Thursday 11/14/19
1. Grab Notes & Calc
2. Complete Warm-up
3. HW
4. Finish Solving Notes
5. Graphing Radicals Notes
Warm-Up

Solve the following radical equations. Be sure to check for extraneous solutions.

1. \( \sqrt{4x + 32} - x = 8 \)
   \( 4x + 32 = x^2 \)
   \( 0 = x^2 - 4x - 32 \)
   \( 0 = (x - 8)(x + 4) \)
   \( x = 8 \)
   \( x = -4 \)

Graph of the Square Root Function

A square root function has the form:

\[ y = a\sqrt{x - h} + k \]

The parent function has the form:

\[ y = \sqrt{x} \]

A graph of the parent function is displayed to the right.

Complete the table of values for the parent function.

<table>
<thead>
<tr>
<th>x</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>6</td>
</tr>
<tr>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Transformations of the square root function:

\[ y = a\sqrt{x - h} + k \]

<table>
<thead>
<tr>
<th>Transformation</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Shift</td>
<td>( f(x) = \sqrt{x} + k ) ( f(x) = \sqrt{x} - k )</td>
</tr>
<tr>
<td>Horizontal Shift</td>
<td>( f(x) = \sqrt{x + h} ) ( f(x) = \sqrt{x - h} )</td>
</tr>
<tr>
<td>Vertical Stretch</td>
<td>( f(x) = ax ) ( a &gt; 1 )</td>
</tr>
<tr>
<td>Vertical Compression (Shrink)</td>
<td>( f(x) = a\sqrt{x} ) ( 0 &lt; a &lt; 1 )</td>
</tr>
<tr>
<td>Reflection</td>
<td>( f(x) = -\sqrt{x} )</td>
</tr>
</tbody>
</table>
(26) \( \sqrt{-2v-6} = (v+3)^2 \)

\[-2v-6 = (v+3)(v+3)\]

\[-2v \cdot \frac{v}{6} = v^2 + 6v + 9 \]

\[-2v + 6 = \frac{v^2 + 6v + 9 + 2v + 6}{2v + 6} \]

\[0 = v^2 + 8v + 15 \]

\[0 = (v+5)(v+3) \]

\[v+5 = 0 \quad v+3 = 0 \]

\[v = -5 \quad v = -3 \]

\[v = -3 \text{ extran} \]

\[v = -5 \]

\[\sqrt{-2(-5)-6} = -5 + 3 \]

\[\frac{-2}{4} = -2 \]

\[2 = -2 \]

\[\sqrt{-2(-3)-6} = -3 + 3 \]

\[\frac{-6}{0} = 0 \]

\[0 = 0 \]
**Topic:** Graphing Radical Functions

**Examples**

Describe the transformation(s) of each function.

1) \( y = \sqrt{x} + 1 \)

   - Shifts left 1
   - Reflects over \( x \)-axis
   - Down 4 units

2) \( y = -\sqrt{x} - 4 \)

3) \( y = 2\sqrt{x} - 2 + 1 \)

   - Vertical stretch by factor of 2
   - Shifts right 2 units
   - Up 1

Write an equation using the following characteristics.

1) A radical that shifts up 2 and right 3
2) A radical that shifts left 4 and is reflected

\[ y = -\sqrt{x-3} - 2 \]
\[ y = \sqrt{x+4} - 2 \]
\[ y = -\frac{1}{2}\sqrt{x+3} - 1 \]

3) A radical has a vertical shrink of \( \frac{1}{2} \) and shifts down 1 and left 5

**Steps for Graphing**

1) Start by graphing the parent function.
2) Describe the transformation(s) of the graph.
3) Graph the transformation(s) and sketch the curve.

**Summary**

Summarize the lesson in your own words.