**Exam 2   Algebra & Trig   10/10/2003**

Each problem is worth 10 points. Show adequate justification for full credit. Please circle all answers and keep your work as legible as possible. One bonus point for underlining this sentence to show you read the directions.

1. Write an equation for the line passing through the point (3,-1) with a slope of ½.

2. Find the center and radius of the circle with equation $x^2 + y^2 - 10y + 16 = 0$.

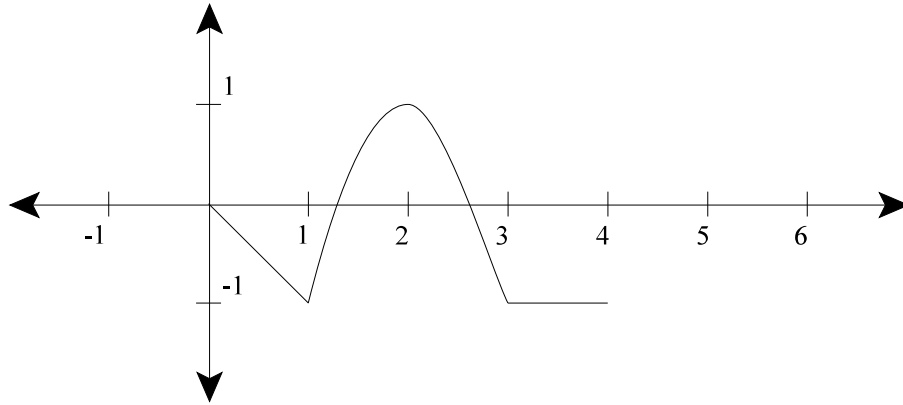3. Write a possible formula for the polynomial pictured below:
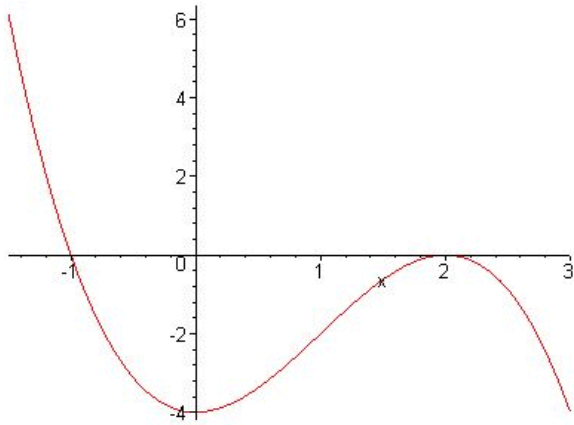
4. If $f(x) = 3x$ and $g(x) = \sqrt{x+1}$, find:

a) $f(4)$

b) $g \circ f(2)$

c) $f(a+h)$

5. If f(x) has the graph shown below, sketch the graphs of g(x) = f(x) + 1 and h(x) = f(x - 2) on the same set of axes. Make sure to **label which is which.**

6. If $f(x) = \dfrac{2x}{x+1}$, find $f^{-1}(x)$.

7. Bunny is a Precalc student at a large state university, and she's having some trouble. Bunny says "I can, like, always figure out where the polynomy things cross the x axis, but I never know what to do when they ask other stuff about them, like how to factor them and stuff."

Explain clearly to Bunny what the connection is between factoring and places where a polynomial's graph crosses the x axis, **and why these things are connected**.

8. Find all solutions, real and complex, to the equation $x^4 + 2x^3 + x^2 + 8x - 12 = 0$.

9. If $f(x) = \dfrac{x(x-a)}{(x-b)(x-c)}$ for some distinct real constants a, b, and c, where does $f(x)$ have:

a) vertical asymptotes?

b) x-intercepts?

c) horizontal asymptotes?

10. Decompose $\dfrac{5x^2 + 7x + 6}{(x-1)(x+2)^2}$ into partial fractions.

Extra Credit (5 points possible):

Find all points on the parabola $y = x^2$ which are 5 units away from the point (5,0).