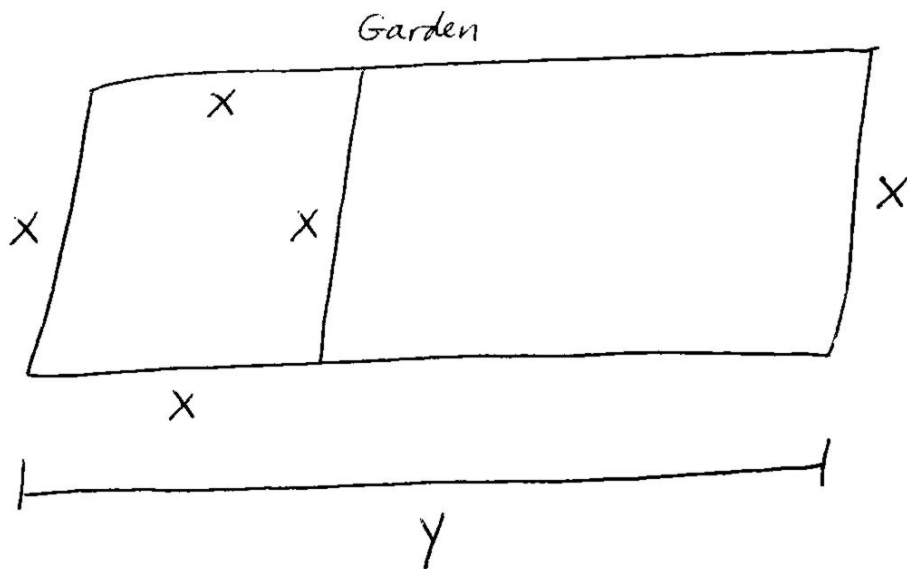


# QUIZ 7

Problem 1: (12 pts. total) Marcus has 2000 ft. of fencing to fence a garden. One part of the garden has to be the shape of a square and the other is to be a rectangle adjacent to one side of the square, as shown below.



- (a) Find a formula for the area of the garden.
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- (b) Find a formula for the perimeter of the garden (includes ALL sides), and use it to express the area of the garden only in terms of  $x$ . Area =  $A(x) =$  \_\_\_\_\_
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- (c) What are the dimensions of  $x$  and  $y$  which maximize (make the largest) the area of the garden.

HINT: Your area function should end up being a quadratic function.

Problem 2: (14 pts. total). Consider the polynomial function

$$P(x) = 2(x-2)^2(-x+3)^3$$

(a) Find the zeros of  $P(x)$ .

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(b) Find the  $y$ -intercept of  $P(x)$ .

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(c) Explain the end behavior of  $P(x)$ .

Your answer should look something like

$$"P(x) \rightarrow \underline{\hspace{2cm}} \text{ as } x \rightarrow \infty,$$

$$P(x) \rightarrow \underline{\hspace{2cm}} \text{ as } x \rightarrow -\infty,"$$

or a similar format.

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(d) Use the following set of test points and parts (a), (b), and (c) to draw a rough sketch of the graph of  $P$ .

$$(-1, 1152), \left(2.5, \frac{1}{16}\right), (4, -8).$$

"0.0625"

\* Make sure to label your axes!

Problem 3: (18 pts. total). Consider the rational function

$$r(x) = \frac{x^2 - 4}{(x-2)(x+3)}$$

(a) Find the  $x$ -intercepts of  $r$ .

(b) Find the  $y$ -intercept of  $r$ .

(c) Does the graph of  $r(x)$  have any holes?  
If so, find the coordinates of the hole.

(d) State the vertical asymptotes of  $r(x)$ .  
"  $x = \underline{\quad}$  "

(e) State the behavior of  $r(x)$  at each of its  
vertical asymptotes. ( "  $r(x) \rightarrow \infty$  as  $x \rightarrow a^+$  " )  
etc.

(f) State the horizontal asymptotes of  $r(x)$ .  
"  $y = \underline{\quad}$  "

(g) Draw a rough sketch of the graph of  $r(x)$ .