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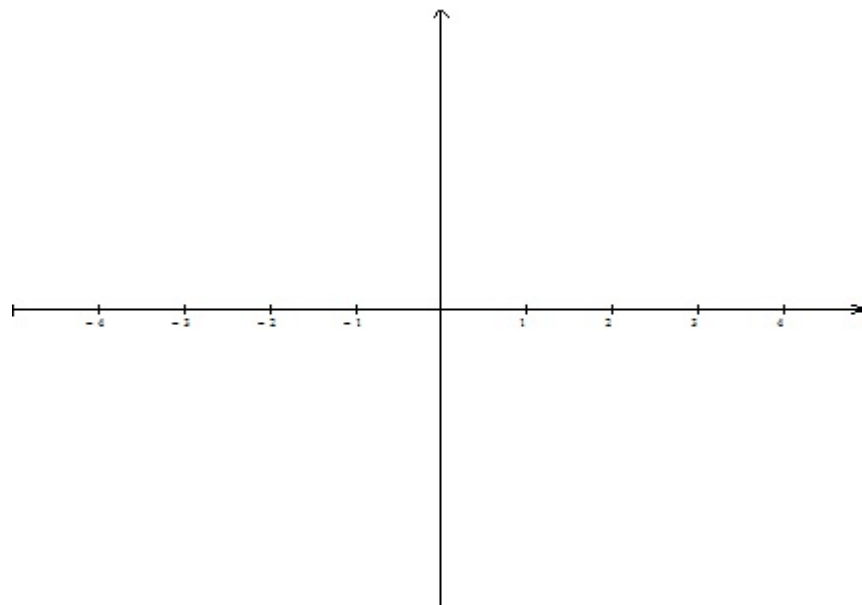   a. Complete the following table :

x	-3	-2	-1	0	1	2	3
$f(x)$							

   b. Complete the following mapping diagram for f with the
      indicated numbers (determine an appropriate scale for the
      target values.):
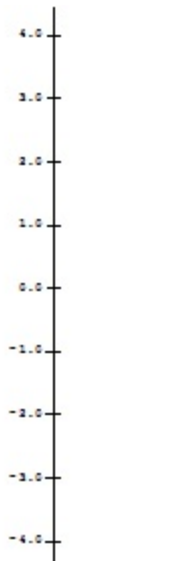
```
                                                    4.0 ┤
                                                    3.0 ┤
                                                    2.0 ┤
                                                    1.0 ┤
                                                    0.0 ┤
                                                   -1.0 ┤
                                                   -2.0 ┤
                                                   -3.0 ┤
                                                   -4.0 ┤
```
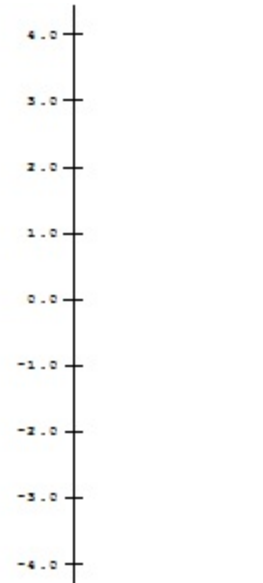
   c. Sketch a graph for f based on the chart (determine an appropriate scale for the vertical
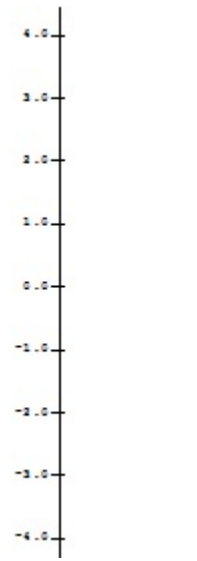   axis.):

2. Let $f(x) = \mathbf{m}\,x + \mathbf{b}$ sketch mapping diagrams for the following:
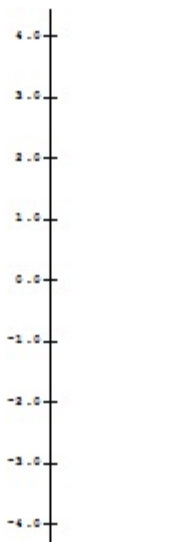
Use the same scale for the second axis.
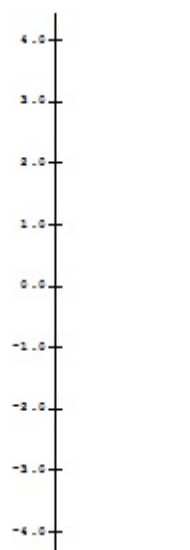
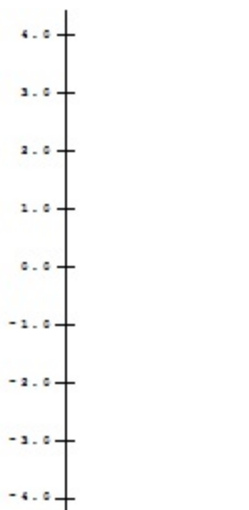a. m = -2; b = 1: $f(x) = -2x + 1$

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

b. m = 2; b = 1: $f(x) = 2x + 1$

e. m = 1; b = 1: $f(x) = x + 1$

c. m = ½; b = 1: $f(x) = ½\,x + 1$

3.   Using the focus point to solve a problem. [Use the same scale for the second axis.]
E 1.Solving a linear equation: $2x+1 = 5$
Let $f(x) = 2x+1$
For which x does $f(x) = 5$?

Solution: Find the focus points $[2,1]$ for f.
Use $[2,1]$ to find the solutions.

```
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
```
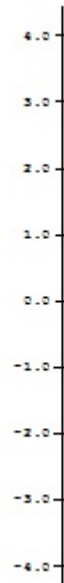
4.   Suppose f is a linear function with $f(1) = 3$ and $f(3) = -1$.
Find $f(0)$. Ans. _____
For which x does $f(x) = 0$. Ans.: _____

Solution: Find the focus point P_f for f.
Use P_f to find the solution.

```
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
```
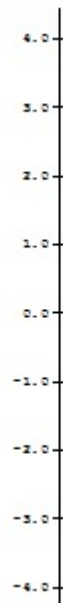
5.

   a.   On separate diagrams sketch mapping diagrams for $g(x) = 2x$ and $h(x) = x+1$
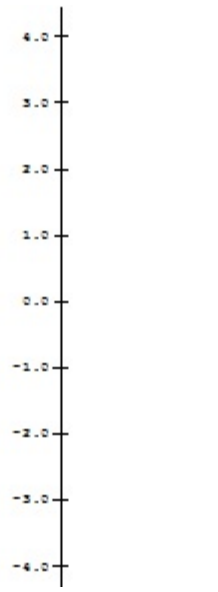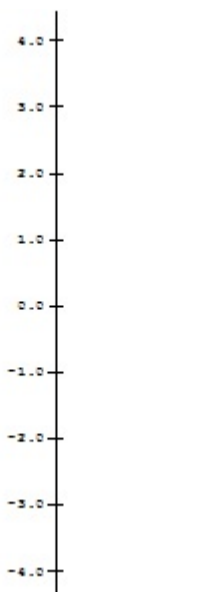
b. Use these sketches to draw a composite sketch of the mapping diagram for the composite
function $f(x) = h(g(x)) = (2x) + 1$ and then a sketch for the mapping diagram of $f(x) = 2x + 1$
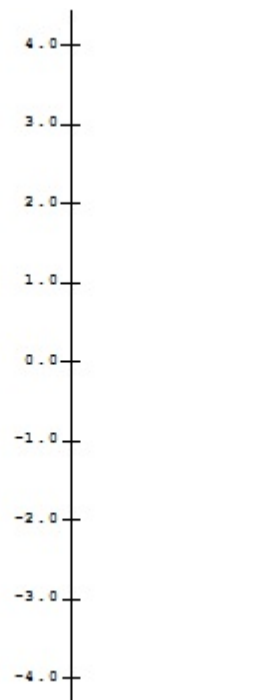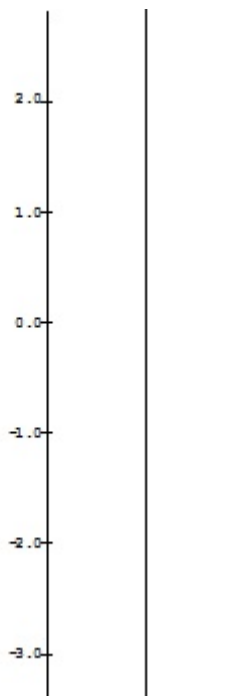
c. Use the sketches of part a. to draw a composite sketch of the mapping diagram for the composite function p(x) = g(h(x)) =2(x + 1) and then a sketch for the mapping diagram of p(x) = 2(x + 1) = 2x +2
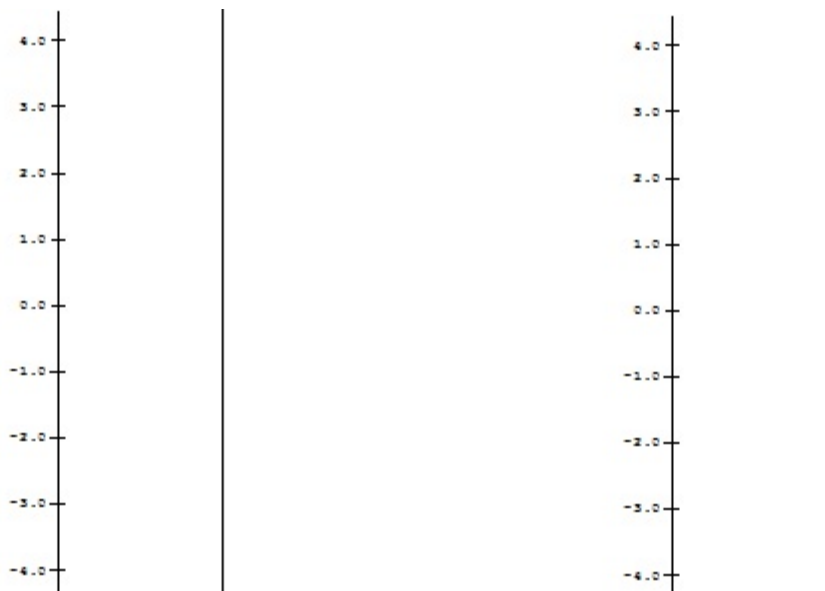
Inverse linear functions:

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
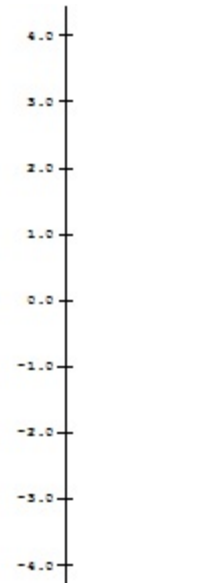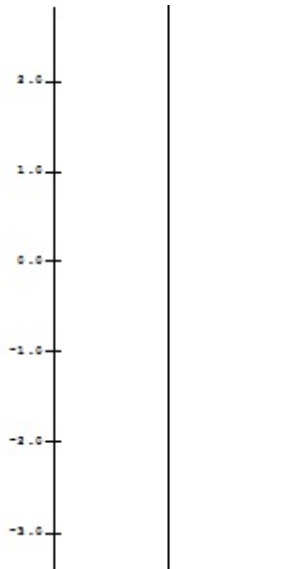
               Invg(x) = 1/2 x   and   Invh(x)= x-1

"Socks and shoes" with mapping Diagrams

    b. Recall $f(x) = h(g(x)) = (2\,x) + 1$ Use the sketches of part a to draw a composite sketch of the mapping diagram for the composite function $invf(x) = invg(invh(x)) = 1/2(x - 1)$ and then a sketch for the mapping diagram of $invf(x) = 1/2(x - 1) = 1/2\,x -1/2$

Think about These Problems:

7. How would you use the Linear Focus to **find the mapping diagram for the function inverse for a linear function when m≠0?**

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