Name: _____

Panther ID: _____

Spring 2014

MAC 1140 - Precalculus Algebra

Test # 1

There are 10 problems for a total of 108 points. **Show your work;** an answer alone, even correct, will get no credit. An illegible answer will not be graded, so write your work neatly.

Problem 1. (8 pts) Find and simplify the difference quotient $\dfrac{f(x+h)-f(x)}{h}$ for $f(x) = 5x^2 - 3x - 4$

Problem 2. (8 pts) Find two functions f and g (neither of them identity) so that h(x) = (fog)(x), where $h(x) = \sqrt[5]{3x^2 - 7}$

Problem 3. (11 pts) The graph of a function f is given below. Answer questions a)-g).
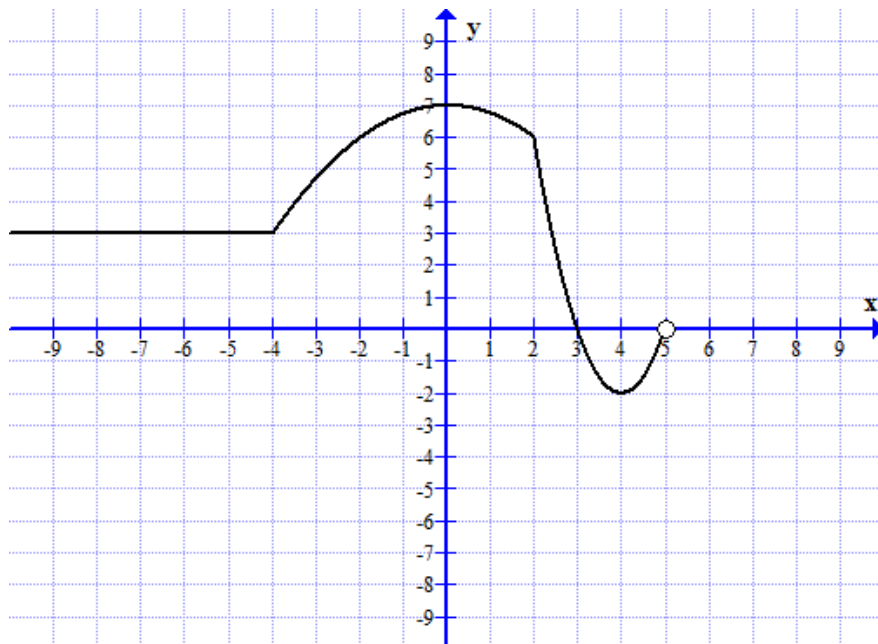
a) Find the domain of f; write it in the interval notation

b) Find the range of f; write it in the interval notation

c) Find the x-intercepts, if any

d) Find the y-intercept , if any

e) Find the intervals on which f is increasing

f) Find the intervals on which f(x) < 0

g) Find f(2) and f(-5)

Problem 4. (4pts) Is $f(x) = \dfrac{2}{3}x^4 - 3x^3 + 4x - 3 - \dfrac{1}{x}$ a polynomial function?

If yes, what is its degree and the leading coefficient?

Problem 5. (10 pts)A function f is given by $f(x)= \begin{cases} 2x+3 & ,if \ x \leq -2 \\ x^2-1 & ,if \ x > -2 \end{cases}$

a) Find f(-2), f(0), f(1)
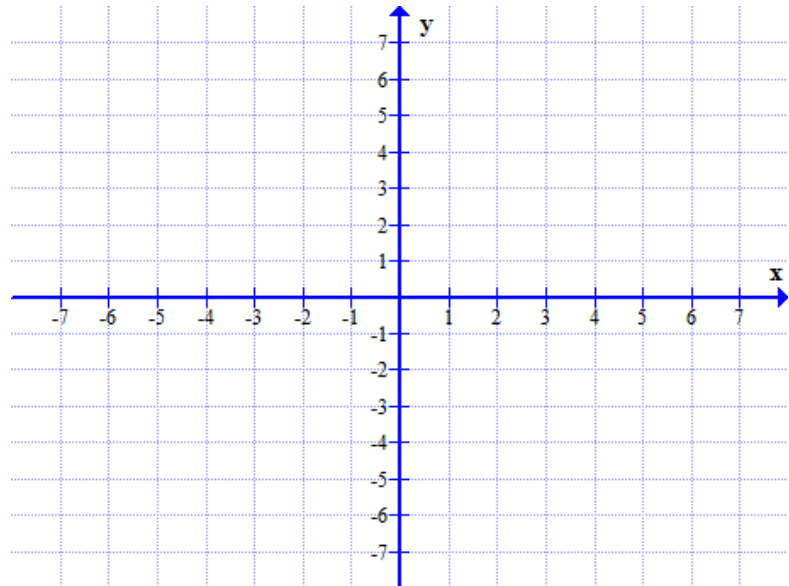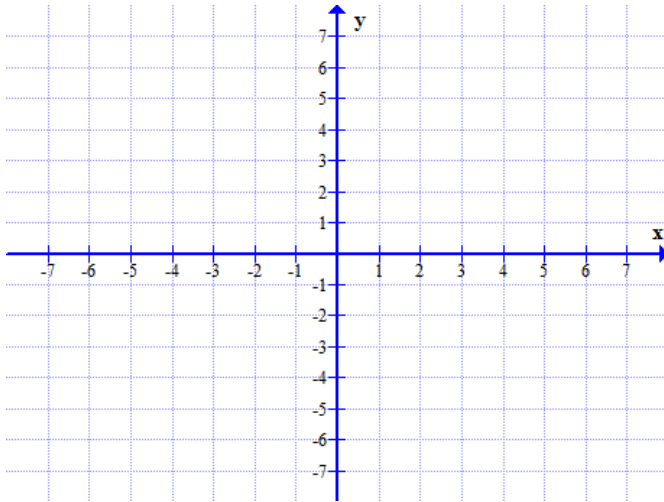
 f(-2) = _____

 f(0) = _____
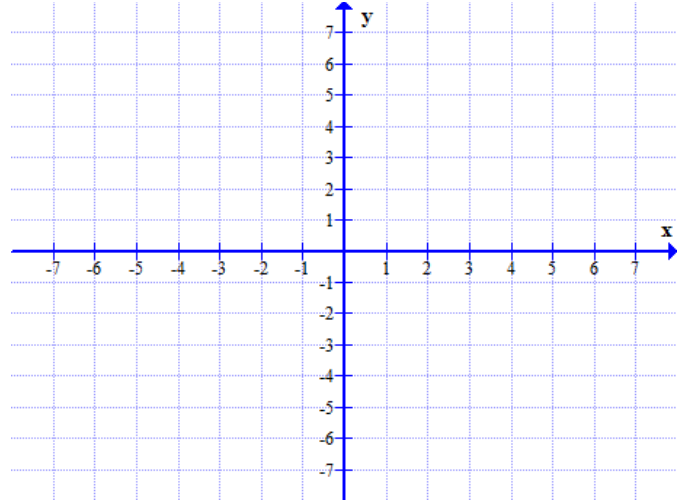
 f(1) = _____

b) Graph function f

Problem 6 (10 5pts) Find the domain of $f(x)= \dfrac{\sqrt{2-x}}{x+1}$

Problem 7. (10 pts) Use transformations to graph $f(x) = -\left(\frac{1}{2}x + 3\right)^2$. Start with a basic function, plot accurately at least 3 points and use them to perform the transformations. Draw the transformations in the order a,b,c,d and write the equation for each intermediate function
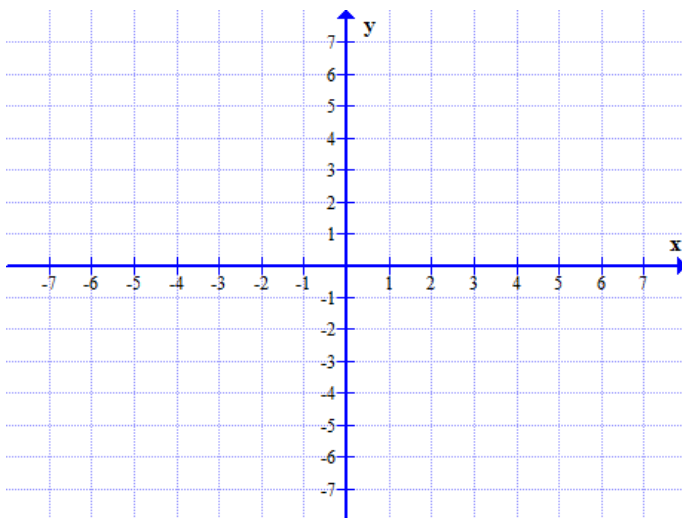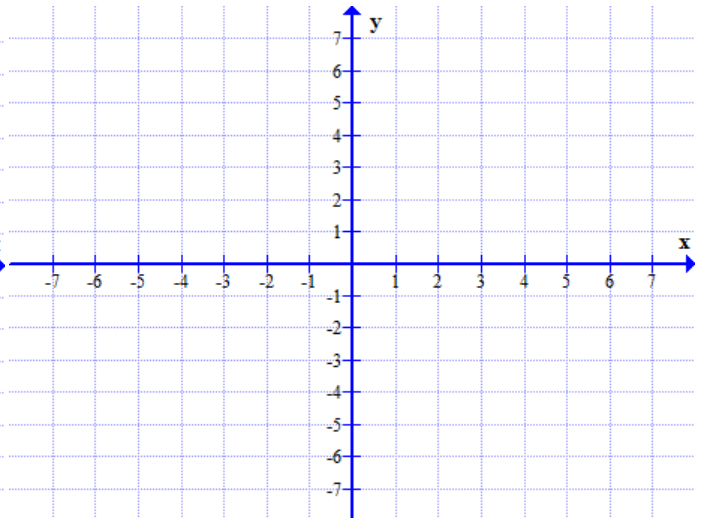
a) y = _____

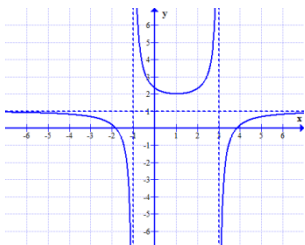b) y = _____

c) y = _____

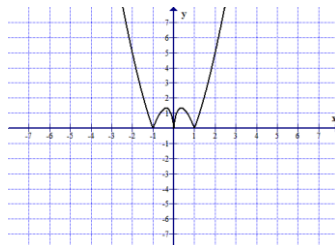d) $f(x) = -\left(\frac{1}{2}x + 3\right)^2$

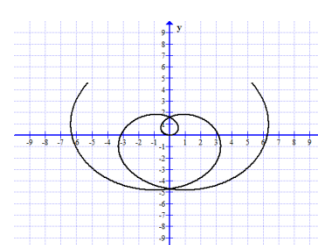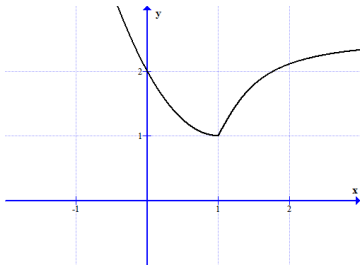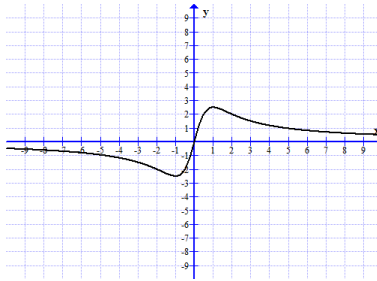**Problem 8.** (5 pts) Which graph(s) represents a function? Explain

a)

b)

c)

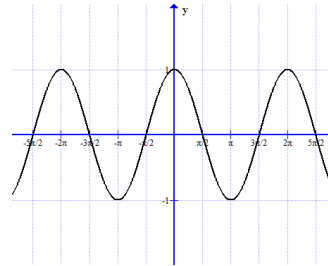**Problem 9.** (5 pts) Which graph(s) represents an odd function? Explain.

a)

b)

c)

Problem 10. (7 pts). Check whether (x+4) is a factor of $f(x) = 4x^6 - 64x^4 + x^2 - 15$? Show your work clearly and write your conclusion.

Problem 11. (8 pts) List all potential rational zeros of $f(x) = -4x^3 + x^2 + x + 6$

Problem 12 (12 pts) Find all real zeros of the polynomial function $f(x) = x^4 + x^3 - 8x^2 - 2x + 12$ and write it in a factored form.

Problem 13. (10 pts) Factor completely. Simplify as much as possible

a) (4pts) $8x^3 - 27$ =

b)(6 pts) $5(x-1)^3(x+2)^4 - 3(x-1)^2(x+2)^5$ =