

Name: _____

Block: _____ Column A

March 1st, 2017

Unit 9: Quadratic functions and transformations

Dear Students/Parents,

This is a take home test. You may take as long as you wish on the test and continue the test over multiple sittings. Once the test is started you may not use the book or materials from class nor discuss with, receive hints from or enlist the help of parents, siblings, other students or anyone else to do the test or check your work. The test is due to Dr. Baharav at the beginning of your next class meeting (Each block received a specific time and date).

Important note: If you plan or wish to use any additional resources or accommodations, please let me know (in person or schoology). For example, use of a reader for the word-problems.

After finishing the test, both the student and one parent/guardian should sign this sheet, confirming adherence to the rules, and return it and the test still stapled together.

Good luck and do well!

Dr. Zachi Baharav
Alg2H

Parent/Guardian _____ Date _____

Student _____ Date _____

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Unit 9: Quadratic functions and transformations

You are allowed to use a graphic calculator on this test, including desmos.com (or the app) calculator. See previous page (the one with the signatures) for additional instructions.

Graphing: When you are asked to graph a function, please indicate a few (2 or more) points on the graph, and mark the graph itself clearly. Please use a different color, or different line-style, to distinguish between lines.

There are only 7 questions in this test.

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Question 1

Given the function $f(x) = -0.5 \cdot (x - 2)^2 + 5$

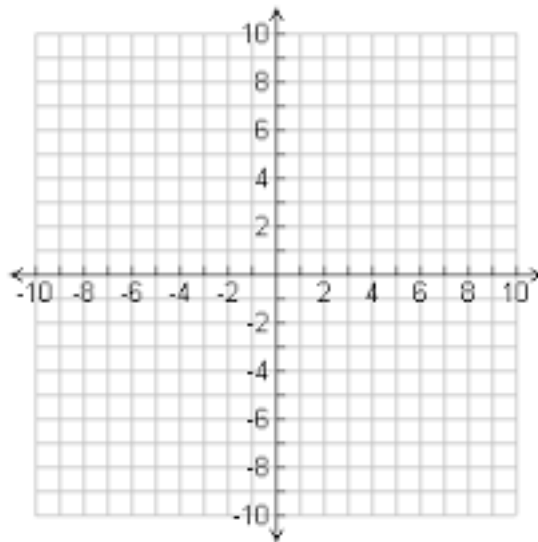
a. Graph the function in the space given below.

b. Find the vertex : _____

c. Find the x-intercept(s): _____

d. Find the y-intercept(s): _____

e. Note all the above points clearly on the graph.



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Question 2

Given the function $f(x) = 6x^2 - 17x + 8$

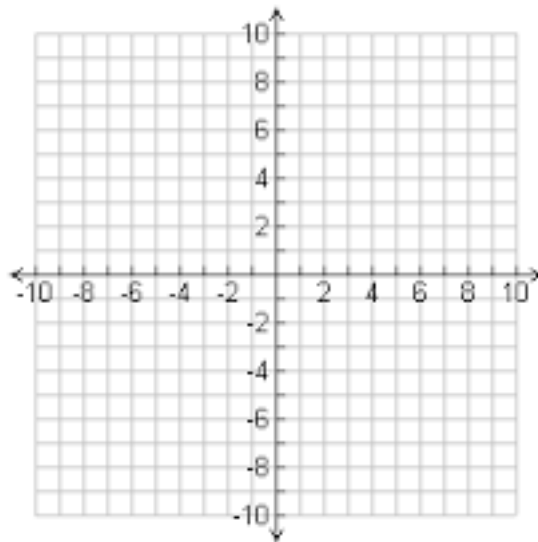
a. Find the vertex : _____

b. Write the function in vertex-form $a(x - h)^2 + k$ _____

c. Find the x-intercept(s): _____

d. Find the y-intercept(s): _____

e. Graph the function in the space given below. Note all the above points clearly on the graph.

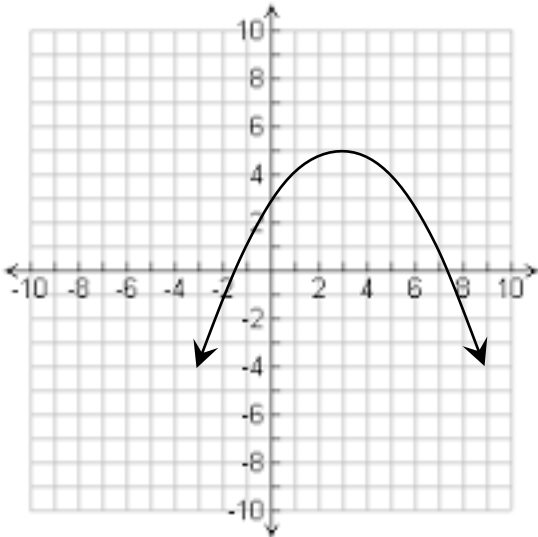


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Question 3

Given the function as in the graph below.



(Helper: The points where the function lands right on the grid are (3,5) , (5,4) and (1,4), and (9,-4) and (-3,-4))

a. Find the vertex : _____

b. Write the function in vertex-form $a(x - h)^2 + k$ _____

c. Find the x-intercept(s): _____

d. Find the y-intercept(s): _____

e. Write the function in standard quadratic form $ax^2 + bx + c$

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Question 4

Farmer John sells milk. Each cow yields milk worth \$40 per day. On the other hand, each additional cow above the 50 he has room-for adds additional cost of \$4 per day. The formula for his profit as a function of the number of cows is therefore:

$$\text{Profit} = 40 \cdot x - 4 \cdot (x - 50)^2$$

where x denotes the number of cows.

What is the number of cows farmer John should keep in order to maximize his profit?

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Question 5

The two sides of a right triangle add up to 10cm long.

a. What should be the length of each side in order to get **minimum** length of the hypotenuse ?

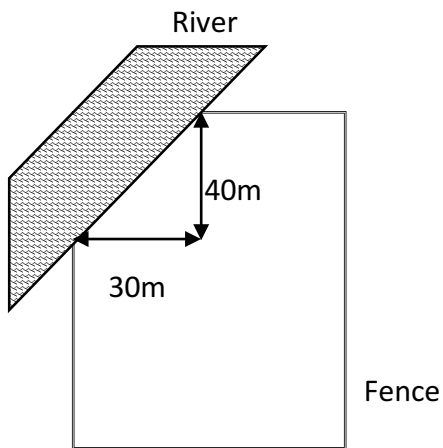
b. What should be the length of each side in order to get **maximum** length of the hypotenuse ?

Question 6

A farmer (yes, John) has 500 meters of fence to create a practice area for the horses. The area is bounded in one corner by a river as described in the picture below.

In the picture you can see that the river cuts-off a right-triangle from the corner of the lot. The size of the right triangle is 30m x 40m as described in the picture. The area next to river does NOT need fencing. Assume that the points the fence meets the river are fixed.

What is the maximum area the farmer can fence off? Draw your result.



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Question 7

Given the function

$$f(x) = 3(x - 2)^2 + 1$$

a. What is the Vertex of this function. _____

b. Plot the function on the graph below, and indicate the vertex.

c. Find the equation of a line, parallel to the X-axis, and that goes through the Vertex. Plot the line on the graph below.

e. Given the line $y = 2x + 0.5$.

a. Find the intersection points of the line and $f(x)$. _____

b. Find the intersection points of the line and the line you found in part 2.

c. Draw the line on the graph.

Extra Credit:

Given the line $y = 2x + C$, where C is an unknown number. What should be the value of C such that the line intersects with $f(x)$ in only ONE point. What is the point? Draw the line on the graph.

