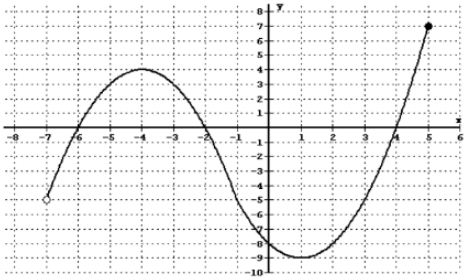
Midterm Review Sheet Algebra II HONORS

1) Solve for r.
   a. $V = \frac{1}{3}\pi r^2 h$ b. $p^2 r - 3r = 14$
2) Solve.
   a. $|2x + 5| > 7$ b. $|5x - 1| \leq 11$ c. $|3x - 1| = 10$ d. 3(x – 4) = 5x + 8
3) Evaluate: $\frac{3}{5}x - \frac{7}{2}y$ when x = 3 and y = 4.
4) Find the indicated value of $f(x)$.
   a. $f(x) = \frac{x-7}{3x}$; f(2) b. $f(x) = x^2 - 3x - 1$; f(-3)
5) Find the domain and range of the graph below. (Interval Notation)



   a. $f(0) =$___ b. $f(x) = 0$ ___

   c. x & y intercepts _____

   d. State where the function is increasing, decreasing, or constant in interval notation.

6) Graph the piecewise function f(x). $f(x) = \begin{cases} x+2, x \geq 1 \\ 1, -2 \leq x < 1 \\ -x-4, x < -2 \end{cases}$

7) Find the minimum and maximum value of the objective function $P = 4x + 3y$ with the given constraints:

$x \leq 3$
$y \geq -3x + 4$
$y \leq \frac{2}{3}x + 4$

8) A teacher at AMHS wanted to explore the relationship between the number of students in a mathematics class and the average grade for the class. The teacher's data is shown in the table below.

Class Size	16	19	24	26	27	29	32
Class Average	81.2	80.6	82.5	79.9	78.6	79.3	77.7

   a. Use your calculator to approximate the line of best fit for the data.
   b. Predict the Class Average when your class size contains 40 students.
   c. Based on this data, Describe the Correlation between Class Size and Class Average.

9) Evaluate the function for the given value of f(x). $f(x) = -2x^2 - 13; f(x + 3)$
10) Write the function in standard form. $y = -(x - 1)^2 + 2$
11) Use completing the square to write the equation in vertex form and identify the vertex. $y = -x^2 - 2x - 6$
12) Find the discriminant and the number and type of solutions. $x^2 - 6x + 10 = 0$
13) A manufacturer of light fixtures has daily production costs modeled by $y = 0.25x^2 - 10x + 800$ where y is the total cost in dollars and x is the number of fixtures produced.
   a. What is the minimum daily production cost? b. How many fixtures should be produced each day to yield a min cost?

14) The path that a diver follows is given by $y = -0.4(x - 4)^2 + 14$ where x is the horizontal distance (in feet) from the edge of the diving board and y is the height (in feet).
    a. What is the maximum height of the diver? b. How far from the edge of the diving board is the diver at his max height?

15) The manager of a home electronics store is considering re-pricing a new model of digital camera. At the current price of $680, the store sells about 70 cameras each month. Sales data from other stores indicate that for each $20 decrease in price, 5 more cameras per month would be sold.
    a. Write the revenue equation. b. What should the camera price be to maximize revenue?

16) Solve. $x^2 - 6x - 27 = 0$ b. $\frac{-1}{2}(x+1)^2 = 5$ c. $x^2 = 2x - 5$

17) The distance, d (in meters), travelled by a falling object is given by the equation $d = 4.9t^2$, where t is the time in seconds. How many seconds would it take for an object fall 103 meters?(Round to two decimal places.)

18) Simplify. Write as a complex number in standard form.
    a. $(3 - 5i) - (9 + 2i)$ b. $3i(9 - i)$ c. $(-1 + 4i)(3 - 6i)$ d. $\frac{3+11i}{-1-2i}$

19) Solve $x^2 - 5x - 24 \le 0$

20) You are making a fence to enclose the four sides of your rectangular rose garden. You have 60 ft of fence to enclose the sides and you want to make the garden have an area of 120 ft^2? What should the dimensions of the garden be?(Round to two decimal places.)

21) The water in a large fountain leaves the spout with a vertical velocity of 30 ft per sec. After going up in the air it lands in a basin 6 ft below the spout. If the spout is 10 ft above ground, how long does it take a single drop of water to travel from the spout to the basin? (Use the model $h = -16t^2 + v_0 t + h_0$ and round to two decimal places.)

22) Graph. a. $f(x) = -2(x + 1)^2 + 4$ b. $f(x) = \frac{1}{2}(x - 5)(x + 3)$ c. $y = x^2 + 3x - 4$

23) Graph and describe the end behavior of the polynomial $f(x) = -x(x+3)^3(x-1)^2$

24) Evaluate $\left(\frac{-2x^3}{3y^{-2}}\right)^4$.

25) Simplify $(-3x^{-5}y^2)^{-2}$.

26) Factor completely $7x^3 - 56$.

27) Factor completely $x^3 - 4x^2 - 11x + 30$.

28) Find all the zeros of $f(x) = x^3 - 2x^2 + x - 2$.

29) Divide $(x^5 - 3x^3 - 2x + 3) \div (x + 2)$.

30) Find a standard form polynomial function of least degree with leading coefficient 1 with zeros 4 and 7-i.

31) Use a graphing calulator to graph $f(x) = x^3 + 5x^2 + 2x - 8$. Identify the *x*–intercepts and the points where the local maximums and local minimums occur.

32) Use Pascal's Triangle to expand $(2x-1)^5$

#33-***Significant for Performance Task Concept- must do a similar problem in 60-80 minutes.***

***A box with no top is to be constructed from a 22 x 30-inch sheet of cardboard by cutting squares of equal size from each corner and folding up the sides.**

a. Create a diagram of the scenario.
b. Write a function to model the volume of the open top box.
c. Create a graph of the function that is titled, labeled, scaled. Identify Zeros, Intercepts. Intervals of increasing or decreasing, extrema (relative minimums and maximums), end behavior. Interpret the meaning of all key these points.
d. What size square should be cut from each corner of the box to maximize the volume? What are the dimensions of this box? What is the maximum volume?
e. What size square should be cut from each corner of the box to have a volume of 1000 cubic inches?
f. What are the dimensions of the box(es) with a volume of 1000 cubic inches?