

Day 27 is Monday, October 29, 2012

Discuss Quiz #7 ~~from~~ common mistake

$$f'(x) = 3x^2 + 6x - 9$$

You needed to find critical values of  $f$   
(that is, the partition numbers for  $f'$ ).

Set  $f'(x) = 0$  and solve for  $x$

$$3x^2 + 6x - 9 = 0$$

Here are some of the factorizations from  
Student quizzes.

$$3(x-2)(x-1)$$

$$3(x-3)(x+3)$$

$$3(x-3)(x-1)$$

$$(3x-9)(x-1)$$

$$3(x-3)(x+1)$$

$$3(x+3)(x-1)$$

} these cannot all be correct.

How can you tell?

Regardless of how you got your factorization

$$f'(x) = 3x^2 + 6x - 9 \xrightarrow{\text{factorize}} 3(x-2)(x-1)$$

Check by multiplying!

$$3(x-2)(x-1) = 3(x^2 - x - 2x + 2) = 3(x^2 - 3x + 2) = 3x^2 - 9x + 6$$

Conclude that the factorization was incorrect!

try another factorization

$$f'(x) = \cancel{3(x+3)(x-1)} \quad 3x^2 + 6x - 9 \xrightarrow{\text{factor}} 3(x+3)(x-1)$$

Check by multiplying

$$3(x+3)(x-1) = 3(x^2 - x + 3x - 3) = 3(x^2 + 2x - 3) = 3x^2 + 6x - 9 \checkmark$$

# Resume Section 5-6 Optimization

## Resume Example involving Cameras

(B) If the goal is to maximize weekly Profit,  
 how many cameras should be made per week,  
 and what should be the selling price?

### Solution

We need the profit function  $P(x)$   
<sup>capital P.</sup>

$$\begin{aligned}
 P(x) &= R(x) - C(x) \\
 &= \underbrace{\left( \left(-\frac{1}{30}\right)x^2 + 300x \right)}_{\text{from our work on Thursday}} - \underbrace{\left( 90,000 + 30x \right)}_{\text{given on Thursday}} \\
 &= \left(-\frac{1}{30}\right)x^2 + 270x - 90,000
 \end{aligned}$$

