Mat 011 Agenda Day 19  June 20, 2005

Review of Factoring
Square Roots
Quadratic Equations, PowerPoint 30

Quiz

Homework: Topics 29, 30, 31
Factor: \( x^2 - 4x - 12 \)

\[
(x + 2)(x - 6)
\]

\[
(x - 6)(x + 2)
\]

\[
x^2 - 4x + 2x - 12
\]

\[
x^2 - 4x - 12
\]
### Factor:

<table>
<thead>
<tr>
<th>Expression</th>
<th>Factored Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6x + 9$</td>
<td>$3(2x + 3)$</td>
</tr>
<tr>
<td>$14x - 7$</td>
<td>$7(2x - 1)$</td>
</tr>
<tr>
<td>$-10x + 50$</td>
<td>$-10(x - 5)$</td>
</tr>
<tr>
<td>$8x^2 - 6x$</td>
<td>$2x(4x - 3)$</td>
</tr>
</tbody>
</table>

*maximal*
## Factor:

<table>
<thead>
<tr>
<th>Expression</th>
<th>Factored Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>$27x^2 - 18x$</td>
<td>$9x(3x - 2)$</td>
</tr>
<tr>
<td>$15x^3 - 5x^2$</td>
<td>$5x^2(3x - 1)$</td>
</tr>
<tr>
<td>$x^2 + 7x + 6$</td>
<td>$(x + 1)(x + 6)$</td>
</tr>
<tr>
<td>$x^2 - 8x + 15$</td>
<td>$(x - 5)(x - 3)$</td>
</tr>
<tr>
<td>Expression</td>
<td>Factored Form</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>$x^2 - 6x + 9$</td>
<td>$(x - 3)(x - 3) = (x - 3)^2$</td>
</tr>
<tr>
<td>$x^2 - 3x - 18$</td>
<td>$(x - 6)(x + 3)$</td>
</tr>
<tr>
<td>$x^2 + 13x + 30$</td>
<td>$(x + 10)(x + 3)$</td>
</tr>
<tr>
<td>$x^2 - 15x + 50$</td>
<td>$(x - 10)(x - 5)$</td>
</tr>
</tbody>
</table>
Differ

\[ x^2 - 4 \]
\[ (x + 2)(x - 2) \]

\[ x^2 - 2x + 2x - 4 \]
\[ x^2 - 6 = (x-8)(x+8) \]
\[ \text{Add } dy \]

\[ x^2 + 4 = \frac{(x+2i)(x-2i)}{(x-2i)(x+2i)} \]

\[ x^2 + 4x + 4 \]

\[ (x+2)(x-2) = x^2 - 4 \]

\[ (x-2)^2 = x^2 - 4x + 4 \]

non-factorsable over reals
<table>
<thead>
<tr>
<th>Expression</th>
<th>Factored Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x^2 - 100$</td>
<td>$(x-10)(x+10)$</td>
</tr>
<tr>
<td>$x^2 - 36$</td>
<td>$(x-6)(x+6)$</td>
</tr>
<tr>
<td>$x^2 - 81$</td>
<td>$(x+9)(x-9)$</td>
</tr>
<tr>
<td>Expression</td>
<td>Factored Form</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>$x^2 - 5x + 6$</td>
<td>$(x-3)(x-2)$</td>
</tr>
<tr>
<td>$x^2 - 5x - 6$</td>
<td>$(x-6)(x+1)$</td>
</tr>
<tr>
<td>$\frac{x^2 - 5x}{x}$</td>
<td>$x(x-5)$</td>
</tr>
<tr>
<td>$x^2 - 25$</td>
<td>$(x+5)(x-5)$</td>
</tr>
</tbody>
</table>
Perfect Squares:
Radicals
A number $b$ is a square root of a number $a$ if $b^2$ equals $a$. 

\[ b = \sqrt{a} \quad \text{if and only if} \quad b^2 = a \]

\[ 5 = \sqrt{25} \quad \Rightarrow \quad 5^2 = 25 \]

\[ \sqrt{36} = 6 \quad \Rightarrow \quad (-7)^2 = 49 \]

\[ \sqrt{49} = 7 \quad \Rightarrow \quad \chi^2 = 49 \]

\[ \chi = \sqrt{49} = 7 \quad \Rightarrow \quad \chi^2 = 49 \]

\[ \chi = -\sqrt{49} = -7 \quad \Rightarrow \quad \chi^2 = 49 \]
\[ \sqrt{49} = 7 \]
\[ -\sqrt{49} = -7 \]
\[ \sqrt{-49} = \text{no real solution} \]
A number $b$ is a square root of a number $a$ if $b^2$ equals $a$.

A number $5$ is a square root of a number $25$ because $5^2$ equals $25$. 
<table>
<thead>
<tr>
<th>\sqrt{25}</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>\sqrt{9}</td>
<td>3</td>
</tr>
<tr>
<td>\sqrt{36}</td>
<td>6</td>
</tr>
<tr>
<td>-\sqrt{36}</td>
<td>-6</td>
</tr>
<tr>
<td>\sqrt{-36}</td>
<td>\text{no real solution}</td>
</tr>
<tr>
<td>\sqrt{10}</td>
<td>3.1623</td>
</tr>
</tbody>
</table>
Solving a quadratic equation:
Second-degree equation in one variable is called a quadratic equation
(quadratic means of the second degree).
A quadratic equation in one variable is any equation that can be written in the form:

$$ax^2 + bx + c \neq 0$$
Factoring a quadratic expression:  \( x^2 - 5x - 6 \)

Solving a Quadratic Equation:  \( x^2 - 5x - 6 = 0 \)

\[ 36 - 30 - 6 = 0 \]

\[ x^2 - 5x - 6 = (x + 1)(x - 6) \]

\[ \frac{1}{2} \cdot \frac{+5}{5(-1)} \]

\[ x - 5x - 6 = 0 \]

\[ (x + 1)(x - 6) = 0 \]

\[ x + 1 = 0 \quad \text{or} \quad x - 6 = 0 \]

\[ x = -1 \quad \text{or} \quad x = 6 \]
Unit 4 Lecture 30
Solving Quadratic Equations

Solving Quadratic Equations
Two Methods
Solving Quadratic Equations

\[ 0 = ax^2 + bx + c \]
Objectives

- Solve a quadratic equation by factoring
- Solve a quadratic equation by using the quadratic formula
Solving Quadratic Equations

0 = ax^2 + bx + c

Find values of x that make the equation = 0

Sometimes called the **zeros** or **roots** of the equation

In graphing they are called the **x-intercepts**
Solving Quadratic Equations

• Factor the quadratic, if possible
• Remember that if $A \cdot B = 0$, then either $A = 0$ or $B = 0$, or both $= 0$
• Use the quadratic formula, if the factors are not obvious
Solve: \( x^2 + 5x + 6 = 0 \)
Solve: \( x^2 + 5x + 6 = 0 \)

\[(x + 3)(x + 2) = 0\]

\[x + 3 = 0 \text{ or } x + 2 = 0\]

\[x = -3 \text{ or } x = -2\]
Solve: \( x^2 - 12x + 35 = 0 \)

\[
(x - 7)(x - 5) = 0
\]

\[x - 7 = 0 \quad \text{or} \quad x - 5 = 0\]

\[x = 7 \quad \text{or} \quad x = 5\]
Solve: \( x^2 - 12x + 35 = 0 \)

\[ (x - 7)(x - 5) = 0 \]

\( x - 7 = 0 \) or \( x - 5 = 0 \)

\( x = 7 \) or \( x = 5 \)
Solve: \( x^2 + 5x - 6 = 0 \)

\[
(x - 1)(x + 6) = 0
\]

\[
x - 1 = 0 \quad \text{or} \quad x + 6 = 0
\]

\[
x = 1 \quad \quad \quad \quad x = -6
\]
Solve: \[ x^2 + 5x - 6 = 0 \]

\[ (x + 6)(x - 1) = 0 \]

\[ x + 6 = 0 \quad \text{or} \quad x - 1 = 0 \]

\[ x = -6 \quad \text{or} \quad x = 1 \]
Solve: \( x^2 - 5x - 6 = 0 \)
Solve: $x^2 - 5x - 6 = 0$

$(x - 6)(x + 1) = 0$

$x - 6 = 0$ or $x + 1 = 0$

$x = 6$ or $x = -1$
Solve: \( x^2 - 5x - 4 = 0 \)

\[
(x+1)(x-4) = 0
\]

1. \( x^2 - 5x - 4 = 0 \)
   \[
   ax^2 + bx + c = 0
   \]

2. \( x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \)
   \[
   = \frac{5 \pm \sqrt{25 - 4(1)(-4)}}{2(1)}
   \]
   \[
   = \frac{5 \pm \sqrt{25 + 16}}{2}
   \]
   \[
   = \frac{5 \pm \sqrt{41}}{2}
   \]

\[
\begin{align*}
\frac{5 + 6.4}{2} &= \frac{11.4}{2} \\
\frac{5 - 6.4}{2} &= \frac{-1.4}{2}
\end{align*}
\]

\( a = 1 \)
\( b = -5 \)
\( c = -4 \)
Solve: \( x^2 - 5x - 4 = 0 \)

\[ (x - 4)(x + 1) = 0 \]

NO, NO, NO!
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]
Use the Quadratic Formula to solve:

0 = x^2 - 5x - 4

0 = ax^2 + bx + c

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]

\[ 0 = ax^2 + bx + c \]

\[ a = 1 \quad b = -5 \quad c = -4 \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{5 \pm \sqrt{5^2 - 4(1)(-4)}}{2(1)} \]

\[ x = \frac{5 \pm \sqrt{25 + 16}}{2} \]
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]
\[ 0 = ax^2 + bx + c \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{5 \pm \sqrt{25 + 16}}{2} \]

\[ x = \frac{2}{2} \]

\[ x = \frac{5 \pm \sqrt{41}}{2} \]
Use of the calculator to evaluate a square root.

To find the square root of a number, use $2^{nd}$ key, then use $\sqrt{}$ key in row 6 column 1.

$$\sqrt{41}$$

is keyed in as $2^{nd}$, $\sqrt{}$, 41, ENTER
Use of the calculator to evaluate a square root.

To find the square root of a number, use the 2nd key, then use the √ key in row 6 column 1.

\[ \sqrt{41} \]

is keyed in as 2nd, √, 41, ENTER

6.403
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]

\[ 0 = ax^2 + bx + c \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{5 \pm \sqrt{25 + 16}}{2} \]

\[ x = \frac{5 \pm \sqrt{41}}{2} \]

\[ x = \frac{5 \pm 6.4}{2} \]
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]

\[
x = \frac{5 \pm 6.4}{2}
\]

\[
\begin{align*}
X &= \frac{5 + 6.4}{2} = \frac{11.4}{2} = 5.7 \\
X &= \frac{5 - 6.4}{2} = \frac{-1.4}{2} = -0.7
\end{align*}
\]
Use the Quadratic Formula to solve:

\[ 0 = x^2 - 5x - 4 \]

\[ \begin{align*}
X &= \frac{5 \pm 6.4}{2} \\

&= \frac{5 + 6.4}{2} = \frac{11.4}{2} = 5.7 \\
&= \frac{5 - 6.4}{2} = \frac{-1.4}{2} = -0.7
\end{align*} \]

Two solutions: \( x = 5.7 \) and \( x = -0.7 \)
Identify each of the following as a quadratic or linear equation by clicking on the term and dragging the arrow to the corresponding equation.

**Quadratic**

- $-x^2 - 3x + 4 = 0$
- $5x + 10 = 0$
- $2x^2 - 5x - 3 = 0$

**Linear**

- $x^2 - 9 = 0$
- $3x - 6 = 0$
Combine Like Terms:

\[-8x^2 + 2x - 8 - 6x^2 + 10x + 2\]

\[-14x^2 + 12x - 6\]
Identify the Polynomials

How many terms do the following polynomials have?

- $x^2 - 9$
- $x^2 + 6x + 9$
- $3x^2$
- $5x$
- $4x - 9$
- $x^2 + xy + 3y^2$
Determine the Degree of the Polynomial

What are the degrees of the following polynomials?

- $x^2 - 9$
- $x^2 + 6x + 9$
- $3x^2$
- $5x$
- $4x^5 - 9$
- $x^2 + x^3y + 2y^3$
Profit = Revenue - Cost

The revenue equation for a company is \( R = -5x^2 + 17x \)
The cost equation for a company is \( C = 3x^2 - 27x + 40 \)
You drop a rock from the top of the 1600 feet tall Rears Tower. The height (in feet) of the rock from the ground is given by the equation:

\[ h = -16t^2 + 1600 \]

h is in feet and t is in seconds. How long until the rock hits the ground?

\[ 0 = -16t^2 + 1600 \]

\[ 0 = -16(t^2 - 100) \]

\[ \frac{-16}{-16} \]

\[ t^2 - 100 = 0 \]

\[ (t - 10)(t + 10) = 0 \]

\[ t - 10 = 0 \quad \text{or} \quad t + 10 = 0 \]

\[ t = 10 \quad \text{or} \quad t = -10 \]

\[ t = -10 \quad \text{not a solution} \]
You drop a rock from the top of the 1600 feet tall Rears Tower. The height (in feet) of the rock from the ground is given by the equation:

\[ h = -16t^2 + 1600 \]

h is in feet and t is in seconds. How long until the rock hits the ground?

\[ 0 = -16t^2 + 1600 \]
\[ 0 = -16(t^2 - 100) \]
\[ 0 = -16(t - 10)(t + 10) \]

\( t = 10 \) or \( t = -10 \)

(t - 10)=0 or (t + 10)=0
You drop a rock from the top of the 1600 feet tall Rears Tower. The height (in feet) of the rock from the ground is given by the equation:

\[ h = -16t^2 + 1600 \]

\( h \) is in feet and \( t \) is in seconds. How long until the rock hits the ground?

\[ h = -16t^2 + 1600 \]
\[ 0 = -16t^2 + 1600 \]
\[ 0 = -16(t^2 - 100) \]
\[ 0 = -16(t - 10)(t + 10) \]

\( t - 10 = 0 \) or \( t + 10 = 0 \)

\[ t = 10 \text{ or } t = 10 \]

\[ t = -10 \]

\( t = 10 \) is the only reasonable answer.
The equation for profit is,
\[ \text{Profit} = \text{Revenue} - \text{Cost} \]

Revenue: \[ R = 280x - 0.4x^2 \]

Cost: \[ C = 5000 + 0.6x^2 \]
The equation for profit is,
Profit = Revenue - Cost

Revenue: \[ R = 280x - .4x^2 \]
Cost: \[ C = 5000 + .6x^2 \]

\[
P = (280x - .4x^2) - (5000 + .6x^2)
\]

\[ P = 280x - .4x^2 - 5000 - .6x^2 \]

\[ P = -1x^2 + 280x - 5000 \]
How many items must be made and sold to generate a $439 profit.

\[ P = -1x^2 + 280x - 5000 \]
How many items must be made and sold to generate a $439 profit.

\[ P = -1x^2 + 280x - 5000 \]

Subtract 439 from both sides

\[ 439 = -1x^2 + 280x - 5000 \]

\[ 0 = -1x^2 + 280x - 5439 \]
Use the Quadratic Formula to solve:

\[ 0 = -1x^2 + 280x - 5439 \]

\[ 0 = ax^2 + bx + c \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ a = -1 \quad b = 280 \quad c = -5439 \]

\[ x = \frac{-280 \pm \sqrt{280^2 - 4(-1)(-5439)}}{2(-1)} \]

\[ x = \frac{-280 \pm \sqrt{78400 - 21756}}{-2} \]

\[ x = \frac{-280 \pm \sqrt{56644}}{-2} \]
Use the Quadratic Formula to solve:

\[ 0 = -1x^2 + 280x - 5439 \]

\[ 0 = ax^2 + bx + c \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-280 \pm \sqrt{280^2 - 4(-1)(-5439)}}{2(-1)} \]

\[ x = \frac{-280 \pm \sqrt{78400 - 21756}}{-2} \]

\[ x = \frac{-280 \pm \sqrt{56644}}{-2} \]
Use of the calculator to evaluate a square root.

To find the square root of a number, use $\sqrt{}$ key in row 6 column 1.

$\sqrt{56644}$

is keyed in as

2nd, $\sqrt{}$, 56644, ENTER
Use the Quadratic Formula to solve:

\[ 0 = -1x^2 + 280x - 5439 \]

\[ 0 = ax^2 + bx + c \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ x = \frac{-280 \pm \sqrt{280^2 - 4(-1)(-5439)}}{2(-1)} \]

\[ x = \frac{-280 \pm \sqrt{78400 - 21756}}{-2} \]

\[ x = \frac{-280 \pm \sqrt{56644}}{-2} \quad x = \frac{-280 \pm 238}{-2} \]
Use the Quadratic Formula to solve:

\[ 0 = -1x^2 + 280x - 5439 \]

\[
x = \frac{-280 \pm 238}{-2}
\]

\[
x = \left(\begin{array}{l}
\frac{-280 + 238}{-2} = \frac{42}{-2} = 21 \\
\frac{-280 - 238}{-2} = \frac{-518}{-2} = 259
\end{array}\right)
\]
Use the Quadratic Formula to solve:

\[ 0 = -1x^2 + 280x - 5439 \]

\[ x = \frac{-280 \pm 238}{-2} \]

\[ x = \frac{-280 \pm 238}{-2} \]

\[ \frac{-280 + 238}{-2} = \frac{-42}{-2} = 21 \]

\[ \frac{-280 - 238}{-2} = \frac{-518}{-2} = 259 \]

**Two solutions to make P = $439:**

\[ x = 21 \text{ and } x = 259 \text{ items} \]
Enclose a rectangle with a 40 inch string and use a wall of the room for one side of the rectangle. Make a table and find the formula for the area of the rectangle.

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wall

[Diagram of a rectangle with labeled sides W and L]
Enclose a rectangle with a 40 inch string and use a wall of the room for one side of the rectangle. Make a table and find the formula for the area of the rectangle.

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>40-2(5)=30</td>
<td>5(30)=150</td>
</tr>
<tr>
<td>10</td>
<td>40-2(10)=20</td>
<td>10(20)=200</td>
</tr>
<tr>
<td>15</td>
<td>40-2(15)=10</td>
<td>15(10)=150</td>
</tr>
<tr>
<td>X</td>
<td>40-2(X)</td>
<td>X(40-2X)=40X-2X^2</td>
</tr>
</tbody>
</table>
Enclose a rectangle with a 40 inch string and use a wall of the room for one side of the rectangle. Find the dimensions of the rectangle if the area is 65 square inches.

\[ A = 40x - 2x^2 \]

\[ 65 = -2x^2 + 40x \]
Enclose a rectangle with a 40 inch string and use a wall of the room for one side of the rectangle. Find the dimensions of the rectangle if the area is 65 square inches.

\[ A = 40X - 2X^2 \]

\[ 65 = -2x^2 + 40x \]

\[ 0 = -2x^2 + 40x - 65 \]

Subtract 65 from both sides
Use the Quadratic Formula to solve:

\[0 = -2x^2 + 40x - 65\]
Use the Quadratic Formula to solve:

\[0 = -2x^2 + 40x - 65\]

\[x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}\]

\[a = -2 \quad b = 40 \quad c = -65\]

\[x = \frac{-40 \pm \sqrt{40^2 - 4(-2)(-65)}}{2(-2)}\]

\[x = \frac{-40 \pm \sqrt{1600 - 520}}{-4}\]
Use the Quadratic Formula to solve:

\[ 0 = -2x^2 + 40x - 65 \]

\[ x = \frac{-280 \pm 238}{-2} \]

\[ x = \frac{-40 \pm 32.86}{-4} \]

\[ \frac{-40 + 32.86}{-4} = \frac{-7.14}{-4} = 1.8 \]

\[ \frac{-40 - 32.86}{-4} = \frac{-72.86}{-4} = 18.2 \]

Two solutions to make A = 65 sq in:

\[ x = 1.8 \text{ and } x = 18.2 \text{ inches} \]
A 10 cm stick is broken into two pieces. One is placed at a right angle to form an upside down “T” shape. By attaching wires from the ends of the base to the end of the upright piece, a framework for a sail will be formed.

<table>
<thead>
<tr>
<th>Base</th>
<th>Height</th>
<th>Area (A=.5bh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A 10 cm stick is broken into two pieces. One is placed at a right angle to form an upside down “T” shape. By attaching wires from the ends of the base to the end of the upright piece, a framework for a sail will be formed.

<table>
<thead>
<tr>
<th>Base</th>
<th>Height</th>
<th>Area (A=.5bh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10-(0)=10</td>
<td>(.5)(0)(10)=0 sq cm</td>
</tr>
<tr>
<td>2</td>
<td>10-(2)=8</td>
<td>(.5)(2)(8)= 8 sq cm</td>
</tr>
<tr>
<td>4</td>
<td>10-(4)=6</td>
<td>(.5)(4)(6)=12 sq cm</td>
</tr>
<tr>
<td>6</td>
<td>10-(6)=4</td>
<td>(.5)(6)(4)=12 sq cm</td>
</tr>
<tr>
<td>8</td>
<td>10-(8)=2</td>
<td>(.5)(8)(2)=8 sq cm</td>
</tr>
<tr>
<td>10</td>
<td>10-(10)=0</td>
<td>(.5)(10)(0)=0 sq cm</td>
</tr>
<tr>
<td>b</td>
<td>10-(b)</td>
<td>(.5)(b)(10-b)= 5b-.5b^2</td>
</tr>
</tbody>
</table>
What should the base of the sail be if the area must be 10 sq cm?

\[ A = 5b - 0.5b^2 \]

\[ 10 = 5b - 0.5b^2 \]
What should the base of the sail be if the area must be 10 sq cm?

\[ A = 5b - 0.5b^2 \]

\[ 10 = 5b - 0.5b^2 \quad \text{Subtract 10 from both sides} \]

\[ 0 = -0.5b^2 + 5b - 10 \]
Use the Quadratic Formula to solve:

\[ 0 = -0.5b^2 + 5b - 10 \]

\[ 0 = ax^2 + bx + c \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ a = -0.5 \quad b = 5 \quad c = -10 \]

\[ x = \frac{-5 \pm \sqrt{5^2 - 4(-0.5)(-10)}}{2(-0.5)} \]

\[ x = \frac{-5 \pm \sqrt{25 - 20}}{-1} \]
Use the Quadratic Formula to solve:

$$0 = -.5x^2 + 5x - 10$$

$$x = \frac{-5 \pm 2.24}{-1}$$

$$x = \frac{-5 \pm 2.24}{-1}$$

$$= \frac{-5 + 2.24}{-1} = \frac{-2.76}{-1} = 2.8$$

$$= \frac{-5 - 2.24}{-1} = \frac{-7.24}{-1} = 7.2$$

Two solutions to make A = 10 sq in:

x = 2.8 and x = 7.2 inches