Monday November 14, 2011
College Algebra
Notes - Review 4F and 4G
Finish 4C - The Fence Problem

Use synthetic division to divide.
\[(6x^3 - 5x^2 + 2) \div (x - 6)\]

<table>
<thead>
<tr>
<th>6</th>
<th>-5</th>
<th>0</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
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<td>210</td>
<td>-1476</td>
</tr>
<tr>
<td>0</td>
<td>-41</td>
<td>246</td>
<td>-1474</td>
</tr>
</tbody>
</table>

\[(x^2 - 41) x + 2460 = \frac{1474}{x + 6} \]
\[(x^2 - 41) x + 2460 = -\frac{1474}{x + 6} \]

Use long division to divide
\[(x^4 - 2x^3 + 5x^2 - 13x + 1) \div (x^2 + 3x + 2)\]

\[
\begin{align*}
x^2 - x + 5 & \quad + \quad \frac{-9}{x^2 + 3x + 2} \\
x^3 + 3x + 2 & \\
x^2 - x + 5 & \\
x^3 + 3x + 2 & \\
5x^2 - 10x + 1 & \\
5x^2 + 15x + 10 & \\
\end{align*}
\]

Divide using long division.
\[x^2 - 2x + 3 \quad \left\lfloor \begin{array}{c}
x^2 + 3x^2 + 1 \\
-2x^2 - 2x^2 \\
\hline
x^2 - 2x + 3 \\
2x^3 + 1x^3 + 1x^3 \\
\hline
x^2 - 2x + 3 \\
4x^2 - 6x + 12 \\
\hline
\end{array} \right. \quad \frac{2x - 11}{x^2 - 2x + 3} \quad \frac{2x - 11}{x^2 - 2x + 3}
\]
Maximize the Area of a Garden

You are building a rectangular garden. You only have 22 meters to use for the fence. What are the dimensions of the garden that maximizes the area of the garden?

- Make a sketch of the situation.

<table>
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<tr>
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<th>width</th>
<th>area</th>
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<tbody>
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<td>10</td>
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<td>10</td>
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</table>

Perimeter: \(2x + 2y = 22\)  
\[ \frac{dy}{dx} = -\frac{2x+22}{2y} = -\frac{x+11}{y} \]

Max occurs at: \[x = \frac{-b}{2a} = 5.5\]

Area: \[A(x) = x \cdot y\]

\[A(x) = x \cdot \left(-x+11\right)\]

\[n(x) = x^2 - 11x + 0\]

\[x = \frac{-(-11)}{2} = 5.5\]

\[A(5.5) = 30.25 \text{ m}^2\]

Max area 30.25

5.5

ax + ay = 22

\(a(5.5) + ay = 22\)
\[11 + ay = 22\]
\[ay = 11\]
\[y = 2.2\]

Maximize the Area of a Garden

Write the formula for the perimeter.

Write the formula for the area.

Solve the perimeter formula for the height.

Substitute the perimeter height into the area formula.

Find the coordinate for the max area. The \(x\) coordinate is one side of the rectangle.

Substitute \(x\) into Area function to find max area.

Substitute \(x\) into Perimeter function to find the other side of the rectangle.

Check with a graph.
Quiz 4.1

A farmer has 932 meters of fencing available to enclose a rectangular portion of his land. One side of the rectangle being fenced lies along a river, so only three sides require fencing.

\[ x + 2y = 932 \]

Area \[ A(x) = xy \]

\[ \text{Perimeter} \]

**tonights homework**

A farmer has 408 meters of fencing available to enclose a rectangular portion of his land. One side of the rectangle being fenced lies along a river, so only three sides require fencing.

**tonights homework**

A farmer has 355 meters of fencing available to enclose a rectangular portion of his land. There is no river so all four sides need to be fenced. What are the dimensions of the rectangle with the maximum area? What is the maximum area?