Mat 011 Agenda  Day 40:  04/30/03
• Review Test 4
Homework:  Study for Test #4
A farmer wants to enclose adjacent rectangular fields with 1000 feet of barbed wire fencing as indicated below. Find the equation for the area of the fields.

\[
\begin{align*}
\text{L} & \quad \text{W} \\
50 & \quad \frac{1000 - 3(50)}{2} = 425 \quad \text{L} \\
100 & \quad \frac{1000 - 3(100)}{2} = 350 \quad \text{W} \\
200 & \quad \frac{1000 - 3(200)}{2} = 200 \quad \text{W} \\
& \quad \frac{1000 - 3x}{2} \quad \text{W}
\end{align*}
\]

Area:

\[
A = \frac{1000 - 3x}{2} \times \frac{1000 - 3(200)}{2} = \frac{1000 - 3x}{2}
\]

21,250 sq ft

35,000 sq ft

40,000 sq ft

\[
A = \frac{1000 - 3X}{2}
\]
<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>80 - 3(20) = 20</td>
<td>4500 m²</td>
</tr>
<tr>
<td>10</td>
<td>80 - 3(10) = 50</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>80 - 3X</td>
<td>X(80 - 3X) = 80X - 3X²</td>
</tr>
</tbody>
</table>
\[ a = -3 \]
\[ b = 80 \]
\[ c = 0 \]

\[ A = 80x - 3x^2 \]
\[ A = -3x^2 + 80x \]
\[ -3 \left( \frac{116.89}{2} \right) + 80 \left( \frac{13.3}{2} \right) = 5333.33 \]

1. Opens down \[ \bigtriangledown \]
2. Vertex: \[ -\frac{b}{2a} = -\frac{80}{2(-3)} = 13.3 \]
3. X-intercepts set \[ A = 0 \]
   \[ 0 = -3x^2 + 80x \]
   \[ x = 0 \] or
   \[ 0 = x(-3x+80) - 3x+80 = 0 \]
\[ 0 = -3x^2 + 80x \]
\[ x(-3x + 80) = 0 \]

\[ x = 0 \text{ or } -3x + 80 = 0 \]
\[ -3x = -80 \]
\[ x = \frac{-80}{-3} = \frac{80}{3} \]

\[ x = 26.6 \]

\((26.6, 0), (0, 0)\)
State the quadratic formula.
State the formula for the x coordinate of the vertex.

\[ y = ax^2 + bx + c \]
Herb’s Company needs to make a profit of $30. Graph and find where the lines intersect.
\[ P = -2x^2 + 28x - 50 \]
\[ 30 = -2x^2 + 28x - 50 \]
\[ 0 = -2x^2 + 28x - 80 \]
\[-2 (x^2 - 14x + 40) = 0 \]
\[(x - 4)(x - 10) = 0 \]
\[ x - 4 = 0 \quad \text{or} \quad x - 10 = 0 \]

\[ x = 4 \quad \quad x = 10 \]
\[ \begin{align*}
\alpha &= -2 \\
\beta &= 28 \\
\gamma &= -80 \\
\end{align*} \]

\[ \begin{align*}
x &= \frac{-\beta \pm \sqrt{\beta^2 - 4\alpha\gamma}}{2\alpha} \\
&= \frac{-28 \pm \sqrt{784 - 4(-2)(-80)}}{2(-2)} \\
&= -28 \pm \sqrt{784 - 440} \\
&= -28 \pm \sqrt{144} \\
&= -28 \pm 12 \\
&= -4 \quad \text{or} \quad -32 \\
\end{align*} \]
Graph the Profit Equation

\[ P = -2x^2 + 28x - 50 \]

When \( P = 30 \), what is \( x \)?

\[ P = -2x^2 + 28x - 50 \]
Simplify:

$5(2x^2 - x + 1) - 3(6x^2 - 7x + 2)$

$10x^2 - 5x + 5 - 18x^2 + 21x - 6$

$-8x^2 + 16x - 1$
Multiply:

\((2x-1)(x+5)\)

\[2x^2 + 10x - 1x - 5\]

\[2x^2 + 9x - 5\]
Multiply: \((x-3)^2\)

\[
(x-3)(x-3)
\]

\[
x^2 - 3x - 3x + 9
\]

\[
x^2 - 6x + 9
\]
Factor: $9x^2 + 6x$

$3x(3x + 2)$
Factor: $x^2 - 2x - 15$

$$(x + 3)(x - 5)$$
Solve: $x^2 + 5x + 6 = 0$

$(x + 3)(x + 2) = 0$

$x + 3 = 0$ or $x + 2 = 0$

$x = -3$ or $x = -2$
Vertex:

Meaning:

X intercepts:

Meaning:

P intercept:

Meaning:
Lighten Up Company makes light bulbs. The cost of making $x$ thousand light bulbs per week is $C = 0.5x^2 - 14x + 120$. The revenue from selling $x$ thousand light bulbs per week is $R = 12x - 0.5x^2$. Find the equation for Profit.