Math 95   Final Review   **Name** _____
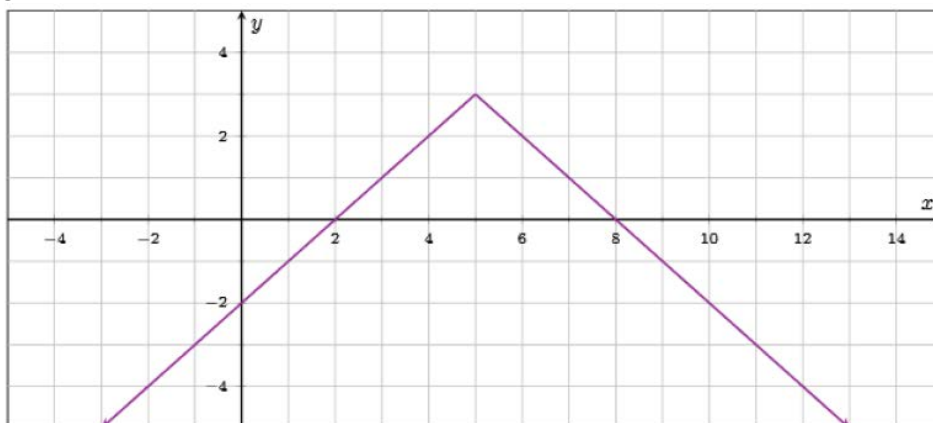Sections 2.1, 2.2, 3.1, 3.3 – 3.5, 8.1 – 8.4, 6.1 – 6.5, 7.1 – 7.6

Part 1 – Graphing Calculator Needed. You may return to this part of the test if you have time. Practice showing all of your steps in proper form as you will on the test.

1. Answer the following for the graph shown. $y = w(x)$

a. Does the graph represent a function? Why or why not?

b. What is the value of w at 4?

c. Where does w have a value of 1?

d. $w(-2) =$ _____

e. What are the solutions to $w(x) = -2$?

f. What is the solution to the inequality $w(x) > 2$ in interval or set notation.

g. What is the domain of w in set or interval notation?

h. What is the range of w in set or interval notation?

2. Answer the following for the graph of $y = f(x)$ shown. $y = f(x)$

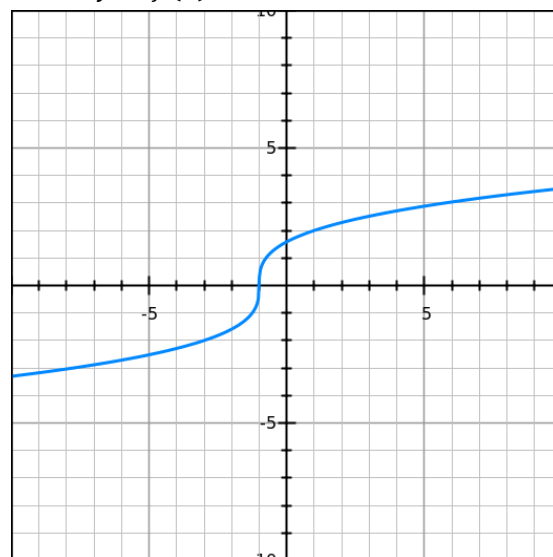a. Where does f have a value of 3?

b. What is the value of f at -1?
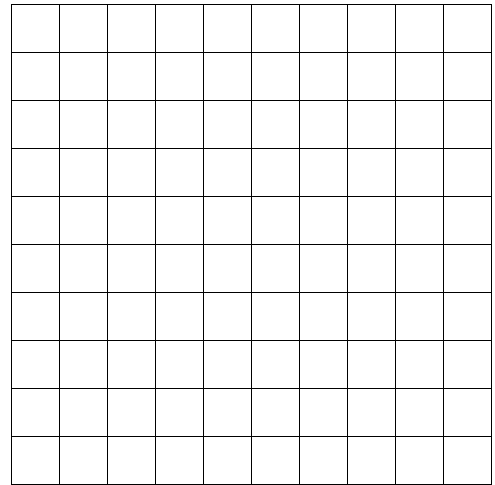
c. Solve $f(x) = 2$.

d. Solve $f(x) < -2$.

e. What is the domain of f in set or interval notation?

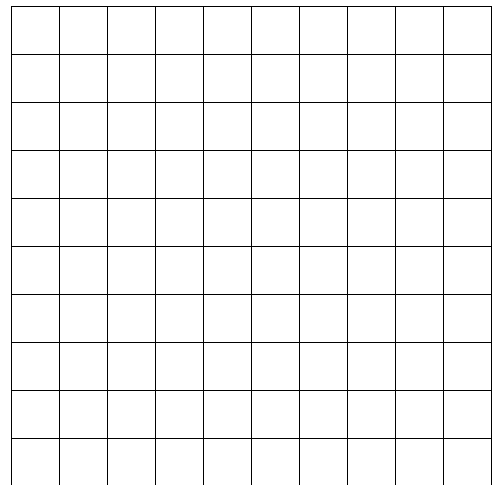f. What is the range of f in set or interval notation?

3. Solve graphically, symbolically and numerically and write the solution set. Show your solution(s) on your table and graph.
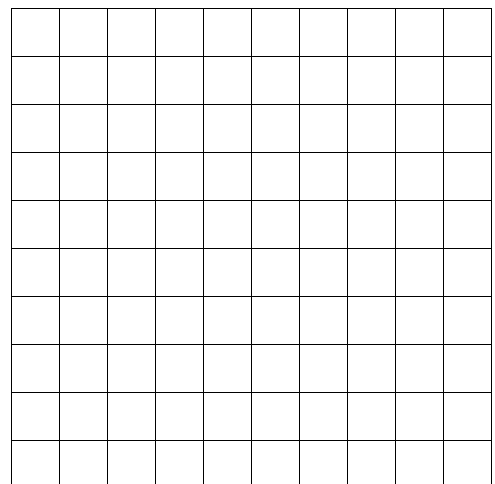
a. $4 - 2x > 1 + x$

b. $x^2 - 3x + 2 = 0$

c. $\sqrt{x + 2} = x$

4. Show your steps to show both types of completing the square. You may use your calculator to check your answers.

Complete the square to solve the equation.

a. $x^2 - 2x - 4 = 0$	b. $2x^2 - 3x = 4$

Complete the square to put the parabola in vertex form.

c. $y = x^2 + 4x + 1$	d. $f(x) = 2x^2 + 4x - 9$

5. Graph the quadratic function $f(x) = 8.7x^2 + 55x - 29.2$ on your calculator. Be sure to find a viewing window that allows you to see the vertex and all intercepts.

Use the graphing features and round all answers to the nearest hundredth.

a. Find $f(20)$ b. Find the vertex.

c. Find all x-intercepts   d. Find the y-intercept

e. State the domain   f. State the range

6. A graphing calculator is launched upward and its height h in feet after t seconds is given by $h(t) = -16t^2 + 88t + 6$. Use your graphing utility. You do not need to show any work for these, just answer in complete sentences.

a. After how many seconds does the calculator reach its maximum height?

b. What is the maximum height reached?

c. How many seconds will it take until the calculator hits the ground?

7. Suppose that an insect population P in thousands per acre is modeled by the function $P(x) = \frac{5x+2}{x+1}$, where x is the time in months that the population is being observed.

a. Evaluate $P(10)$ and interpret the result.

b. Graph P in the window: [0,50,10] by [0,6,1].

c. What happens to the population after several years?

d. After how many months is the insect population equal to 4.8 thousand per acre?

8. Because of the Earth's curvature, a person can see a limited distance to the horizon. The higher the location of the person, the farther that person can see. The distance D in miles to the horizon can be estimated by $D(h) = 1.22\sqrt{h}$, where h is the height of the person above the ground in feet.

You may solve these symbolically, graphically and/or numerically. <u>Show your thinking</u> to support your answer and state your answer in a complete sentence.

a. How far can a 6-foot person see when standing on the top of Mt. Everest at a height of 29,028 feet?

b. What height would allow a person to see 10 miles?

Part 2 – No Calculator. You may not return to this part after you turn it in. Practice showing all of your steps in proper form as you will on the test.

1. Determine whether the table can represent a **linear** function. If it can, write the function in slope-intercept form. If it cannot represent a linear function, explain why.
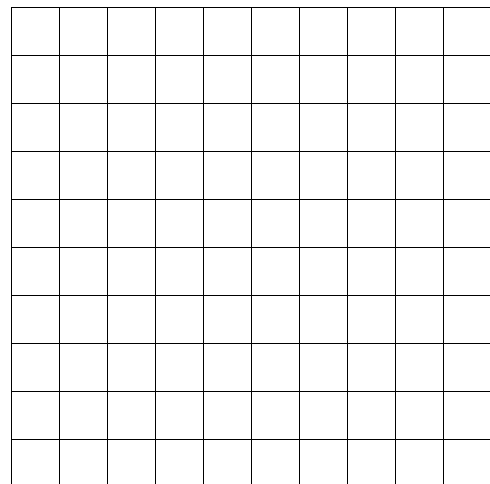
x	-2	-1	0	1	2
$f(x)$	-11	-7	-3	1	5

2. Find the domain of f. Write your answer in set-builder notation.

a. $f(x) = 3x + 2$	b. $f(x) = \frac{x-1}{x+6}$	c. $f(x) = \frac{3}{x^2-3x-10}$
d. $f(x) = \sqrt{x+2}$	e. $f(x) = \sqrt[3]{x}$	f. $f(x) = \frac{1}{\sqrt{x-5}}$

3. Graph the function by hand, showing your calculations. Label your axes, scale and the axis of symmetry as an equation.

$f(x) = x^2 - 6x + 4$

x	$f(x)$

4. Solve symbolically and write the solution set. For inequalities, also include a number line and interval notation.

a. $\frac{2}{5}(x-4) = -12$	b. $\frac{2}{5}z + \frac{1}{4}z > 2 - (z-1)$
c. $5 - x > 1 \; or \; x + 3 \geq -1$	d. $-3 \leq \frac{2}{3}x + 5 < 11$
e. $3t - 1 > -1 \; and \; 2t - \frac{1}{2} > 6$	f. $|1 - 3x| = 4$
g. $|-5x - 8| > 2$	h. $2x^2 = x + 4$
i. $4x^2 - x - 3 = 0$	j. $x^2 - 4x = 6$

k. $\dfrac{4}{x-3} = x$	l. $\dfrac{2}{x+5} = \dfrac{-3}{x^2-25} + \dfrac{1}{x-5}$

5. Simplify the expressions and simplify your answers.

a. $\dfrac{4a}{3ab^2} + \dfrac{b}{a^2c}$	b. $\dfrac{2}{t+2} - \dfrac{t}{t^2-4}$
c. $\dfrac{x^2-2x-8}{x^2+x-12} \div \dfrac{(x-4)^2}{x^2-16}$	d. $\dfrac{\dfrac{4}{x^2} + \dfrac{1}{x}}{\dfrac{4}{x^2} - \dfrac{1}{x}}$

6. Simplify the expression and include absolute value bars as appropriate.

a. $\sqrt{(x+3)^2}$	b. $\sqrt[3]{64x^3}$	c. $\sqrt[5]{-x^{10}}$

7. Translate the expression into radical notation or exponential notation.

a. $(5)^{1/3}$	b. $\sqrt[5]{x^3}$

8. Simplify the expression. Assume that all variables are positive.

a. $16^{1/4}$	b. $(-27)^{2/3}$	c. $(-2)^{1/2}$
d. $(z^3)^{2/3}$	e. $(x^2y^4)^{1/2}$	f. $\left(\dfrac{8x^3}{y^6}\right)^{-1/3}$

9. Simplify the expression. Assume that all variables are positive.

a. $\sqrt[3]{4} \cdot \sqrt[3]{16}$	b. $\sqrt[3]{x^4} \cdot \sqrt[3]{x^2}$	c. $\dfrac{\sqrt{80}}{\sqrt{20}}$
d. $\dfrac{\sqrt{y^3}}{\sqrt{4y}}$	e. $\sqrt{32a^3b^2}$	f. $\sqrt[5]{-16z^3} \cdot \sqrt[5]{16z^3}$

10. Simplify the expression.

a. $\sqrt{45} + \sqrt{20}$	b. $(10 + \sqrt{3})(10 - \sqrt{3})$

11. Rationalize the denominator.

a. $\dfrac{3}{\sqrt{5}}$	b. $\dfrac{\sqrt{5}}{\sqrt{8}}$
c. $\dfrac{1}{\sqrt{3}+2}$	d. $\dfrac{\sqrt{6}}{4-\sqrt{7}}$

12. Solve the equation symbolically. Check your solution(s) and write the solution set.

a. $\sqrt{x-2} = 5$	b. $\sqrt{x+2} = x$
c. $\sqrt[3]{3x} = 3$	d. $\sqrt{2x-1} = \sqrt{x+3}$

e. $\sqrt{2x+4} = x$	f. $\sqrt{x+1} = \sqrt{x+2}$

13. Solve the equation for the indicated variable.

a. $t = \sqrt{x+y}$, for x	b. $A = \sqrt{\dfrac{R}{P}}$, for R

14. Let $p(x) = \sqrt{x+10}$. Find and simplify the following expressions below.

a. $p(2x)$

b. $p(x+6)$

c. $3p(x)$

d. $p(x) + 6$

15. Let $f(x) = (x-1)^{2/3}$ and $g(x) = x^{-3/2}$. Find and simplify the following expressions below.

a. $f(0)$

b. $f(9)$

c. $g(-1)$

d. $g(2)$