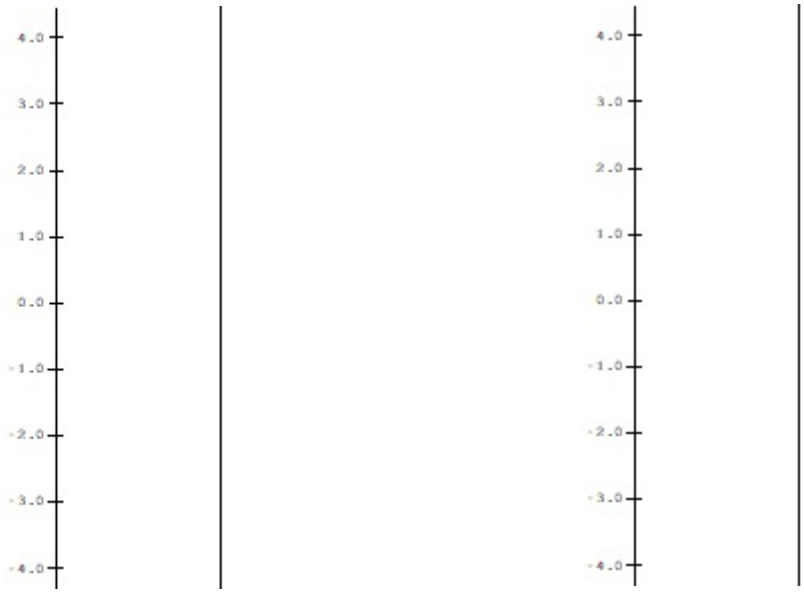
1.

a. Complete the following tables for $m(x) = 2x$ and $s(x) = x + 1$

x	$m(x) = 2x$	$s(x) = x + 1$
2		
1		
0		
-1		
-2		

b. Using the data from part a), on separate diagrams sketch mapping diagrams for $m(x) = 2x$ and $s(x) = x+1$



2. Let $q(x) = x^2$.

a. Complete the following table for $q(x) = x^2$.

x	$q(x) = x^2$
2	
1	
0	
-1	
-2	

b. Using the data from part a), sketch a mapping diagram for $q(x) = x^2$.

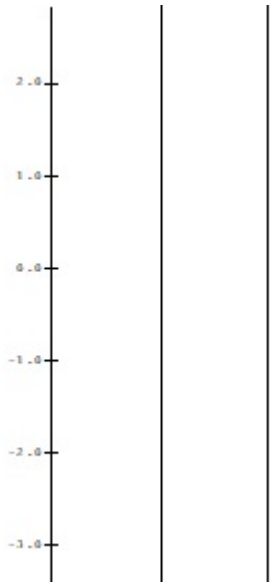
3.

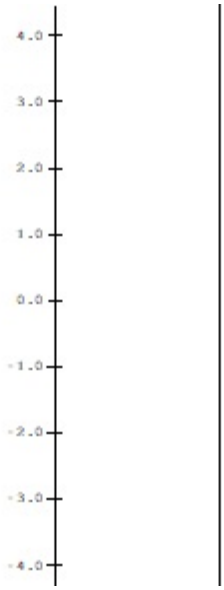
a. Complete the following table for the composite function $f(x) = s(m(x)) = 2x + 1$.

x	$m(x) = 2x$	$s(m(x)) = 2\,x + 1$
2		
1		
0		
-1		
-2		

b. Use the table and the previous sketches of 1.b to draw a composite sketch of the mapping diagram with 3 axes for the composite function $f(x) = s(m(x)) = 2x + 1$

c. Draw a sketch for the mapping diagram with 2 axes of $f(x) = 2\,x + 1$.



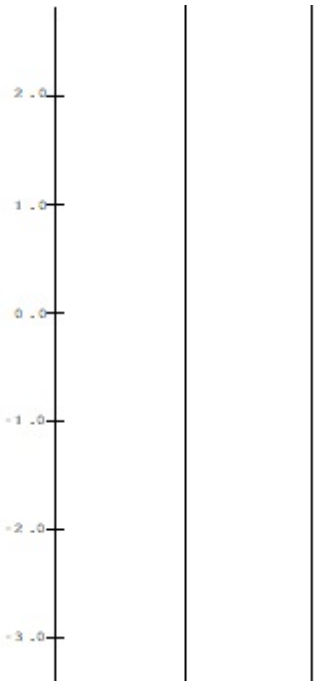


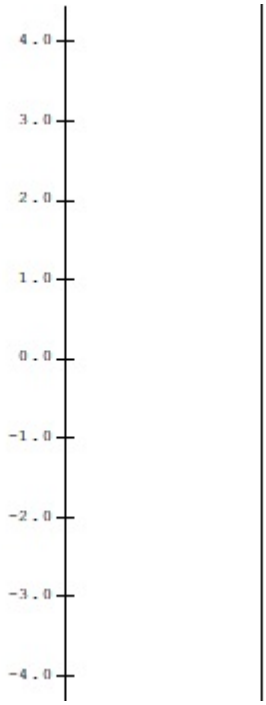
4. Let $q(x) = x^2$ and $R(x) = s(q(x)) = x^2 + 1$.

   a. Complete the following tables for $q(x) = x^2$ and $R(x) = s(q(x)) = x^2 + 1$

x	$q(x) = x^2$	$R(x) = s(q(x)) = x^2 + 1$
2		
1		
0		
-1		
-2		

   b. Using the data from part a), on separate diagrams sketch mapping diagrams for the composition $R(x) = s(q(x)) = x^2 + 1$with three axes and then two axes.





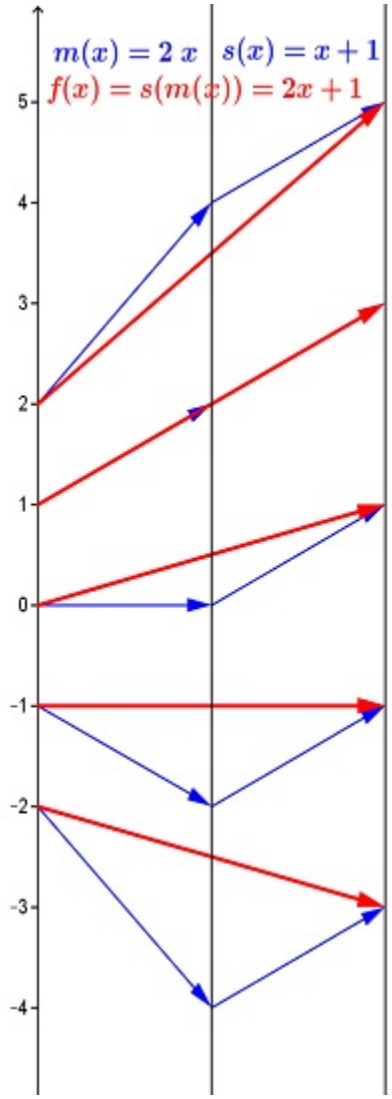
5. Solving Equations:
   a. Use a standard algebraic approach to solve the following equation. Show all steps. Check your answer.

$$2x + 1 = 5.$$

Work:

Check:

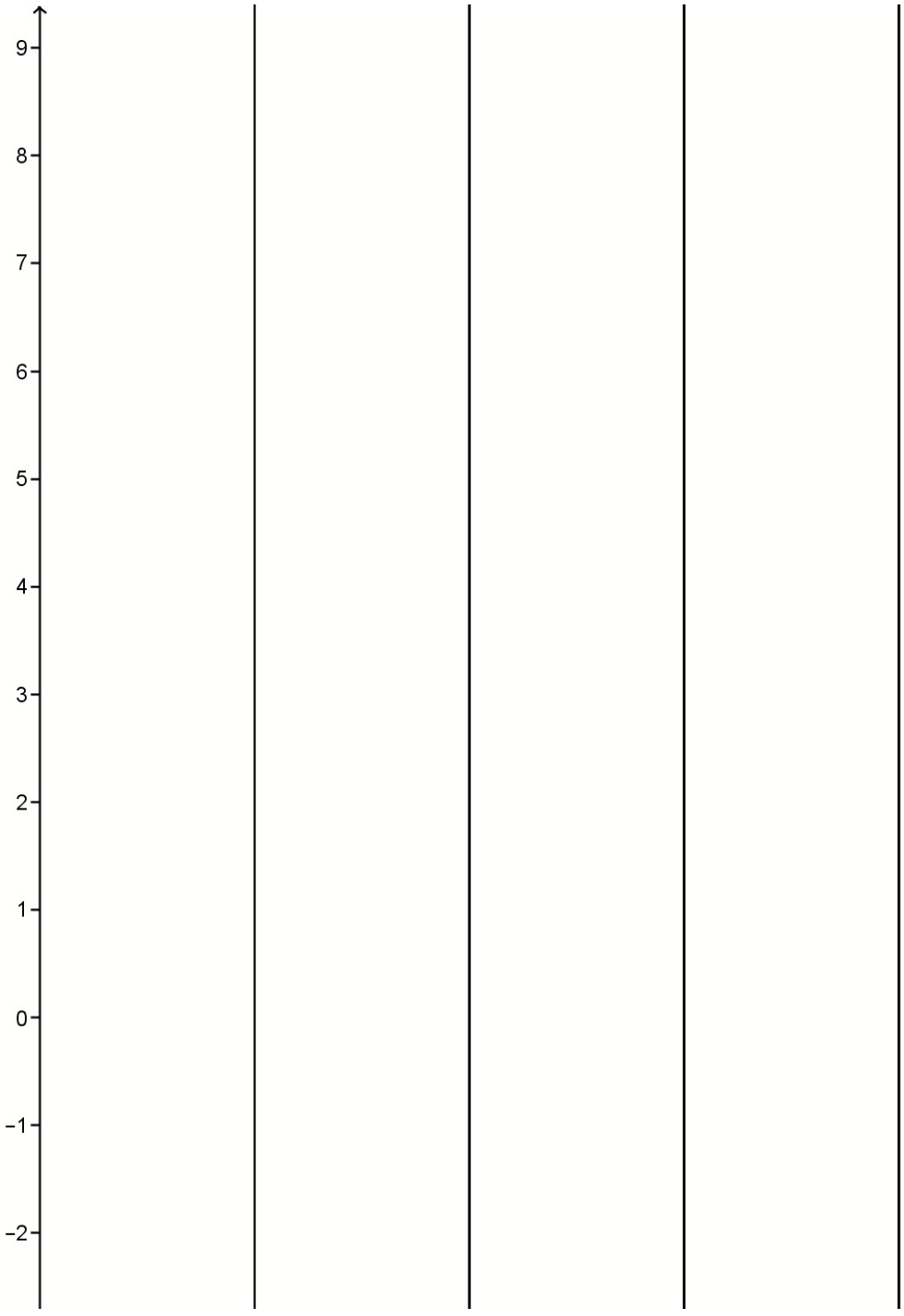
   b. On the mapping diagram below indicate by adding and circling numbers and arrows how the diagram visualizes the work in your algebraic solution of $2x + 1 = 5$.



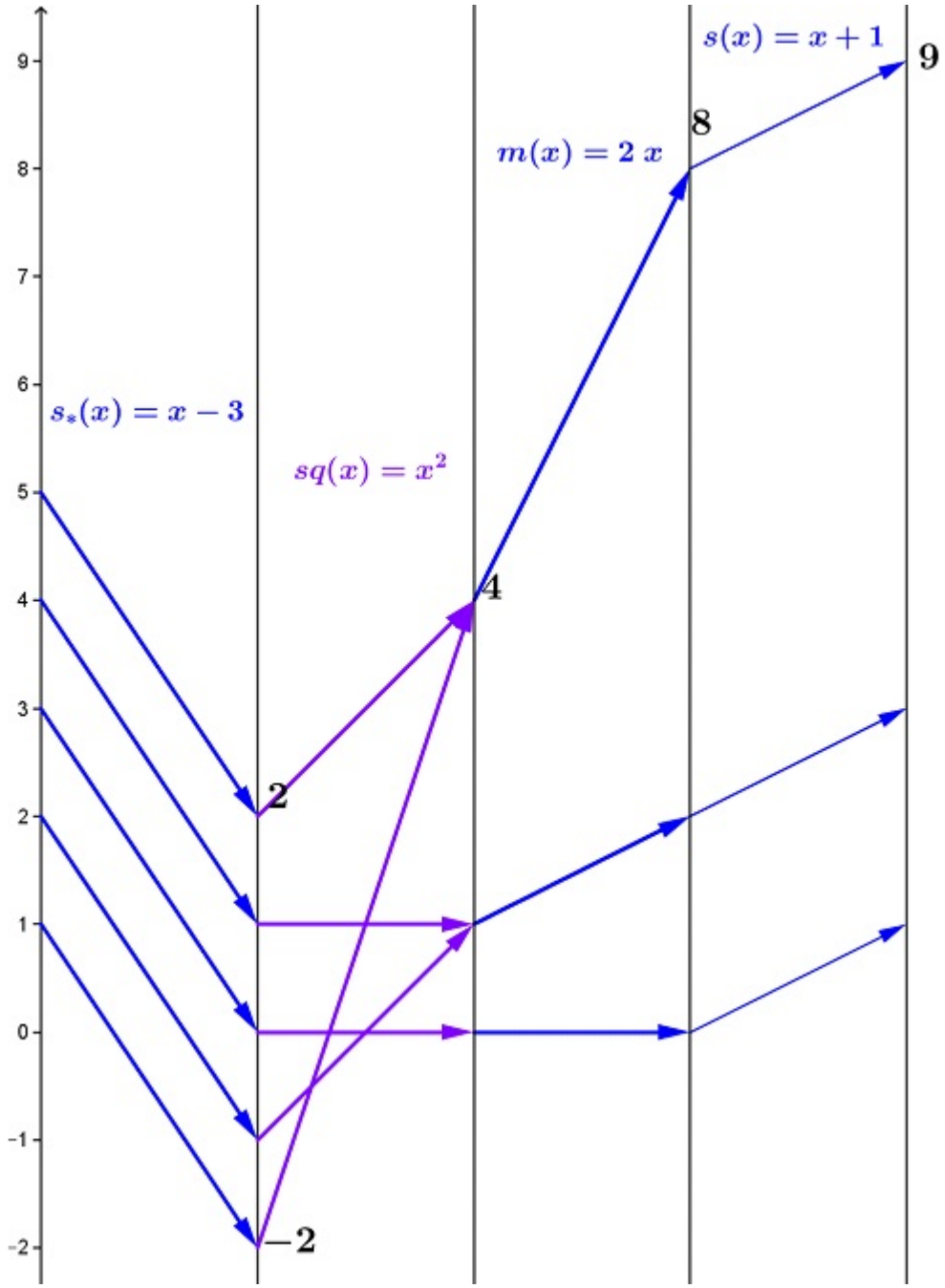
6. Solving $\mathbf{2(x-3)^2 + 1 = 9}$ with a mapping diagram.
   a. Express $\boldsymbol{f(x) = 2(x-3)^2 + 1}$ as composition of core linear and quadratic functions.
   $f(x) = h(m(q(z(x))))$ where

   $h(x) =$ _____
   $m(x) =$ _____
   $q(x) =$ _____
   $z(x) =$ _____

   b. Sketch a mapping diagram for f **as a composition**.



c. On the mapping diagram below indicate by circling numbers and arrows how the diagram visualizes the solution of **$2(x\text{-}3)^2 + 1 = 9$. Check the solutions.**

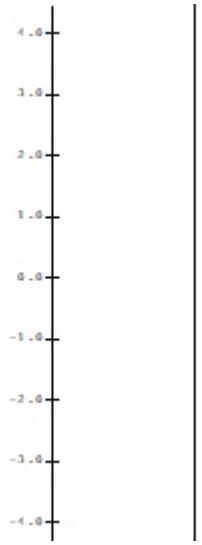


Check:

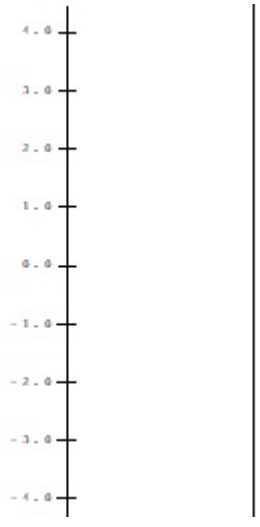
7. Let $f(\mathbf{x}) = \mathbf{mx} + \mathbf{b}$ sketch mapping diagrams for the following:
Use the same scale for the second axis.

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

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



c. m = ½; b = 1: $f(x) = ½ x + 1$



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

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

8.

a. Use a focus point in the mapping diagram to solve a linear equation:

$$2x + 1 = 4.$$

i. Consider $f(x) = 2x + 1$.

Draw the arrows for $0 \to f(0)$ and $1 \to f(1)$.

ii. Find the focus point for *f*.

iii. Connect the focus point to 4 on the target axis to find the solution on the source axis.

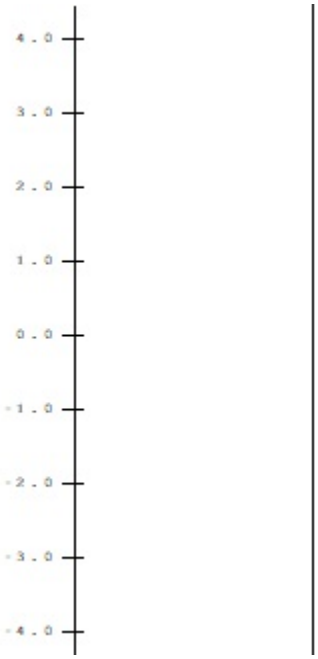
9. Suppose *f* is a linear function with $f(1) = 3$ and $f(3) = -1$.

a. Find the focus point of *f*.

Without algebra

b. Use the focus point to find $f(0)$.

c. Use the focus point to find x where $f(x) = 0$.



Mapping Diagrams (2 and 3 Axes)