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		

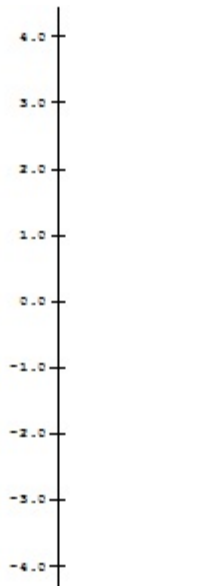b.   Using the data from part a), on separate diagrams sketch mapping diagrams for $m(x) = 2x$ and $s(x) = x+1$
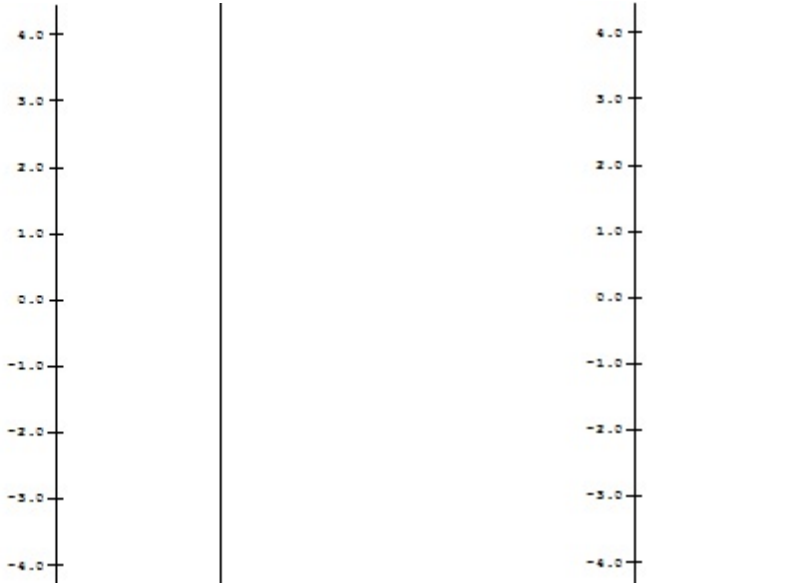
2.   Let $q(x) = x^2$.

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	$m(x) = 2x$	$s(m(x)) = 2x + 1$
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 <u>3 axes for the composite function $f(x) = s(m(x)) = 2x + 1$</u>

c. Draw a sketch for the mapping diagram with <u>2 axes of $f(x) = 2x + 1$.</u>

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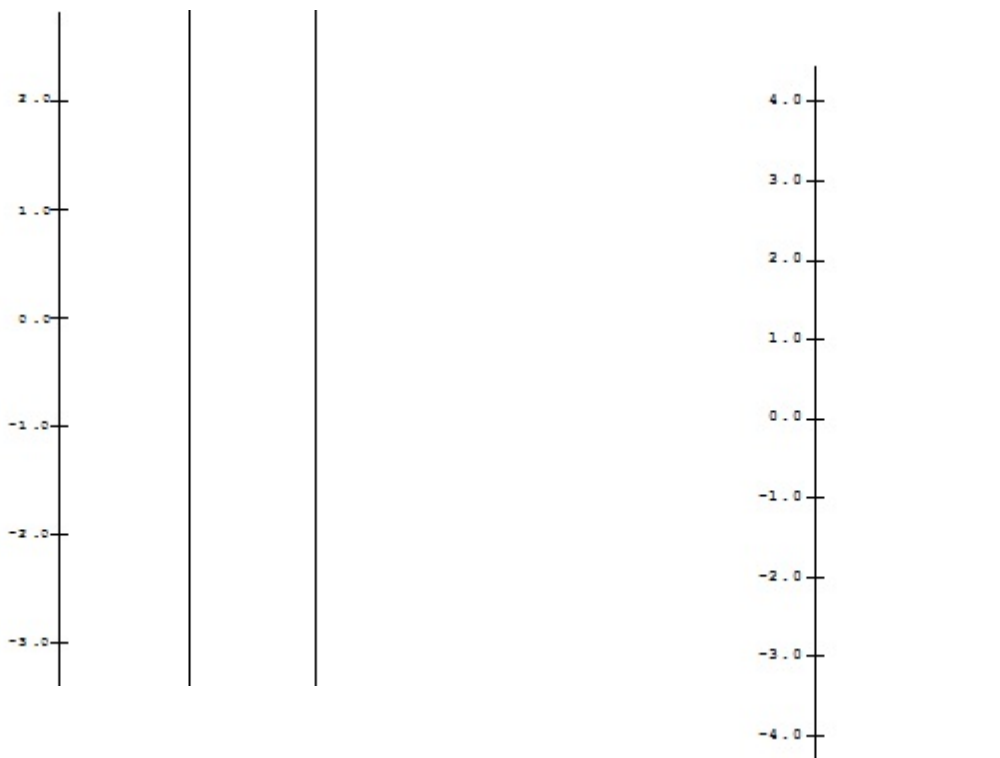
5. Solving Equations:
    a. Use a standard algebraic approach to solve the following equation. Show all steps. Check your answer.

$$2x + 1 = 5.$$

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 $2x + 1 = 5$.

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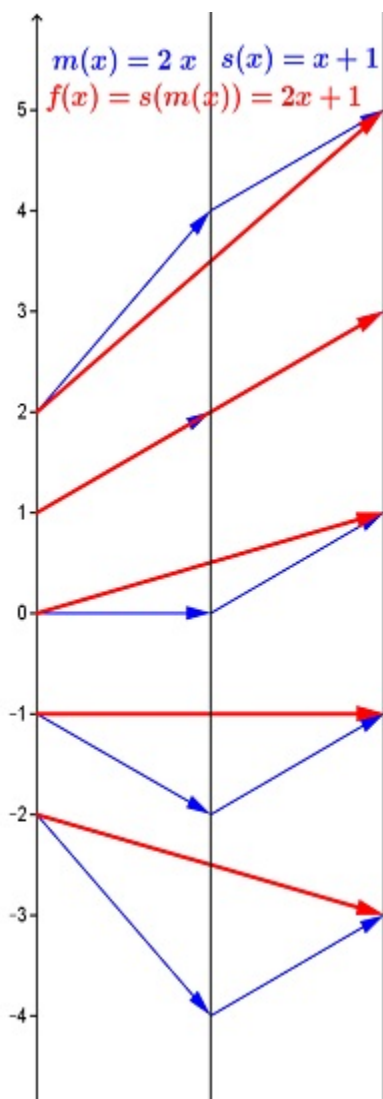
6. Solving $2(x\text{-}3)^2 + 1 = 9$ with a mapping diagram.
    a.   Express $f(x) = 2(x\text{-}3)^2 + 1$ as composition of core linear and quadratic functions.
            $$f(x) = h\,(\,m\,(\,q\,(\,z\,(\,x\,))))\quad\text{where}$$

            $h\,(\,x\,) = \underline{\hspace{2cm}}$
            $m\,(\,x\,) = \underline{\hspace{2cm}}$
            $q\,(\,x\,) = \underline{\hspace{2cm}}$
            $z\,(\,x\,) = \underline{\hspace{2cm}}$

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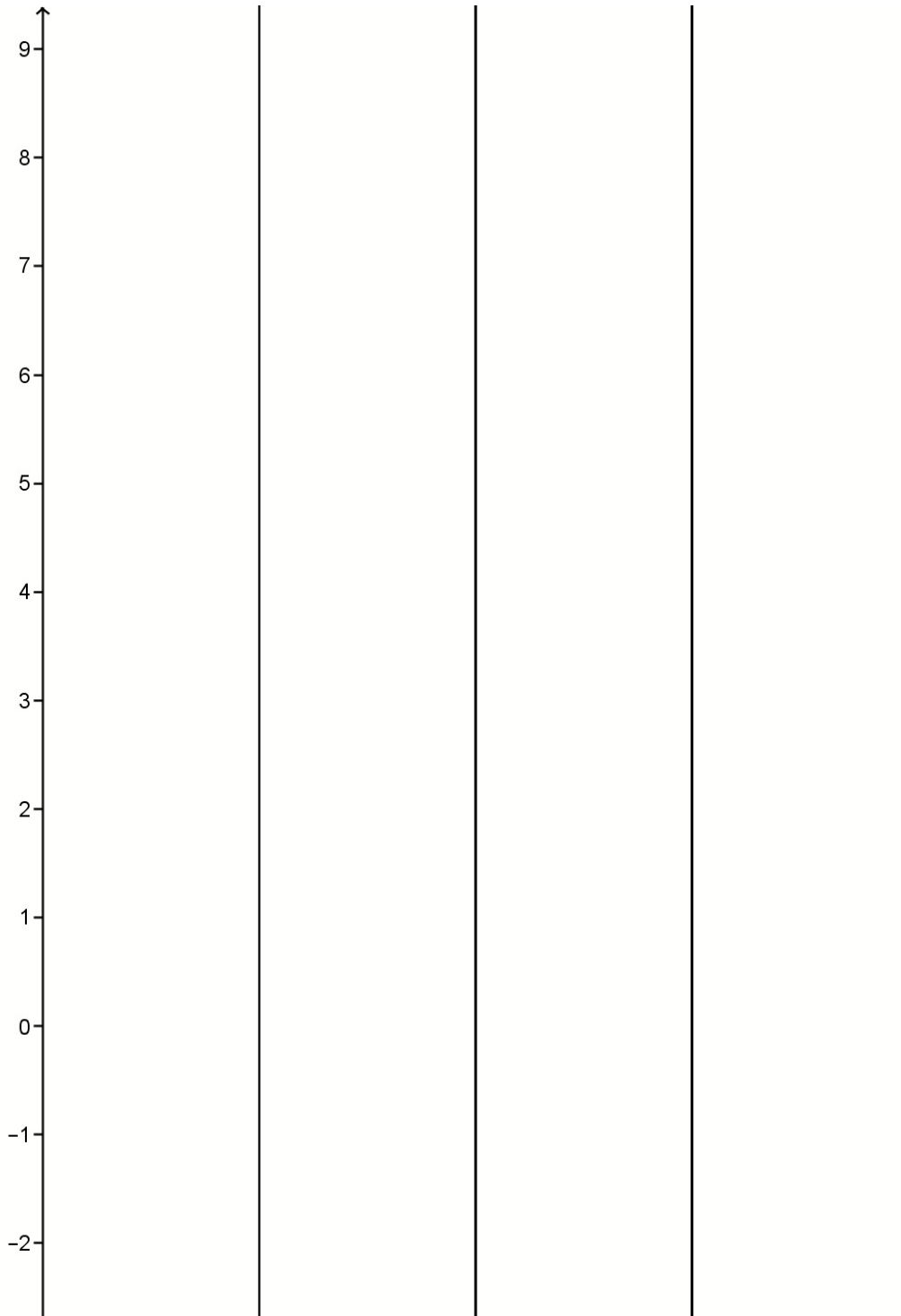
c.   On the mapping diagram below indicate by circling numbers and arrows how the diagram
visualizes the solution of $2(x\text{-}3)^2 + 1 = 9$. **Check the solutions.**
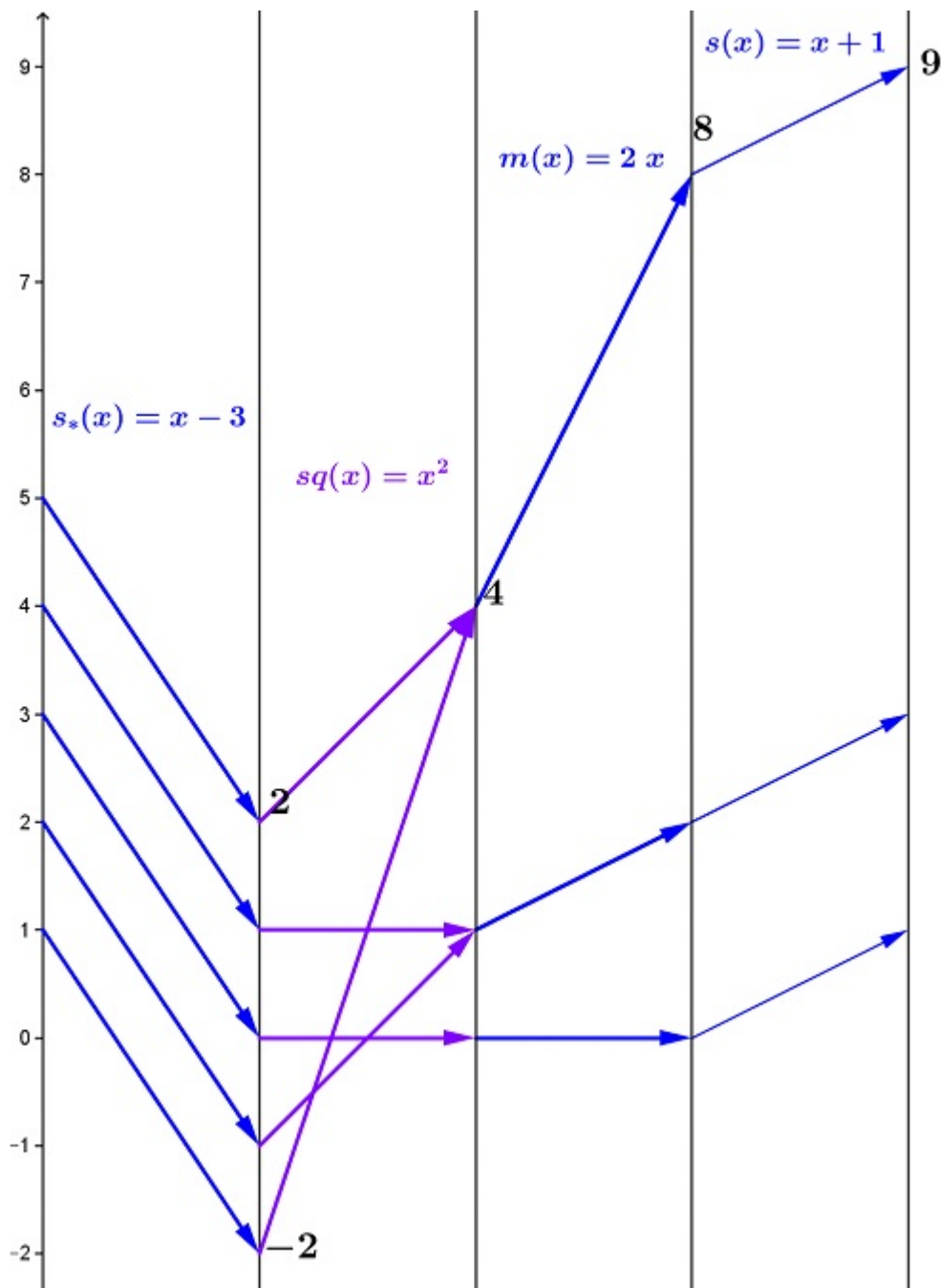
Check:

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

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

    d.   m = 0; b = 1: $f(x) = 0\,x + 1$
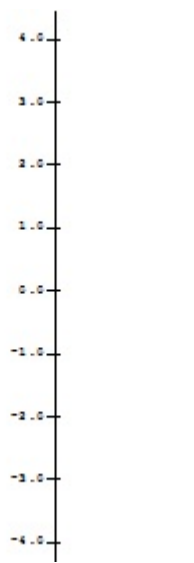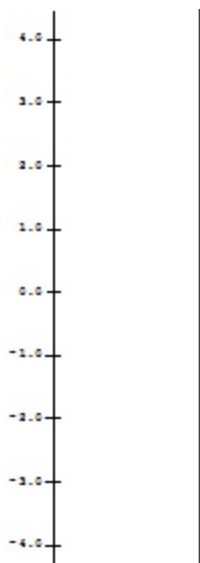
    b.   m = 2 b = 1: $f(x) = 2x + 1$

    e.   m = 1; b = 1: $f(x) = x + 1$
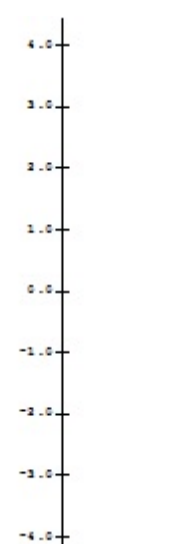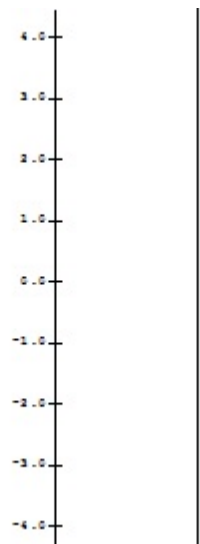
    c.   m = ½; b = 1: $f(x) = \frac{1}{2}x + 1$
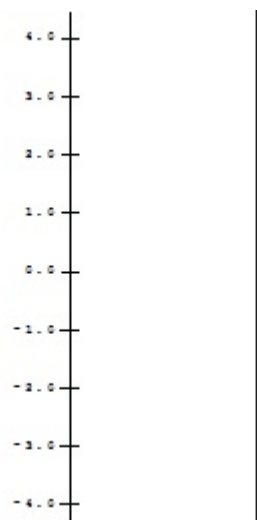
8.

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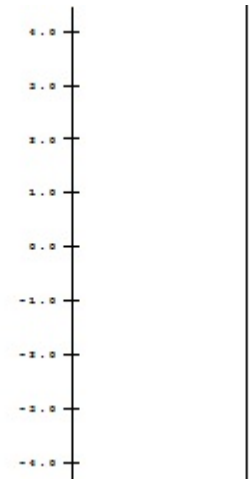
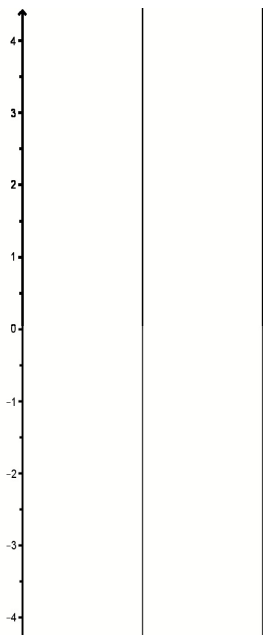9. Suppose f is a linear function with $f(1) = 3$ and $f(3) = -1$.

   a.   Find the focus point of f.
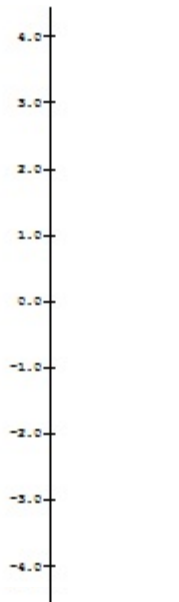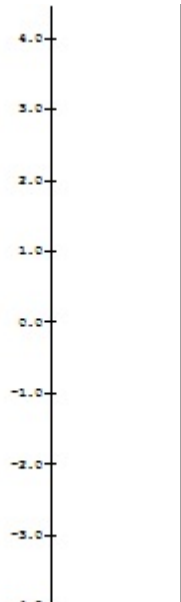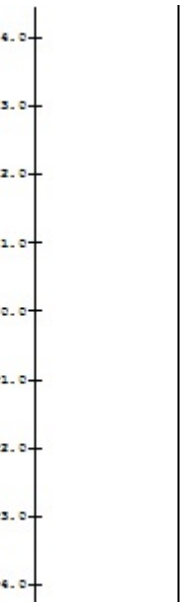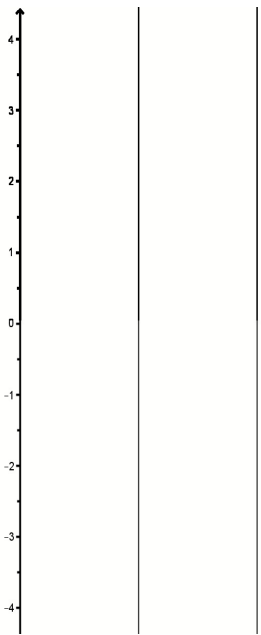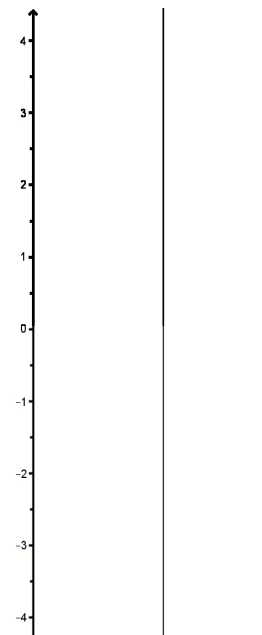
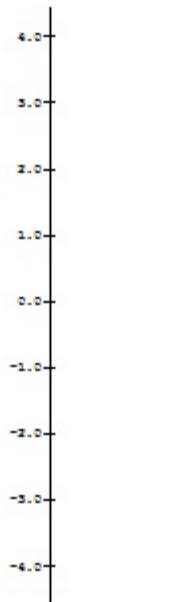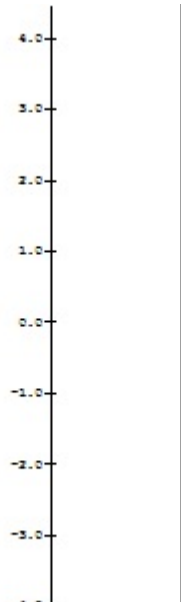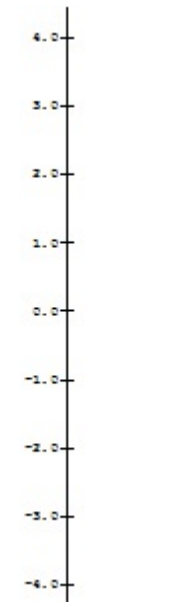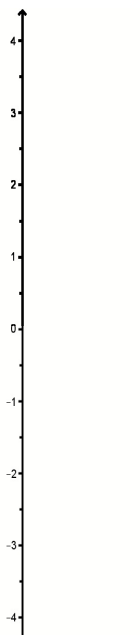Without algebra

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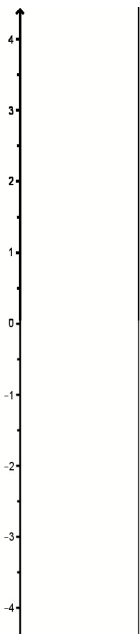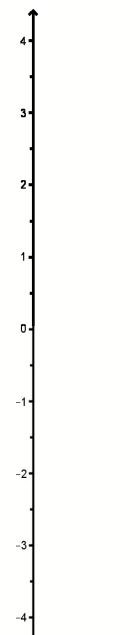
   c.   Use the focus point to find x where $f(x) = 0$.

Mapping Diagrams (2 and 3 Axes)

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