Graph the linear equation, \(-2x + y = 4\) by finding the intercepts.

Even if the instructions had not specified it, we could recognize the equation above as a linear equation (in standard, \(Ax + By = C\), form). In which case, we would expect to find one \(x\)-intercept and one \(y\)-intercept. So, we proceed to find these two points which will allow us to construct a “straight line” through them in order to obtain the graph of the equation.

Since any \(x\)-intercept must have a \(y\)-coordinate of zero, we take the original equation, let \(y = 0\), and solve the resulting equation for \(x\) (as follows)...

\[
\begin{align*}
-2x + 0 &= 4 \\
-2x &= 4 \\
x &= -2 \\
\end{align*}
\]

\(i.e., \quad x\)-intercept @ \((-2,0)\)

And since any \(y\)-intercept must have an \(x\)-coordinate of zero, we take the original equation, let \(x = 0\), and solve the resulting equation for \(y\) (as follows)...

\[
\begin{align*}
-2 \cdot 0 + y &= 4 \\
0 + y &= 4 \\
y &= 4 \\
\end{align*}
\]

\(i.e., \quad y\)-intercept @ \((0,4)\)

We may now plot these two points (the \(x\)- and \(y\)-intercepts), and then draw a straight-line through them, as shown below:

Since one can always draw a line through any two points, we proceed onward to find a third point to confirm that we have indeed graphed correctly the line corresponding to the given equation. We will let \(x = -1\) and solve for \(y\):

\[
\begin{align*}
-2 \cdot (-1) + y &= 4 \\
2 + y &= 4 \\
y &= 4 - 2 \\
\end{align*}
\]

Thus \((-1,2)\) should be a point on the line, and we plot it to make sure it lies on the line we previously graphed...