College Algebra **Review for Test #2**

Section #1: The following problems should be done without a graphing calculator.

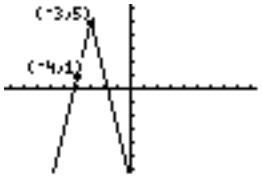
1. The graphs of each of the following functions can be obtained by applying geometric transformations to the graph of a basic function. For each of the following, state the geometric transformations you would apply to the basic function to obtain the graph, sketch a graph of the basic function, and sketch a graph of the function indicated.

a. $y = -\dfrac{1}{x-3}$ b. $y = \dfrac{1}{3}(x+1)^2 - 2$

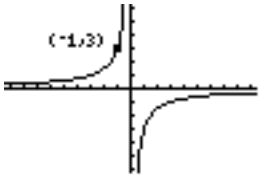
c. $y = \sqrt{-x} + 3$ d. $y = -\sqrt{16-(2x)^2}$

2. Determine an equation for each graph below

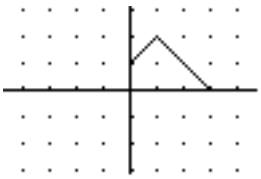
a.



b.



3. Given the graph of y=f(x) shown to the right, sketch the graph of each equation.



a. $y = f(x+2) - 1$ b. $y = -3 \cdot f\left(\dfrac{x}{2}\right)$ c. $y = \dfrac{1}{2} \cdot f(-x)$

4. If $f(x) = \dfrac{x-1}{x+1}$ and $g(x) = \dfrac{2}{3x}$, find the following. Simplify your answers.

a. $(f \cdot g)(-4)$ b. $(f+g)(x)$ c. $(g \circ f)(-5)$ d. $(f \circ g)(x)$ e. $(g \circ f)(x)$

5. Be sure you are able to do the problems on the "Combining Functions" worksheet.

6. If $h(x) = (f \circ g)(x)$, and $h(x) = \dfrac{x^2}{x^2+1}$, determine f(x) and g(x).

7. Write the equation of the line with the following characteristics.

a. Has a slope of zero and passes through the point (-3,-4).

b. Parallel to the y-axis and passes through the point (1,5).

c. Parallel to the line 3x-5y=7 and passes through (-2,7)

d. Perpendicular bisector of the segment with endpoints (-5,-4) and (-1,6).

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

a. Find the vertex.

b. Write the function in vertex form.

c. Find the y-intercept and the x-intercepts.

d. Plot the points that you found and sketch the graph of the parabola.

9. Find the equation of the quadratic function (in general form) with vertex of (-3,5) that passes through the point (5,-27)

Section 2: You may use your graphing calculator for the following problems.

10. Advertising and Sales A marketing firm wishes to find a function that relates the sales S of a product and A, the amount spent on advertising the product. The data is obtained from past experience. Both the advertising and sales are measured in thousands of dollars.

Advertising	20	22	22.5	24	24	27	28.3
Sales	335	339	338	343	341	350	351

a. Does the relation defined by the set of ordered pairs (A,S) represent a function?

b. Draw a scatterplot of the data.

c. With your calculator, find the line of best fit (LinReg) for the sales as a function of the advertising expenses.

d. What does the slope of the line mean to the problem situation? (Be specific!)

e. According to your model, how much would have to be spent in advertising to obtain $355,000 in sales?

11. A gutter is to be made from an aluminum sheet that is 12 inches wide and 100 inches long. The gutter is made by turning up the edges (from the 12 inch sides) 90 degrees. (See the figure for problem #45 on page 138, which is a similar problem.)

a. If the sides are turned up so the height of the gutter is 2 inches, what is the volume of the gutter?

b. Write a function V(x) for the volume of the gutter if the sides are turned up so the height is x inches.

c. Algebraically determine the height of the gutter if the volume is to be maximized, and hence allow the most water to flow. Check your answer with your graphing calculator

d. What is the maximum volume of the gutter?