

Scientific calculator needed. Students are not permitted to use graphing calculator or graphing utility.

Circle Rubric Score: 4: 18-20      3: 14-17      2: 10-13      1: 6-9      0: <= 5

Math 1530 Outcome: Interpret mathematical knowledge to graph and analyze both linear and non-linear functions/relations.

1. (6 pts. total) Below shows the work of a student who solved the equation  $36^{2x} = 30$  on a math test.

$36^{2x} = 30$                       (2 pts.) What error did the student make? Explain.

$(6^2)^{2x} = 6^5$

$6^{4x} = 6^5$                       (4 pts.) What is the correct **exact** answer? Show work.

so,  $4x = 5$

$x = 1.25$

2. (6 pts. total) The path of the water in a drinking fountain follows a curve called a parabola. Suppose the path of the water is approximated by the function:  $f(x) = -(x+1)^2 + 4$

A. On the grid at the right, sketch a graph to illustrate the path of the water. Also create a table of values.

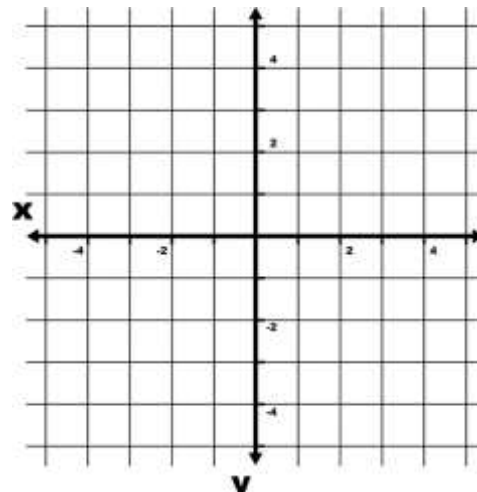
B. (2 pts.) Which of the following characteristics of the graph best describes how high the water will come out of the drinking fountain?

Circle choice:    x-intercepts    y-intercept    vertex

Then write a sentence to explain why this might be important to someone who is going to get a drink of water from the fountain.

(Table 2 pts. & Graph 2 pts.)

X	y



[http://etc.usf.edu/clipart/49200/49296/49296\\_graph\\_0505j.htm](http://etc.usf.edu/clipart/49200/49296/49296_graph_0505j.htm)

3. (8 pts total.) The linear equation  $F(x) = \frac{9}{5}x + 32$  converts a temperature on the Celsius scale represented by  $x$  to the Fahrenheit scale represented by  $F(x)$ .

(4 pts.) Determine

$F(0) =$  \_\_\_\_\_

$F(70) =$  \_\_\_\_\_

If  $F(x) = 0$ , then  $x =$  \_\_\_\_\_

If  $F(x) = 212$ , then  $x =$  \_\_\_\_\_

(4 pts.) The inverse function of  $F(x) = \frac{9}{5}x + 32$  will result in a function which converts a temperature in Fahrenheit to Celsius. Find  $F^{-1}(x)$ . Show work.