PC 12 LG 2 Worksheet (Describing Transformations)

What is the effect on the graph of $y = f(x)$ if it is transformed to each of the following?

1. $y = 2f(3x - 12) + 6$

2. $y = -3f(2x - 10) - 8$

3. $y + 6 = 5f(\frac{1}{2}x - 4)$

4. $y - 5 = -3f(8 - 4x)$

5. $2y + 6 = f(4x - 20)$

6. $4y + 12 = -f(5 - \frac{1}{3}x)$

Given the following effects, create an equation that is a transformation on $y = f(x)$.

1. Vertically expanded by a factor of 3
Vertically translated down 9
Horizontally compressed by a factor of $\frac{1}{2}$
Horizontally translated left 4

2. Vertically compressed by a factor of $\frac{1}{3}$
Vertically translated up 6
Horizontally expanded by a factor of 2
Horizontally translated right 2

3. Vertically expanded by a factor of 2
Vertically translated down 4
Reflection in the x-axis
Horizontally expanded by a factor of 4
Horizontally translated right 8

4. Vertically compressed by a factor of $\frac{1}{4}$
Vertically translated up 2
Horizontally compressed by a factor of $\frac{1}{3}$
Horizontally translated right 3

5. Vertically expanded by a factor of 2
Vertically translated up 2
Horizontally expanded by a factor of 6
Horizontally translated left 12
Reflection in the y-axis

6. Vertically expanded by a factor of 3
Vertically translated up 6
Reflection in the x-axis
Horizontally compressed by a factor of $\frac{1}{6}$
Horizontally translated right 2
Reflection in the y-axis

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Answer Key

1. Vert. exp. by a factor of 2
Trans. up 6
Horiz. comp. by a factor of $\frac{1}{3}$
Trans. right 4

2. Vert. exp. by a factor of 3
Trans. down 8
Refl. in x-axis
Horiz. comp. by a factor of $\frac{1}{2}$
Trans. right 5

3. Vert. exp. by a factor of 5
Trans. down 6
Horiz. exp. by a factor of 2
Trans. right 8

4. Vert. exp. by a factor of 3
Trans. up 5
Refl. in x-axis
Horiz. comp. by a factor of $\frac{1}{4}$
Trans. right 2
Refl. in y-axis

5. Vert. comp. by a factor of $\frac{1}{2}$
Trans. down 3
Horiz. comp. by a factor of $\frac{1}{4}$
Trans. right 5

6. Vert. exp. by a factor of $\frac{1}{4}$
Trans. down 3
Refl. in x-axis
Horiz. exp. by a factor of 3
Trans. right 15
Refl. in y-axis

Answer Key

1. $y = 3f(2x + 8) - 9$
or
$\frac{1}{3}y + 3 = f(2x + 8)$

2. $y = \frac{1}{3}f(\frac{1}{2}x - 1) + 6$
or
$3y - 18 = f(\frac{1}{2}x - 1)$

3. $y = -2f(\frac{1}{4}x - 2) - 4$
or
$-\frac{1}{2}y - 2 = f(\frac{1}{4}x - 2)$

4. $y = \frac{1}{4}f(3x - 9) + 2$
or
$4y - 8 = f(3x - 9)$

5. $y = 2f(-\frac{1}{6}x - 2) + 2$
or
$\frac{1}{2}y - 1 = f(-\frac{1}{6}x - 2)$

6. $y = -3f(-6x + 12) + 6$
or
$-\frac{1}{3}y + 2 = f(-6x + 12)$