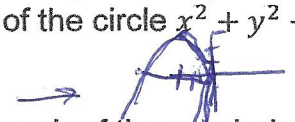
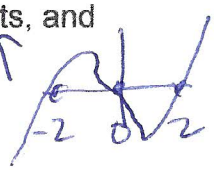
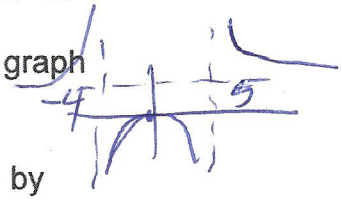
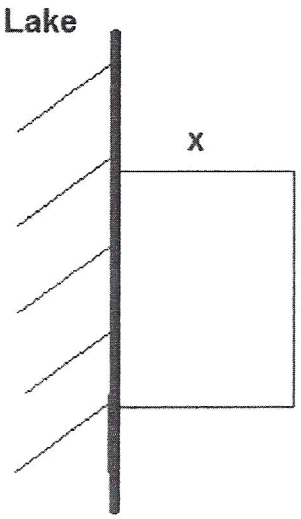
Math 111 Exam 2 Review

1. Solve the equation $x^2 + 4x = -11$ for complex solutions. $-2 \pm i\sqrt{7}$
2. Solve: $x^4 - 3x^2 - 28 = 0$ $\pm\sqrt{7}, \pm 2i$
3. Solve: $\sqrt{x+5} = x+3$ $-4, -1$
4. Solve: $|2x-7| = 3$ $5, 2$
5. Solve and graph: $|x-1| < 4$ $(-3, 5)$
6. For the points (-7, 2) and (4, 0) find a) the midpoint and b) the distance between them. a) $(-\frac{3}{2}, 1)$ b) $d = \sqrt{13}$
7. Find the standard form equation of the circle $x^2 + y^2 - 6y + 5 = 0$. Give the center and radius. $C(0,3)$ $r = 2$
8. Graph $f(x) = -(x+2)^2 + 3$  Vertex $(-2, 3)$
9. Find the intercepts, vertex, and graph of the parabola: $f(x) = -x^2 - 6x + 2$  $V: (-3, 11)$ $(0, 2)$ y-int $(-3 \pm \sqrt{11}, 0)$ x-int
10. Find the domain of the function $f(x) = \dfrac{x^2-1}{x^2+3x-4}$ $\{x \mid x \neq 1, -4\}$
11. Find the quotient: $\dfrac{x^3-2x^2-5x+6}{x+2}$ $= x^2 - 4x + 3$
12. Graph the polynomial function $P(x) = x^5 - 4x^3$ showing its intercepts, turning points, and direction. $x^3(x+2)(x-2)$ 
13. Find all the zeros of $f(x) = 2x^3 - 2x^2 - 8x + 8$, given that 2 is one of the zeros.
14. Find all solutions of the equation $x^3 - 5x^2 - 4x + 20 = 0$. $\{-2, 5\}$
15. Give the degree, zeros, and their multiplicities, and rough sketch of $f(x) = x(x+3)^3(x-5)^2$. (see below)
16. Find the horizontal and the vertical asymptotes, and sketch the graph 
$$f(x) = \frac{2x^2}{x^2-x-20}$$ $= (x-5)(x+4)$ VA: $x = 5, x = -4$ HA: $y = 2$
17. The cost, C, of producing x thousand units of a product is given by $C = x^2 - 30x + 335$ (dollars). Find the value of x for which the cost is minimum. $x = 15$
18. Solve the inequalities:
    a) $x^3 \geq 9x$ $(-3, 0) \cup (3, \infty)$ b) $\dfrac{x}{x+2} \geq 2$ $[-4, -2)$
19. 

A 120 foot rope is used to section off 3 sides of a rectangular picnic area on the edge of a lake. Assume the lake's edge is straight and longer than 120 ft., and that there is no rope on the lake's edge

a) Write an expression for the area, and call it A(x).
b) Find the dimensions of the rectangle that produce the maximum area.
c) What is the maximum area?

$A(x) = x(120-2x) = -2x^2 + 120x$

b) 30 ft x 60 ft

c) 1800 ft^2

15. $f(x) = x(x+3)^3(x-5)^2$ degree = 6 zeros: 0, -3, 5 multiplicity: 1, 3, 2 cross, cross, touch