The X and Y intercepts

X Intercept - where the graph crosses the x axis.

NOTE - When the graph crosses the x axis the value of $y = 0$

Y Intercept - where the graph crosses the y axis.

NOTE - When the graph crosses the y axis the value of $x = 0$

<table>
<thead>
<tr>
<th>$x$</th>
<th>$y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>-1</td>
<td>0</td>
</tr>
</tbody>
</table>

$y = 3x + 3$
Graphing linear (line) equations using the x and y intercepts

1) substitute 0 for x and solve for y
2) substitute 0 for y and solve for x
3) plot the points
4) draw the line

solve for y
\[
y = 2x + 4 \\
y = 2(0) + 4 \\
y = 0 + 4 \\
y = 4
\]
solve for x
\[
y = 2x + 4 \\
(0) = 2x + 4 \\
-4 = 2x \\
-4 \div 2 = X \\
-2 = X
\]

Plot the points

Draw the graph

\[
y = 2x + 4
\]
NOTE: You need to be careful plotting line graphs this way when the intercepts are not integers.

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

**y-intercept**
(remember - \( x = 0 \))

\[ y = \frac{1}{2}(0) + \frac{2}{3} \]

\[ y = 0 + \frac{2}{3} \]

\[ y = \frac{2}{3} \]

y intercept = \((0, \frac{2}{3})\)

**x-intercept**
(remember - \( y = 0 \))

\[ 0 = \frac{1}{2}x + \frac{2}{3} \]

\[ -\frac{2}{3} = \frac{1}{2}x \]

\[ -\frac{2}{3} \cdot \frac{2}{1} = \frac{1}{2}x \cdot \frac{2}{1} \]

\[ -1\frac{1}{3} = x \]

x intercept = \((1\frac{1}{3}, 0)\)
Can you tell where the x and y intercepts are by looking at the graph below?

The only way to get the exact coordinates is by letting $x = 0$ and solving for $y$ and then letting $y = 0$ and solving for $x$

$$y = \frac{2}{3}x + \frac{1}{5}$$

$$y = \frac{2}{3}(0) + \frac{1}{5}$$

$$y = 0 + \frac{1}{5}$$

$$y = \frac{1}{5}$$

$y$ intercept = $(0, \frac{1}{5})$

$$0 = \frac{2}{3}x + \frac{1}{5}$$

$$0 = \frac{2}{3}x + \frac{1}{5}$$

$$-\frac{1}{5} = \frac{2}{3}x$$

$$-\frac{1}{5} = \frac{2}{3}x$$

$$\frac{-1}{5} = \frac{2}{3}$$

$$\frac{-3}{10} = x$$

$x$ intercept = $(-\frac{3}{10},0)$
How we can use the intercepts

At the play, student tickets were sold for $5 and adult tickets were sold for $8. In total $400 was collected. Let $x$ be the number of student tickets sold and $y$ be the number of adult tickets sold.

This can be represented by the equation $5x + 8y = 400$

**Y intercept**

$$5x + 8y = 400$$
$$5(0) + 8y = 400$$
$$8y = 400$$
$$\frac{8y}{8} = \frac{400}{8}$$
$$y = 50$$

**Y intercept = (0,50)**

Since $x$ represents the number of student tickets sold, if no student tickets were sold 50 adult tickets had to be sold.

**X intercept**

$$5x + 8(0) = 400$$
$$5x = 400$$
$$\frac{5x}{5} = \frac{400}{5}$$
$$x = 80$$

**X intercept = (80,0)**

Since $y$ represents the number of adult tickets sold, if no adult tickets were sold 80 student tickets had to be sold.