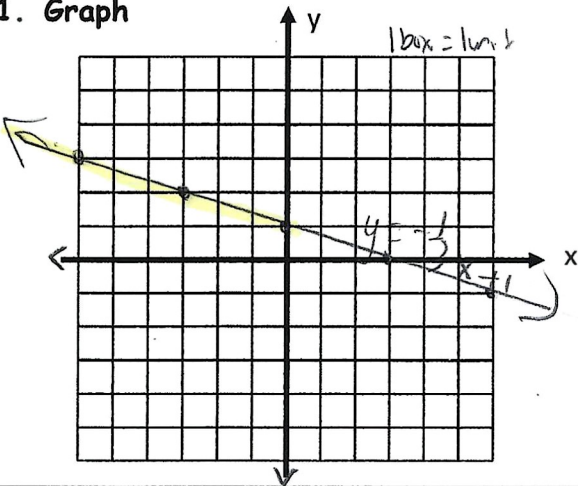
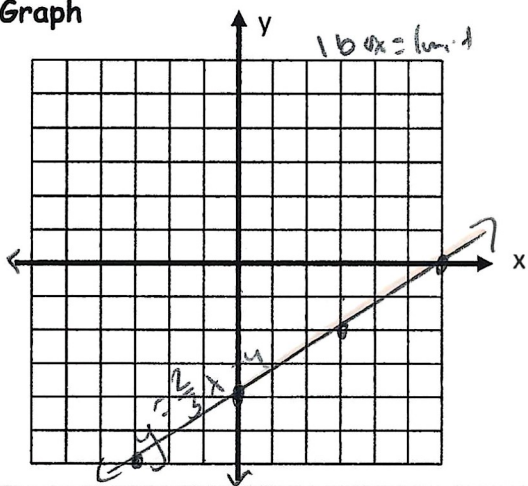
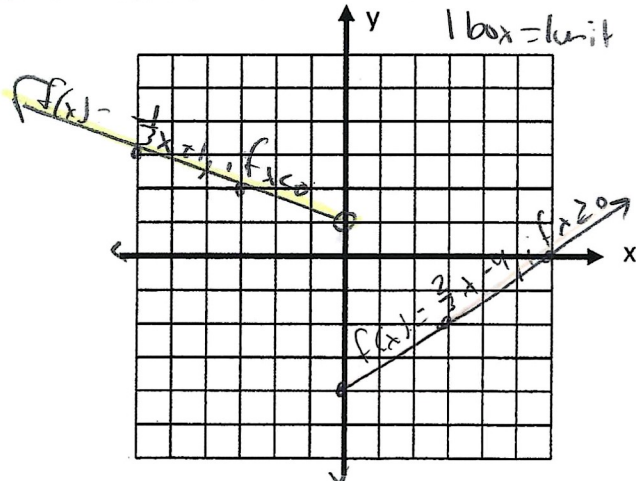


## Introduction to Piecewise Functions

• Represented by a combination of equations, each corresponding to a part of the domain

<p><b>1. Equation</b></p> $y = -\frac{1}{3}x + 1$ <p style="text-align: right;"><math>m = -\frac{1}{3} \downarrow</math> <math>b = 1</math></p>	<p><b>2. Equation</b></p> $y = \frac{2}{3}x - 4$ <p style="text-align: right;"><math>m = \frac{2}{3} \uparrow</math> <math>b = -4</math></p>
<p><b>1. Graph</b></p> 	<p><b>2. Graph</b></p> 
<p>Highlight the PIECE where <math>x</math> is less than 0</p> <p style="text-align: center;"><math>x &lt; 0</math> (constraint)</p>	<p>Highlight the PIECE where <math>x</math> is greater than or equal to 0</p> <p style="text-align: center;"><math>x \geq 0</math> (constraint)</p>

Combine both PIECES into ONE FUNCTION called a Piecewise Function

<p><b>Equation</b></p> $f(x) = \begin{cases} -\frac{1}{3}x + 1, & \text{if } x < 0 & (\text{open circle}) \\ \frac{2}{3}x - 4, & \text{if } x \geq 0 & (\text{closed circle}) \end{cases}$	<p><b>Graph</b></p> 
<p>* Steps to graph on calc:</p> <ol style="list-style-type: none"> <li>① press <math>[Y=]</math></li> <li>② place expressions in a set of <math>\{ \}</math></li> <li>③ place constraints in a set of <math>( )</math> using <math>[and]</math> <math>[or]</math> <math>[+]</math> <math>[-]</math> <math>[*]</math> <math>[/math&gt;</math></li> <li>④ press <math>[graph]</math></li> </ol>	

<p><b>3. Equation</b></p> $y = -2x - 4$ <p><math>m = -\frac{2}{1}</math> <math>b = -4</math></p>	<p><b>4. Equation</b> <i>horizontal line</i></p> $y = -4$ <p><math>m = 0</math> <math>b = -4</math></p>	<p><b>5. Equation</b></p> $y = \frac{1}{2}x + 3$ <p><math>m = \frac{1}{2}</math> <math>b = 3</math></p>
<p>Highlight the <b>PIECE</b> where <math>x</math> is less than <math>-3</math></p> $x < -3$	<p>Highlight the <b>PIECE</b> where <math>x</math> is greater than <math>-3</math> and less than <math>2</math></p> $-3 < x < 2$	<p>Highlight the <b>PIECE</b> where <math>x</math> is greater than or equal to <math>2</math></p> $x \geq 2$

Combine all **PIECES** into **ONE FUNCTION** called a Piecewise Function

<p><b>Equation</b></p> $f(x) = \begin{cases} -2x - 4, & \text{if } x < -3 & \text{(open circle)} \\ -4, & \text{if } -3 < x < 2 & \text{(open circles)} \\ \frac{1}{2}x + 3, & \text{if } x \geq 2 & \text{(closed circle)} \end{cases}$
<p><b>Graph</b></p>