Graphing Linear Equations using Intercepts

**Essential Question(s):** How do you graph a linear equation using the x-intercept and y-intercept? When is it easiest to use intercepts to graph an equation?

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**x-intercept:** the __________________________ of a point where the graph crosses the ____________.

**y-intercept:** the __________________________ of a point where the graph crosses the ____________.

**STANDARD FORM**
The x- and y-intercepts are easy to find when an equation is in STANDARD FORM.

The standard form of a linear equation is:

Notes:
- A & B are NOT BOTH zero (either A or B can be zero, but not both).
- The x and y terms are on the same side of the = sign, and the constant (C) is on the other side of the = sign.
- A, B, and C are integers (positive or negative whole numbers)
- No fractions or decimals.
- Traditionally the “Ax” term is positive.
HOW TO FIND X- AND Y- INTERCEPTS

To find the x-intercept:
   Let _________ in the equation and ________________________.

To find the y-intercept:
   Let _________ in the equation and ________________________.

Example 1: Find the x- and y-intercepts of $2x + y = 6$.

x-intercept:

$2x + y = 6$  \hspace{1cm} \text{Original equation}

$2x + ___ = 6$  \hspace{1cm} \text{Substitute 0 in for y}

\hspace{1cm} \text{Solve for x}

The x-intercept is __________

y-intercept:

$2x + y = 6$  \hspace{1cm} \text{Original equation}

$2(___) + y = 6$  \hspace{1cm} \text{Substitute 0 in for x}

\hspace{1cm} \text{Solve for y}

The y-intercept is __________

The graph passes through the point ________

The graph passes through the point ________

Practice: Find the x- and y-intercepts of $-4x + 3y = -12$

x-intercept: y-intercept:
Using Intercepts to Graph a Linear Equation

Find the x-intercept and y-intercept.
Plot the x-intercept and y-intercept as points on a graph.
Draw a line through the points.

Example 2: Graph the equation $8x - 4y = -16$ using intercepts.

<table>
<thead>
<tr>
<th>x-intercept:</th>
<th>y-intercept:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$8x - 4y = -16$</td>
<td>$8x - 4y = -16$</td>
</tr>
</tbody>
</table>

The x-intercept is ___________  The y-intercept is ___________
So plot the point ___________.  So plot the point ____________.

Draw a line through the x-intercept and y-intercept to graph the equation.

Practice: Graph the linear equation $x + 3y = 6$ using intercepts.

<table>
<thead>
<tr>
<th>x-intercept:</th>
<th>y-intercept:</th>
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</thead>
<tbody>
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Identifying the Intercepts from a Graph

Use the following graph to identify the intercepts of the line shown.

x-intercept: __________
y-intercept: __________

Practice: Use the graph to find the x- and y-intercepts.

1) x-intercept: __________
y-intercept: __________

2) x-intercept: __________
y-intercept: __________