Domain = All possible values of \( x \)
Range = All possible values for \( y \)

\( f(x) = \sqrt{x+7} \)

Find domain:

- \( x \geq -7 \)
- \( x = 0, 1, 3, 9 \)

1. If (only if) you are given a table

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

- Domain: \( \{1, 3, 2\} \)
- Range: \( \{1, 3, 2\} \)

2. Given a function \( y = \sqrt{x-2} \)

- Domain is assumed to be all real numbers except any that give an invalid output

Example 2:

\( f(x) = \sqrt{x+5} \)

- Domain: \( \{x \geq -5\} \)
- Range: \( \{y \geq 0\} \)

3. Finding D/R given a graph

- Graph of \( f(x) = \sqrt{x-2} \)
- Graph of \( f(x) = \sqrt{x+5} \)

4. Given a graph

- Domain: \( \{2, 3\} \)
- Range: \( \{2, 3\} \)

5. Solving Quadratics (\( x^2 \ldots \))

\( x^3 + 3x + 2 = 0 \)

- Expression: \( x^3 + 3x + 2 = 0 \)
- Equation: \( x^3 + 3x + 2 = 0 \)

Who cares? Simplify by multiplying both sides by a number or factor.

To solve \( x^3 + 3x + 2 = 0 \)

- \( x^3 + 3x + 2 = 0 \)
- \( x^3 + 3x = -2 \)
- \( x \) cannot be isolated.

So we factor it.
To solve \( x^2 + 3x + 2 = 0 \)

\[ x^2 + 3x - 2 = 0 \]

\( x \) cannot be isolated, so we factor it.

1. Factor
   \[ (x + 2)(x + 1) = 0 \]
   \[ x + 2 = 0 \quad x + 1 = 0 \]
   \[ x = -2 \quad x = -1 \]

2. Zero Products Property
   \[ a \cdot b = 0 \Rightarrow a = 0 \text{ or } b = 0 \]

3. Set each factor to zero

4. Check

\[ x^2 + 3x + 2 \]
\[ (-1)^2 + 3(-1) + 2 \]
\[ 1 - 3 + 2 = 0 \]

Solving Quadratics

\[ y^2 - 10y + 24 = 0 \]
\[ 3y^2 - y - 14 = 0 \]

\[ (y - 4)(y - 6) = 0 \]
\[ 3y^2 - y - 14 = 0 \]

\[ y = 4 \text{ or } y = 6 \]

\[ y^2 + 6y - 7y - 42 \]
\[ 3y(y + 2) - 7(y + 2) = 0 \]
\[ (3y - 7)(y + 2) = 0 \]

\[ 3y - 7 = 0 \text{ and } y + 2 = 0 \]
\[ y = \frac{7}{3} \quad y = -2 \]

\[ y^2 = y + 1 \]
\[ \frac{y - 5}{5} \]

\[ (3x) \]
\[ \frac{y^2 - y}{5} = \frac{1}{2} \]

\[ y^2 - 2y - 15 = 0 \]

\[ (y + 3)(y - 5) = 0 \]
\[ y = 3 \quad y = 5 \]