

Advanced Precalculus
Function Transformations

Name: Key

1.) $y = -3f\left[2\left(x - \frac{5}{2}\right)\right] + 2$
 $y = -3f(2x-5)+2$

Describe it: $R_x, VSTR 3,$

R_x
 $VSTR 3$
 $HSHR \frac{1}{2}$
 $\rightarrow \frac{5}{2}$
 $\uparrow 2$

If (6,4) is a point on $y = f(x)$,
 what point is on the transformed function?

$R_x (6, -4)$ OR $(6, 4)$
 $VSTR 3 (6, -12)$ $\rightarrow f(6) = 4$
 $HSHR \frac{1}{2} (3, -12)$
 $\rightarrow \frac{5}{2} (\frac{11}{2}, -12)$
 $\uparrow 2$ $(\frac{11}{2}, -10)$

$y_{new} = -3(4) + 2 = -10$
 $6 = 2x - 5$
 $11 = 2x_{new}$
 $x = \frac{11}{2}$

2.) $y = -\frac{1}{2}f(4-3x)+5 = -\frac{1}{2}f\left[-3\left(x - \frac{4}{3}\right)\right] + 5$

Describe it: R_x
 $VSHR \frac{1}{2}$
 R_y
 $HSHR \frac{1}{3}$
 $\rightarrow \frac{4}{3}$
 $\uparrow 5$

If (10,-3) is a point on $y = f(x)$,
 what point is on the transformed function?

$R_x (10, 3)$ OR $(10, -3)$
 $VSHR \frac{1}{2} (10, \frac{3}{2})$ $\rightarrow f(10) = -3$
 $R_y (-10, \frac{3}{2})$
 $HSHR \frac{1}{3} (-\frac{10}{3}, \frac{3}{2})$
 $\rightarrow \frac{4}{3} (-2, \frac{3}{2})$
 $\uparrow 5$ $(-2, \frac{13}{2})$

$10 = 4 - 3x$
 $6 = -3x$
 $x = -2$

$y = -\frac{1}{2}(-3) + 5$
 $y = \frac{3}{2} + 5$
 $y = \frac{13}{2}$

3.) $y = 3f\left(\frac{1}{2}x - 1\right) + 1 = 3f\left[\frac{1}{2}(x - 2)\right] + 1$ 4.)

Describe it: $VSTR 3$
 $HSTR 2$
 $\rightarrow 2$
 $\uparrow 1$

If (-4,5) is a point on $y = f(x)$,
 what point is on the transformed function?

$VSTR 3 (-4, 15)$ OR $(-4, 5)$
 $HSTR 2 (-8, 15)$ $\rightarrow f(-4) = 5$
 $\rightarrow 2 (-6, 15)$
 $\uparrow 1$ $(-6, 16)$

$-4 = \frac{1}{2}(x-2)$
 $-8 = x-2$
 $-6 = x$

$y = 3(5) + 1$
 $y = 16$

4.) $y = \frac{1}{3}f\left(\frac{5}{2} - 3x\right) - 3 = \frac{1}{3}f\left[-3\left(x - \frac{5}{6}\right)\right] - 3$

Describe it: $VSHR \frac{1}{3}$
 R_y
 $HSHR \frac{1}{3}$
 $\rightarrow \frac{5}{6}$
 $\downarrow 3$

If (-8,-2) is a point on $y = f(x)$,
 what point is on the transformed function?

$VSHR \frac{1}{3} (-8, -\frac{2}{3})$ OR $(-8, -2)$
 $R_y (8, -\frac{2}{3})$ $\rightarrow f(-8) = -2$
 $HSHR \frac{1}{3} (\frac{8}{3}, -\frac{2}{3})$
 $\rightarrow \frac{5}{6} (\frac{21}{6}, -\frac{2}{3}) = (\frac{7}{2}, -\frac{2}{3})$
 $\downarrow 3$ $(\frac{7}{2}, -\frac{11}{3})$

$-8 = -3(x - \frac{5}{6})$
 $\frac{8}{3} = x - \frac{5}{6}$
 $\frac{7}{2} = x$

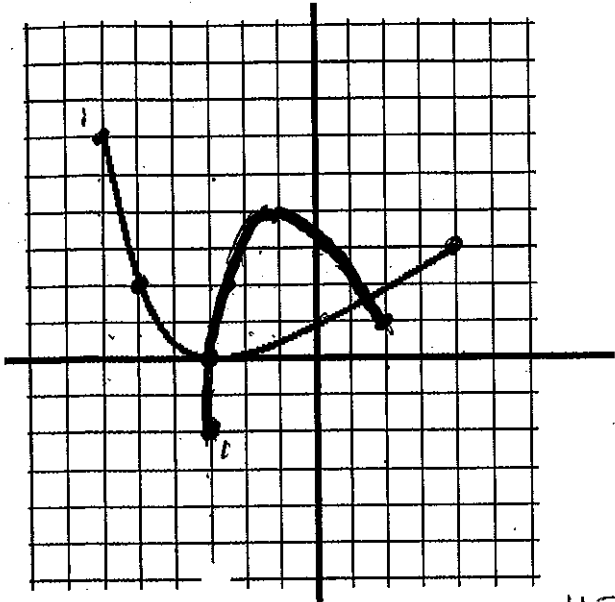
$y = \frac{1}{3}(-2)$
 $y = -\frac{2}{3} - 3$
 $y = -\frac{11}{3}$

5.)

Given the graph of $y = f(x)$, R_x
draw the graph of

$y = -f(2x) + 4$

HSHR $\frac{1}{2}$
 $\uparrow 4$

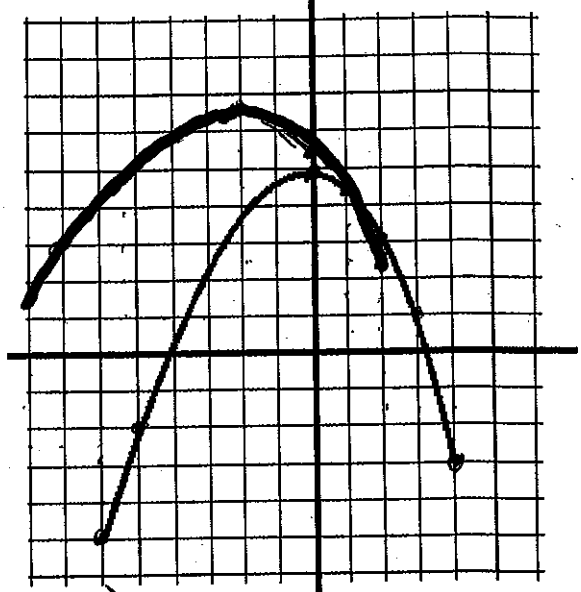


6.)

Given the graph of $y = f(x)$,
draw the graph of

$y = \frac{1}{2}f(x+2) + 4$

$\leftarrow 2$
 $\uparrow 4$



Extra Problem in Notes:

$(\frac{13}{4}, \frac{-46}{15})$

$y = -\frac{2}{3}f(\frac{4x-7}{5-2x}) + \frac{8}{5}$

Point $(-4, 7)$ on $y = f(x)$
 \downarrow
 $f(-4) = 7$

$-4 = \frac{4x-7}{5-2x}$
 $-20 + 8x = 4x - 7$
 $4x = 13$
 $x = \frac{13}{4}$

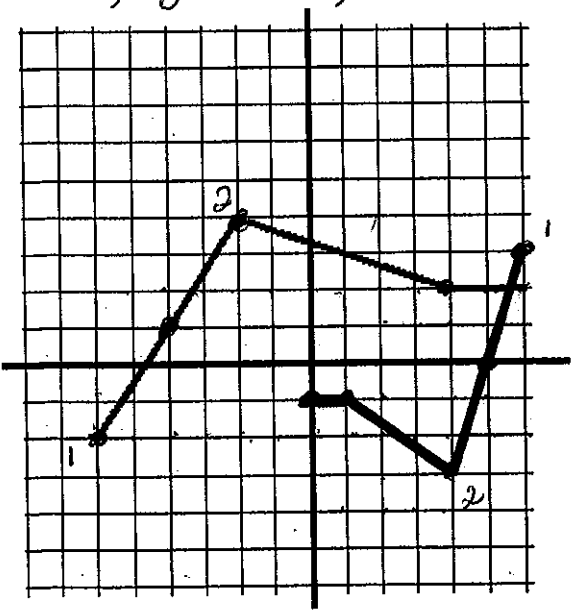
$y = -\frac{2}{3}(7) + \frac{8}{5}$
 $y = -\frac{14}{3} + \frac{8}{5} = -\frac{70}{15} + \frac{24}{15} = -\frac{46}{15}$

7.)

Given the graph of $y = f(x)$,
draw the graph of

$y = -f(6-2x) + 1 = -f[-2(x-3)] + 1$

$R_x, R_y, \text{HSHR } \frac{1}{2}, \rightarrow 3, \uparrow 1$



8.)

Given the graph of $y = f(x)$,
draw the graph of

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

$R_x, \text{VSHR } \frac{1}{2}, \leftarrow 1, \downarrow 1$

