

Review – Transformations

Name key

Describe what is occurring in each transformation.

- 1) $f(-x)$ reflection over y
- 2) $f(x - 2)$ right 2
- 3) $f(x) + 3$ up 3
- 4) $-f(x)$ reflection over x
- 5) $\frac{1}{2}f(x)$ vertical shrink by $\frac{1}{2}$
- 6) $2f(x)$ vertical stretch by 2
- 7) $f(\frac{1}{2}x)$ horizontal stretch by 2
- 8) $f(2x)$ horizontal shrink by $\frac{1}{2}$

Order of Transformations: Vertical: str/shr, reflect., shifts

Horizontal: shifts, reflect, str/shr

For questions 9 and 10, list **in the correct order**, the transformations performed on the parent function $f(x)$.

9) $-2f(3x+1) - 5$

10) $\frac{1}{5}f(-x+3) - 8$

Horizontal: (x)

Vertical: (y)

Horizontal: (x)

Vertical: (y)

1) left 1

1) stretch by 2

1) left 3

1) shrink by $\frac{1}{5}$

2) shrink by $\frac{1}{3}$

2) reflection over x

2) reflect over y

2) down 8

3) _____

3) down 5

3) _____

3) _____

For questions 11 and 12, you are given a point on the parent function $f(x)$. Determine the new coordinates of the point after the transformations have been applied.

11) $(3, -2)$: $-2f(3x+1) - 5$

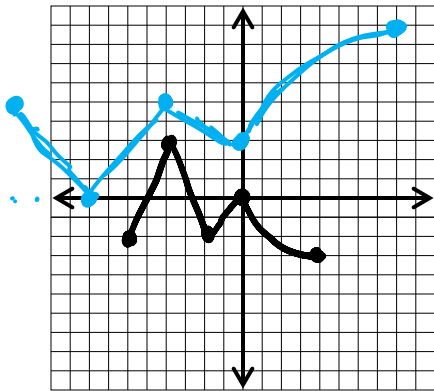
12) $(-1, 5)$: $\frac{1}{5}f(-x+3) - 8$

$(\frac{2}{3}, -1)$

$(4, -7)$

For 13 – 16, list the transformations ***in the correct order***; then describe how each coordinate will be affected. Lastly, plot the new points to create the transformed graph.

13) $-f\left(\frac{1}{2}x\right) + 3$



A) Vertical:

- 1) reflect over x
- 2) up 3
- 3) _____

Horizontal:

- 1) stretch by 2
- 2) _____
- 3) _____

B) X's: multiply by 2
 Y's: opp of y, add 3

C) Original Points

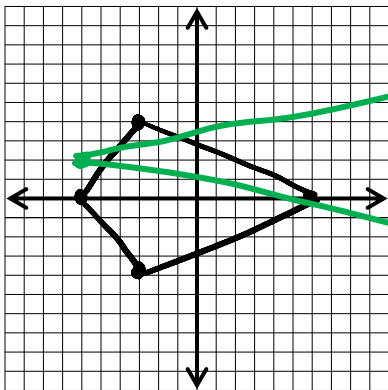
- (-6, -2)
- (-4, 3)
- (-2, -2)
- (0, 0)
- (4, -3)

New Points

- (-12, 5)
- (-8, 0)
- (-4, 5)
- (0, 3)
- (8, 9)

$-2 \uparrow$ \rightarrow opp, +3

14) $f\left(-\frac{1}{2}x + 3\right) + 2$



A) Vertical:

- 1) up 2
- 2) _____
- 3) _____

Horizontal:

- 1) left 3
- 2) reflect over y
- 3) stretch by 2

B) X's: subtract 3, take opp, multiply by 2
 Y's: add 2

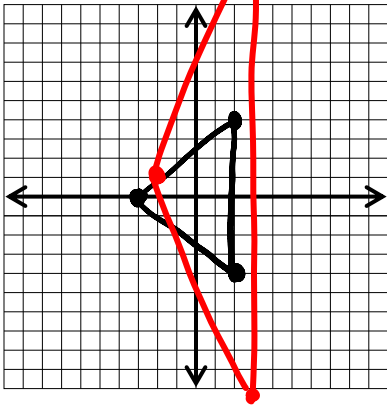
C) Original Points

- (-6, 0)
- (-3, 4)
- (-3, -4)
- (6, 0)

New Points

- (18, 2)
- (12, 6)
- (12, -2)
- (-6, 2)

15) Transformed function: $3f(x-1)+1$



A) Vertical:

- 1) stretch by 3
- 2) up 1
- 3) _____

Horizontal:

- 1) right 1
- 2) _____
- 3) _____

B) X's: add 1

Y's: multiply by 3, add 1

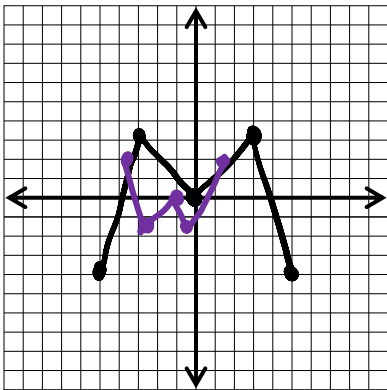
C) Original Points

- $(-3, 0)$
- $(2, 4)$
- $(2, -4)$

New Points

- $(-2, 1)$
- $(3, 13)$
- $(3, -11)$

16) $-\frac{1}{2}f(2x+2)$



A) Vertical:

- 1) shrink by $\frac{1}{2}$
- 2) reflect over x
- 3) _____

Horizontal:

- 1) left 2
- 2) shrink by $\frac{1}{2}$
- 3) _____

B) X's: subtract 2, multiply by $\frac{1}{2}$

Y's: multiply by $\frac{1}{2}$, opp. of y

C) Original Points

- $(-5, -4)$
- $(-3, 3)$
- $(0, 0)$
- $(3, 3)$
- $(5, -4)$

New Points

- $(-3.5, 2)$
- $(-2.5, -1.5)$
- $(-1, 0)$
- $(.5, -1.5)$
- $(1.5, 2)$