Use example 3 from last day's lesson to help you solve this question

Example 1: Given $y = -3x^2 - 12x + 5$, complete the square and find the vertex, the A of S, the x and y-intercepts, the domain, and range

Example 2: Two numbers have a difference of 10. Their product is a minimum. What are the numbers?

1. Establish a "Let" statement: let $x =$ first number and $y =$ second number
2. Since the "difference" is 10, $x - y = 10$ or $y = x - 10$
3. Since their "product is a minimum", $P = x \cdot y$
4. Therefore, the quadratic equation is $P = x(x - 10)$
5. Use CTS to change equation to standard form

$P = x^2 - 10x$

Vertex:

Since $x =$, you'll find that $y =$

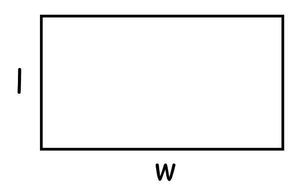
Therefore, the two #'s are ____ & ____

Confirm their product is a minimum

Example 3: The sum of two numbers is 60. Their product is a maximum. What are the numbers?

Example 4: Eighty meters of fencing are available to enclose a rectangular play area. What is the maximum area that can be enclosed and what are these dimensions?

1. Let $l =$ length & $w =$ width
2. There's 80m to enclose area $P = 2l + 2w = 80$ or $w = 40 - l$
3. The area needs to a maximum so $A = l \cdot w$
4. Therefore, the quadratic equation is $A = l(40 - l)$
5. Use CTS to change equation to standard form



$A = -l^2 + 40l$

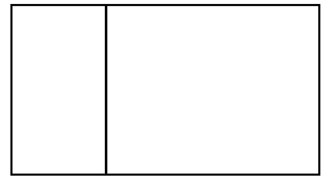
Vertex:

Since $l =$, you'll find that $w =$

So, the dimensions are ____ & ____

Confirm the area is a maximum

Example 5: Two rectangular areas are to be enclosed with 600 m of fencing, as shown by the diagram. What dimensions will yield the largest area?



Example 6: Student ski ticket prices at Whistler are sold for $20 each. 300 students are willing to buy them at that price. For every $5 increase, 30 fewer students will buy the tickets. What price will yield maximum revenue?

Look at price and quantity first: $p_{initial} = 20$ $\quad q_{initial} = 300$

Now look at the changes: $\Delta p = p - p_{initial}$ $\quad \Delta q = q - q_{initial}$

$5 = p - 20$ $\quad -30 = q - 300$

Express price to quantity as a ratio: $\dfrac{\Delta p}{\Delta q} = \dfrac{p - p_{initial}}{q - q_{initial}} \Rightarrow \dfrac{5}{-30} = \dfrac{p-20}{q-300}$

Solve for 'q': $\dfrac{5}{-30} = \dfrac{p-20}{q-300}$

Since $\text{Revenue} = p \cdot q$, sub '$q$' into eqn & CTS

Example 7: Blue Chip Cookies at UBC sells chocolate chip cookies for $0.90 each, resulting in about 20 000 cookies sold each month. For every $0.05 decrease, 2000 more cookies are sold. What price will yield maximum revenue?

Homework: