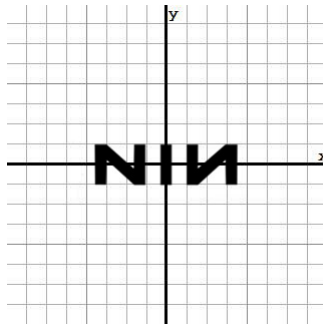


University of South Carolina
Math 115: Precalculus
Instructor: Austin Mohr
Section 006
Fall 2009

Test 2

Do not write on this page. Instead, use the blank paper provided to show all your work and answers. Credit will not be given if no work is shown.

1. Let $f(x)$ have the following graph:



Sketch the graph of $-f(x + 4) - 1$ by performing the appropriate translations *one at a time*. At each step, give the function of the graph you are drawing.

2. In the following parts, let $f(x) = (x + 2)^2(x - 1)^3$.
- What is the y-intercept of $f(x)$?
 - What is/are the x-intercept(s) of $f(x)$? Describe the behavior of the function at the x-intercepts you find.
 - Describe the end behavior of $f(x)$.
 - Sketch the graph of $f(x)$. Make sure your sketch agrees with the information you found in the previous parts.
3. In the following parts, let $f(x) = \frac{2x+1}{x+3}$.
- What is the y-intercept of $f(x)$?
 - What is/are the x-intercept(s) of $f(x)$? Describe the behavior of the function at the x-intercepts you find.
 - What is/are the asymptote(s) of $f(x)$?
 - Sketch the graph of $f(x)$. Make sure your sketch agrees with the information you found in the previous parts.

4. In the following parts, let $f(x) = x^2 + 3x$ and $g(x) = x^3 + 5$. Evaluate each expression.

a. $\left(\frac{f}{g}\right)(-2)$

b. $f(x+h) - f(x)$

c. $(f \circ g)(x)$

d. $g^{-1}(x)$

5. Solve each expression for x .

a. $(x-1)^{-\frac{3}{2}} = 27$

b. $\sqrt{3x+1} - \sqrt{x} = 1$

c. $\frac{x^2-9}{x+1} \geq 0$

6. Your instructor, convinced by a green fairy that he is capable of flight, attempts to leap from the edge of his roof to his neighbor's roof. The function $h(t) = 10 + 10t - 9.8t^2$ models his height (in feet) above the ground t seconds after lift-off.

a. How tall is his roof?

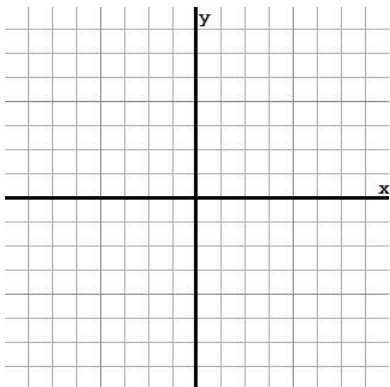
b. When does he reach the pinnacle of the jump? How high above the ground is he at this moment?

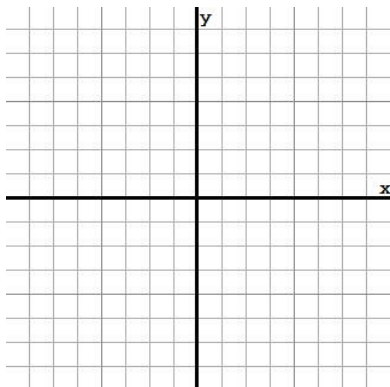
c. The neighbor's roof is way too far away. When will he land instead in the neighbor's rose garden?

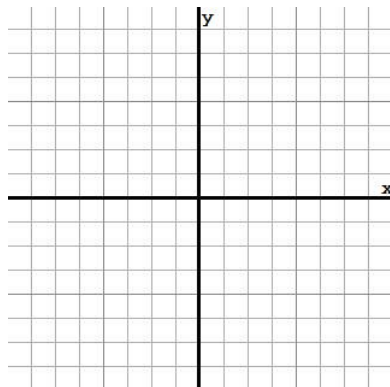
Answer Sheet

Use the axes provided to graph your solution to problems 1, 2c, and 3d.

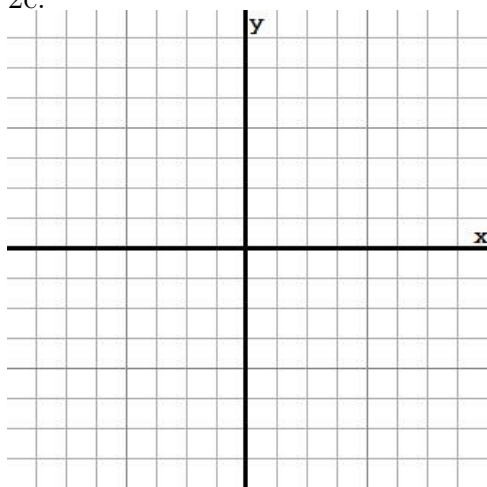
1.







2c.



3d.

