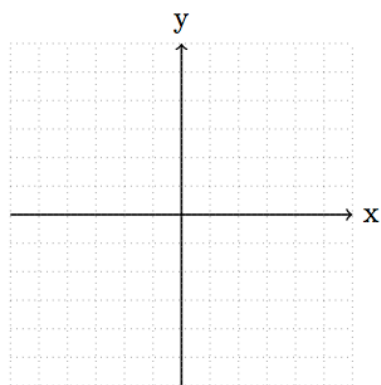
4. Graph the function $g(x) = \begin{cases} -x & \text{if } x \leq -2 \\ x^2 & \text{if } x > -2 \end{cases}$



5. Graph $p(x) = \frac{x^2 - 9}{x^2 - 3x - 4}$. Label intercepts and asymptotes.



6. Graph the function $q(x) = \frac{1}{4}(x + 2)^3(x - 1)^2$. Label all intercepts.



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7. Each of the following problems is worth 3 points. NO justification is required for these problems.

(a) Find the domain of the function $r(x) = \frac{7}{5x^2 - 2x}$

(b) Jill is on an island which is 3 miles from shore. She want to get to a town which is 10 miles down the shoreline from the nearest point to the island. She can row at 3 miles/hour and walk at 5 miles per hour. The time T it takes her to travel to the city if she rows to a point on the shore x miles from town is $T(x) = \frac{1}{5}x + \frac{1}{3}\sqrt{9 + (10 - x)^2}$. Use a graphing utility to find the value of x for which T is smallest.

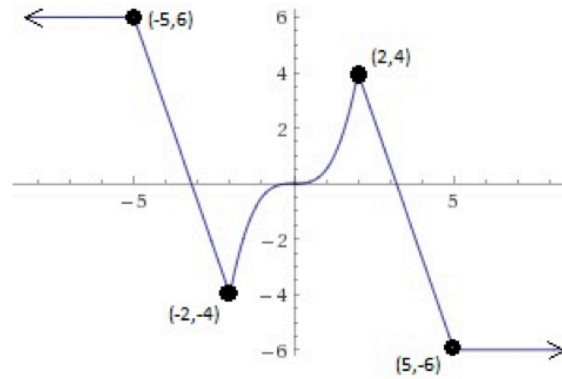
(c) For the piecewise defined function $g(x)$ given below, find $g(-1)$.

$$g(x) = \begin{cases} 1 - x & \text{if } x \leq -3 \\ x^2 & \text{if } -3 < x \leq 0 \\ 2x - 3 & \text{if } x > 0 \end{cases}$$

(d) The following data represents the weight, in grams, of various candy bars and the corresponding number of calories. Use a graphing utility to find the line of best fit.

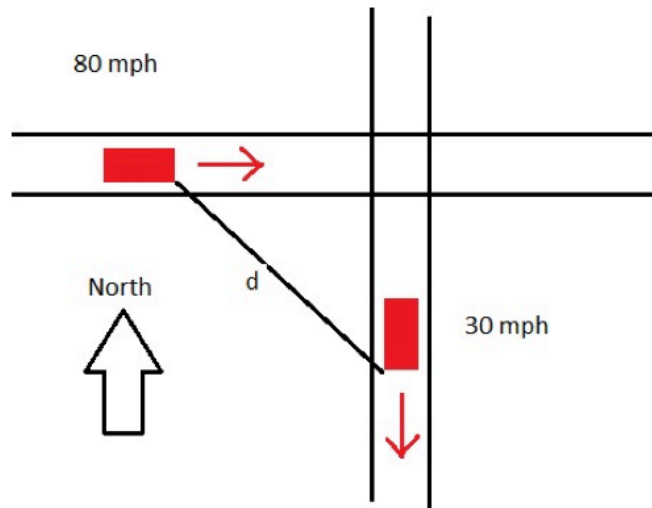
Candy Bar	Weight,x	Calories, y
Nestle's Crunch	44.84	230
Butterfinger	61.30	270
Baby Ruth	66.45	280
Heath	39.52	210
Snickers	61.12	280
Almond Joy	47.33	220

8. Each of these problems is worth 2 points. No justification is required for these problems. For the graph of $f(x)$, given below, do the following:



- (a) Find the domain of $f(x)$
- (b) Find the range of $f(x)$
- (c) Find the interval(s) on which $f(x)$ is decreasing
- (d) Find the interval(s) on which $f(x)$ is increasing
- (e) Find the absolute minimum of $f(x)$, if it exists
- (f) State whether $f(x)$ is odd, even, or neither

9. At a certain time ($t = 0$) a car is 10 miles west of a freeway overpass and is approaching the overpass at a constant speed of 80 miles per hour. At the same time, a second car is 2 miles south of the overpass and is driving AWAY from the overpass at a constant speed of 30 miles per hour. Build a model that expresses the distance d between the cars as a function of time t , in hours.



10. Jack has a monthly car payment of \$120. In addition, it costs him \$0.20 for every mile he drives.
- (a) Write a linear model that relates C , the monthly cost for Jack to drive his car, to x , the number of miles driven.
- (b) Jack has \$160 this month for driving expenses. How far can he drive this month without exceeding this amount?
11. For the quadratic function $p(x) = -2x^2 + 8x - 2$, do the following:
- (a) Find the vertex.
- (b) Find the axis of symmetry.