Transformations with Fred Functions
Day 2

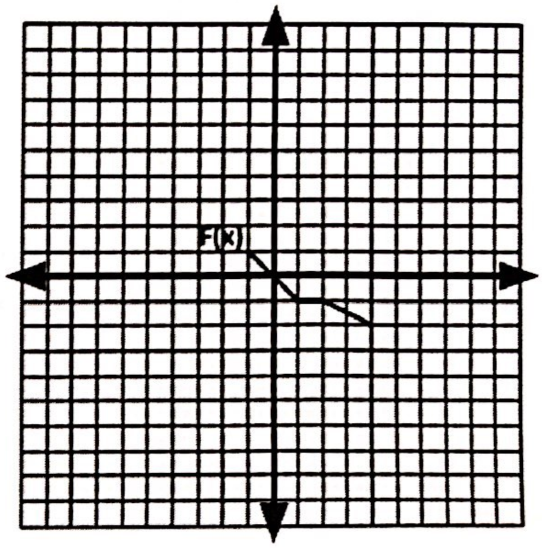
Today, we will revisit our parent function Fred and investigate transformations *other than* translations.

Recap:

Recall that the equation for Fred is **y = F(x)**.

Here is the graph of Fred, as well as a table of his characteristic points:

x	F(x)	y
-1	1	1
1	-1	-1
2	-1	-1
4	-2	-2



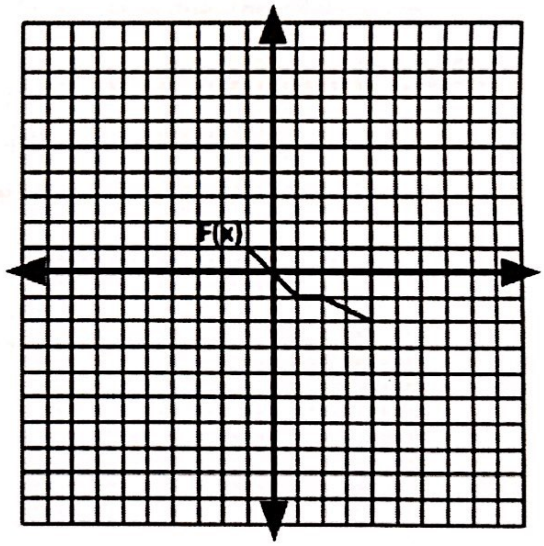
Part I: Frankie

Let's suppose that Frankie is y = $\boxed{-F(x).}$ (outside change)

1. Complete the table below for this new function, and then graph it on the coordinate plane.

y = – F(x)   New

x	F(x)	y
–1	1	–1
1	-1	1
2	-1	1
4	-2	2



2. How did this transformation affect the x-values? ...the y-values?
(Hint: Compare the characteristic points of Fred and Frankie.)

x-values stayed the same
y-values became opposite

3. What type of transformation maps Fred, F(x), to Frankie, –F(x)? (Be specific.)

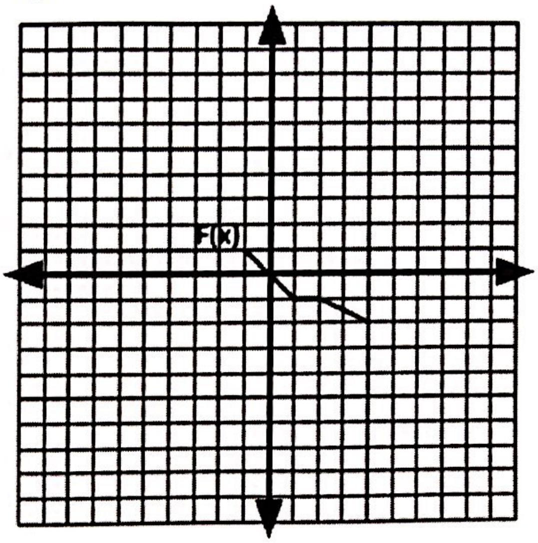
Reflection over the x-axis (x, -y)

4. In y = – F(x), how did the negative coefficient of "F(x)" affect the graph of Fred? How does this relate to our study of transformations earlier this semester?

The parent function F(x) was reflected over the x-axis. The rules were the same!

Part 2: Franklin

Now let's suppose that Franklin is y = $\boxed{F(-x).}$ Inside changes



1. Complete the table below for this new function, and then graph it on the coordinate plane.

y = F(−x) New Key Points

x	−x	y
1	−1	1
−1	1	−1
−2	2	−1
−4	4	−2

2. How did this transformation affect the x-values? ...the y-values? *(Hint: Compare the characteristic points of Fred and Franklin.)*

   x-values became opposite
   y-values stayed the same

3. What type of transformation maps Fred, F(x), to Franklin, F(-x)? (Be specific.)

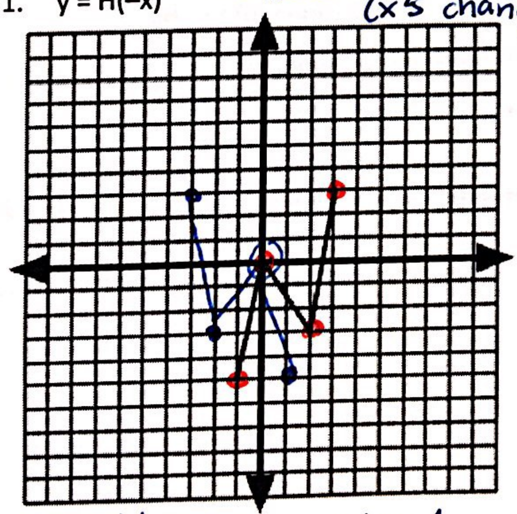
   Reflection over the y-axis (-x, y)

4. In y = F(−x), how did the negative coefficient of "x" affect the graph of Fred? How does this relate to our study of transformations earlier this semester?

   The parent function F(x) was reflected over the y-axis. The rules were the same!

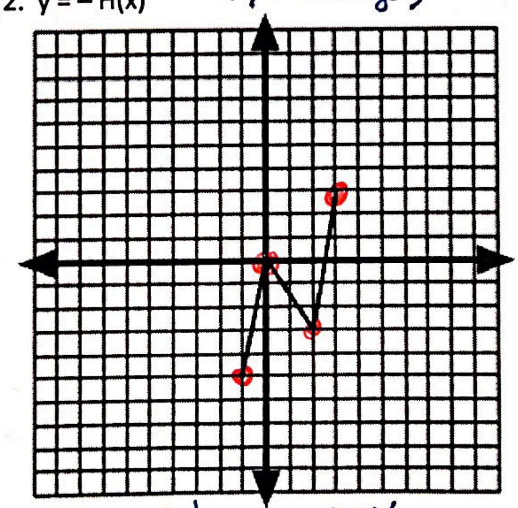
Checkpoint: Harry is H(x) and is shown on each grid. Use Harry's characteristic points to graph Harry's children without making a table.

1. y = H(−x) Reflect over y-axis (x's change)



Old	New
(−1, −5)	(1, −5)
(0, 0)	(0, 0)
(2, −3)	(−2, −3)
(3, 3)	(−3, 3)

2. y = − H(x) Reflect over x-axis (y's change)



Old	New
(−1, −5)	(−1, 5)
(0, 0)	(0, 0)
(2, −3)	(2, 3)
(3, 3)	(3, −3)

Part 3: Felicia and Frederick

Now let's suppose that Felicia is **y = 3F(x)**, and Frederick is **y = ¼ F(x)**.

1. Complete the table below for these new functions, and then graph them on the coordinate planes below.

Felicia (outside change)

x	F(x)	3 F(x)
−1	1	3
1	−1	−3
2	−1	−3
4	−2	−6

2. What transformation maps Fred to Felicia?

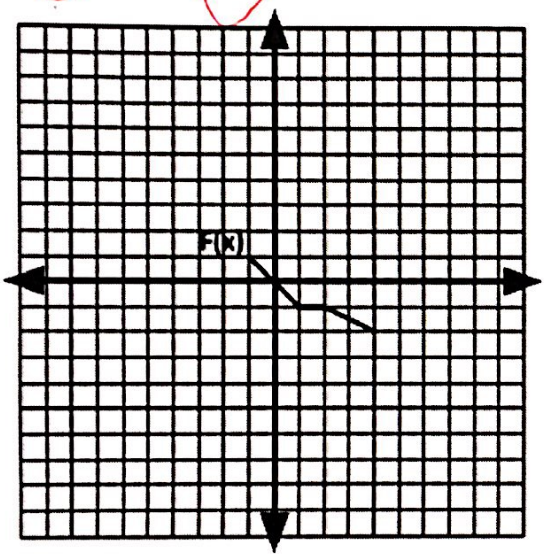
Vertical Stretch by 3

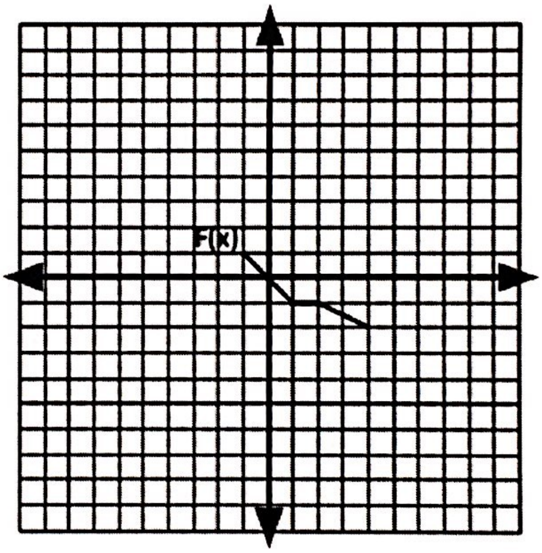
Frederick (outside change)

x	F(x)	¼ F(x)
−1	1	$\frac{1}{4}$
1	−1	$-\frac{1}{4}$
2	−1	$-\frac{1}{4}$
4	−2	$-\frac{1}{2}$

3. What transformation maps Fred to Frederick?

Vertical compression by $\frac{1}{4}$





Summary: Reflections and Dilations

The transformations of functions are ___similiar to___ the transformations of individual coordinates. The one distinctive difference between coordinate notation and functions notation is still that ___horizontal shifts are backwards 8___.

Checkpoint: Using the understanding you have gained so far, describe the effect on Fred for the following:

Equation	Effect to Fred's graph
1. y = 2 F(x) + 30	vertical stretch by 2, Translate up 30
2. y = F(x − 8) + 6	Translate right 8 up 6
3. y = F(−x) − 71	Reflect over y-axis, down 71

Equation	Effect to Fred's graph
4. y = −F(x + 88)	Reflect over x-axis left 88
5. y = ½ F(x − 5) + 1	Vertical compression ½ right 5, up 1
6. y = −5F(x) + 23	Reflect over x-axis Vertical Stretch by 5 up 23