1. Suppose that \( f(x) = 5x - 7 \) for all \( x \in \mathbb{R} \).
   a. Complete the following table:

<table>
<thead>
<tr>
<th>( x )</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. Complete the following mapping diagram for \( f \) with the indicated numbers (determine an appropriate scale for the target values):

   c. Sketch a graph for \( f \) based on the chart (determine an appropriate scale for the vertical axis):
2. Let \( f(x) = mx + b \) sketch mapping diagrams for the following: Use the same scale for the second axis.

a. \( m = -2; b = 1: f(x) = -2x + 1 \)   m = 2; 

b. \( b = 1: f(x) = 2x + 1 \)

c. \( m = \frac{1}{2}; b = 1: f(x) = \frac{1}{2}x + 1 \)

d. \( m = 0; b = 1: f(x) = 0x + 1 \)

e. \( m = 1; b = 1: f(x) = x + 1 \)
3. **Using the focus point to solve a problem.** [Use the same scale for the second axis.]

E 1. Solving a linear equation: 2x + 1 = 5; 2x + 1 = x + 2

Let \( f(x) = 2x + 1 \) and \( g(x) = x + 2 \)

For which \( x \) does \( f(x) = 5 \); \( f(x) = g(x) \)?

**Solution:** Find the focus points \([2,1]\) for \( f \) and \([1,2]\) for \( g \).

Use \([2,1]\) and \([1,2]\) to find the solutions.

What visual feature of \([2,1]\) and \([1,2]\) identified \( x \) where \( f(x) = g(x) \)?

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4. Find “fixed points” of \( f : f(x) = 2x + 1 \)

For which \( x \) does \( f(x) = x \)?

**Solution:** Find the focus point \([2,1]\) for \( f \). Use \([2,1]\) to find the solution.

What visual feature of \([2,1]\) identified \( x \) where \( f(x) = x \)?
5. 
   a. On separate diagrams sketch mapping diagrams for \( g(x) = 2x \) and \( h(x) = x + 1 \)

   b. Use these sketches to draw a composite sketch of the mapping diagram for the composite function \( f(x) = h(g(x)) = (2x) + 1 \) and then a sketch for the mapping diagram of \( f(x) = 2x + 1 \)
c. Use the sketches of part a. to draw a composite sketch of the mapping diagram for the composite function \( p(x) = g(h(x)) = 2(x + 1) \) and then a sketch for the mapping diagram of \( p(x) = 2(x + 1) = 2x + 2 \)

Inverse linear functions:

6. a. Make a transparency for mapping diagrams for \( g(x) = 2x \) and \( h(x) = x + 1 \). Flip the transparency over and use this on separate diagrams to sketch mapping diagrams for \( \text{invg}(x) = \frac{1}{2}x \) and \( \text{Invh}(x) = x - 1 \).
“Socks and shoes” with mapping Diagrams

b. Use the sketches of part a to draw a composite sketch of the mapping diagram for the composite function \( \text{invf}(x) = \text{invh}(\text{invg}(x)) = \frac{1}{2}(x - 1) \) and then a sketch for the mapping diagram of \( \text{invf}(x) = \frac{1}{2}(x - 1) = \frac{1}{2}x - \frac{1}{2} \)

7. How would you use the Linear Focus to find the mapping diagram for the function inverse for a linear function when \( m \neq 0 \)?

8. How does the choice of axis scales affect the position of the linear function focus point and its use in solving equations?