

DO NOT TURN THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO

- ❖ Write your name below on the space provided.
- ❖ This test has a total of 6 pages.
- ❖ Work the problem in the space provided. If you need more space, write on the back of the test.
- ❖ To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- ❖ Look only at your test. Don't give me the impression that you are cheating.
- ❖ Be sure to write neatly. If I cannot read what was written, do not expect the problem to be graded.
- ❖ If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	9	
2	3	
3	3	
4	6	
5	9	
6	15	
7	6	
8	12	
9	9	
10	9	
11	6	
12	4	
13	9	
Total	100	

Name _____

CIRCLE FINAL ANSWERS

1) (3 points each) For the following functions, determine the domain. Write the domain for part c in interval notation:

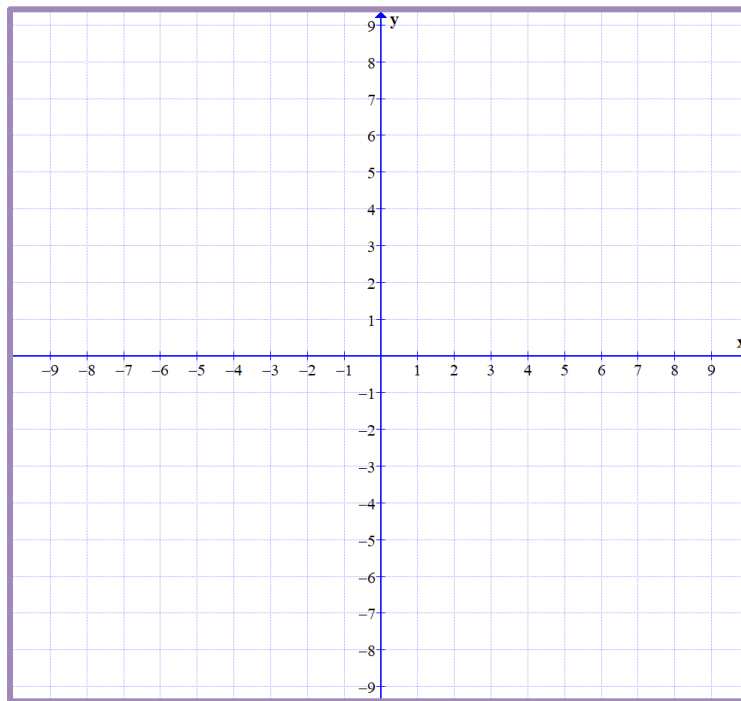
a) $f(x) = 2x^2 - 4x + 1$

b) $g(x) = \frac{4x^2 + 1}{x^2 - 16}$

c) $h(x) = \sqrt{12x + 5}$

2) (3 points) For the function $f(x) = 3x^2 + 2x + 1$, find and simplify $\frac{f(x+h) - f(x)}{h}$

3) (3 points) Sketch a graph of the piecewise-defined function $f(x) = \begin{cases} 2x + 1 & x \leq -2 \\ 5 & -2 < x < 2 \\ |x - 3| + 1 & x \geq 2 \end{cases}$



- 4) (2 points each) Short answer: In your own words, describe the formula for...
- a) Cost
 - b) Revenue
 - c) Profit

- 5) (3 points each) Andoio makes the new Snozzberry Pi computer and sells them for \$66.50 each. The cost to build each computer is \$24.50 and there is an additional cost of \$2100 for tools and various supplies.

- a) Write and label the corresponding Revenue, Cost, and Profit functions for this problem:

- b) When only 40 computers are sold, is there a profit or a loss? Show your work to support your answer.
- c) How many computers must be sold to break even?

- 6) (3 points each) Suppose that the price and demand for a gallon of Tuscan Milk was given by $p = D(q) = 74 - 0.26q$ and the price and supply was given by $p = S(q) = 0.48q$ where p is price in dollars and q is the demand in gallons of Tuscan Milk.

- a) Find and interpret, using the language of the problem, the following:

- i) $D(45)$
- ii) $S(105)$

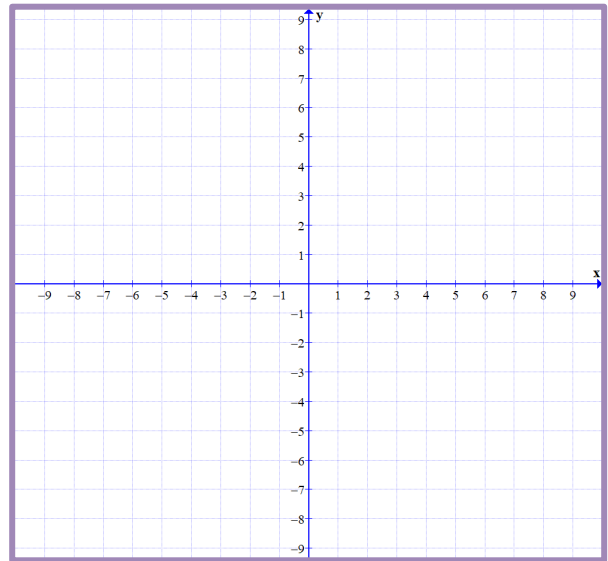
- b) Find the demand when the price is \$61:
- c) Find the supply when the price is \$60:

- d) Find the equilibrium quantity and equilibrium price:

7) (3 points each) For the function $f(x) = -(x+3)^2 + 4 \dots$

a) Explain, in order, the steps needed to sketch the graph:

b) Sketch and label the graph:



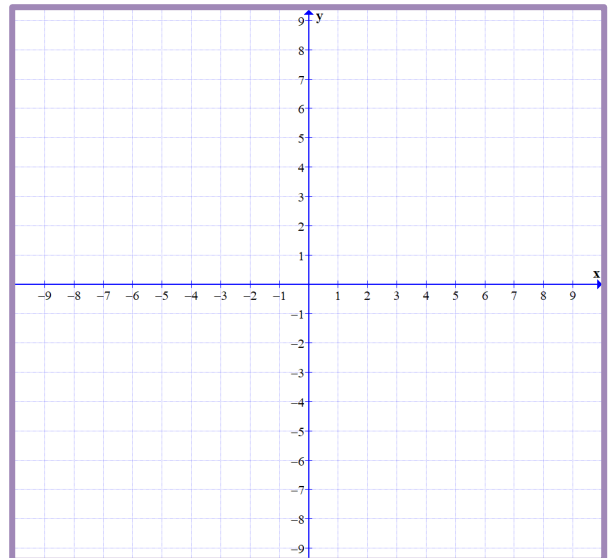
8) (3 points each) For the quadratic function $f(x) = x^2 - 2x - 8$, find...

a) The vertex:

b) The x -intercepts:

c) The y -intercept:

d) Sketch the graph using the above:



9) (3 points each) Jo Jo Ba decided to drop the javelin and start launching pumpkins that she found on her neighbors' front porch. Throwing the pumpkins from a 30 foot cliff, the height of the pumpkin h , in feet, can be given by the function $h(t) = -16t^2 + 40t + 30$ where t is time in seconds. Determine the following:

- a) At what time is the pumpkin the highest off of the ground? b) What is the highest height the pumpkin reaches?

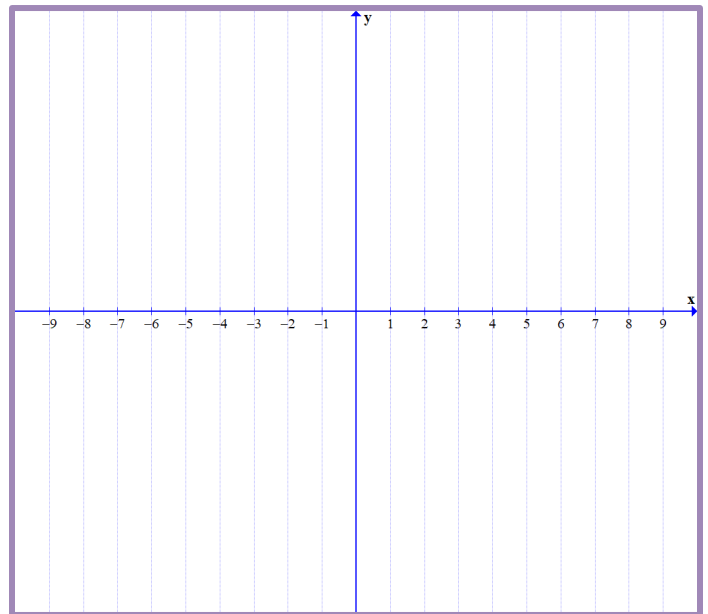
c) When does the pumpkin hit the ground?

10) (3 points each) For the function $f(x) = (x + 3)^2 (2x + 1)^2 (x - 2) \dots$

- a) What is the leading term and which quadrants will the arrowheads end up in? Explain why. c) Sketch the graph based on parts *a* and *b*:

b) Fill in the chart:

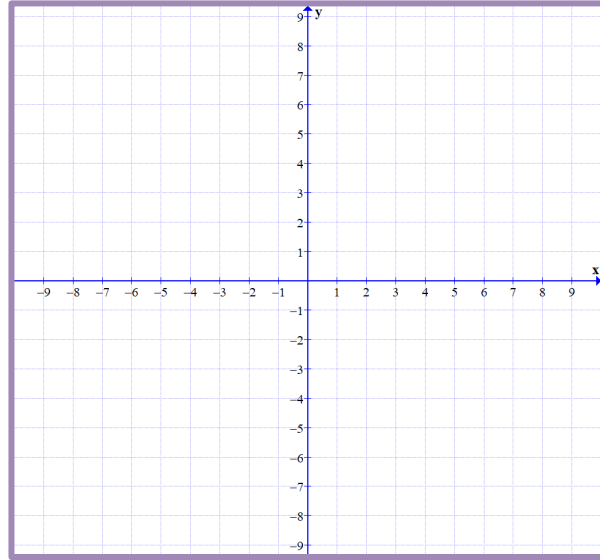
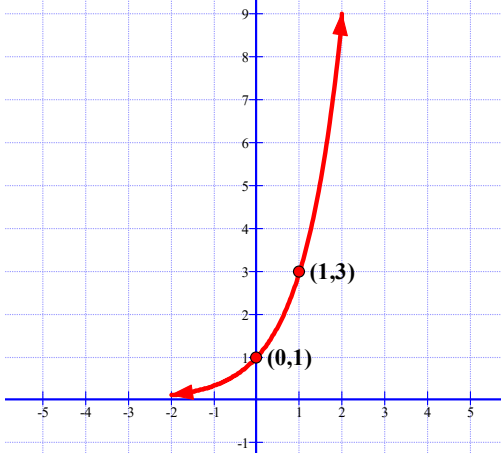
Zero	Multiplicity	Touch/Cross



11) (3 points each) For the rational function $f(x) = \frac{3x^2 + 3}{x^2 - 4x + 4}$, find...

- a) Any Vertical Asymptotes: b) Any Horizontal Asymptotes:

12) (4 points) Graph $g(x) = 2 \cdot 3^{x+3} - 4$ by transforming the given function $y = 3^x$. Be sure to move and label the given points and asymptotes.



13) (3 points each) Once it was revealed that the new Xbox is really only good as a doorstop, the number of Xbox owners began to decay exponentially by the exponential function

$f(t) = 1.05e^{-0.18t}$ where f is in **millions** of Xbox customers and t is the number of hours since the beginning of the announcement, determine...

a) The number of Xbox customers 5 hours after the announcement was made:

b) The number of customers lost per hour for the first 5 hours:

c) The number of customers lost during the 5th hour: