

Transformations -

Starting function is $f(x)$.

1. Up c units: $f(x) + c$ $f(x) = x^2$ $f(x) + 2 = x^2 + 2$

2. Down c units: $f(x) - c$

3. Right c units: $f(x - c)$

4. Left c units: $f(x + c)$

5. Reflect across x axis: $-f(x)$

6. Reflect across y axis: $f(-x)$

7. Stretch vertically: $cf(x)$, $c > 1$

8. Shrink vertically: $cf(x)$, $0 < c < 1$

9. Stretch horizontally: $f(cx)$, $0 < c < 1$

10. Shrink horizontally: $f(cx)$, $c > 1$

Pg 98

15-29 odd, 31-37 odd
No Graph

$$f(x) = -3 \left[-2(x+4) \right]^2 + 5$$

$$f(x) = x^2$$

Ref x axis

v. ST or
sh

Ref y axis

h. ST or
sh

Left/Right

up/down.

$$f(x) = \sqrt[3]{\sqrt{5(x-1)}} + 2$$

\swarrow
 $c f(x)$
 $- f(x)$

\swarrow
 $f(x \pm c)$
 $f(cx)$
 $f(-x)$

\swarrow
 $f(x) \pm c$

$$f(x) = \sqrt{x}$$

up 2
 Vert stretch
 Horiz shrink
 Right 1

$$f(x) = 7 - [4(x+6)]^3$$

Annotations for $f(x) = 7 - [4(x+6)]^3$:

- up 7 (arrow pointing to the constant 7)
- Ref across x (arrow pointing to the minus sign)
- Hor. shrink $c > 1$ (arrow pointing to the coefficient 4)
- Left + 6 (arrow pointing to the constant 6)

$$f(x) = x^3$$

1. Up 2

$$f(x) = x^2$$

2. Left 4

3. Vert shrink $(\frac{1}{7})$

4. Hor. stretch $(\frac{1}{2})$

5. Ref across x

$$f(x) = -\frac{1}{7} \left[\frac{1}{2} (x+4) \right]^2 + 2$$

$$29. \quad \sqrt{7-x} - 2$$

$$\sqrt{-x+7} - 2$$

$$\sqrt{-(x-7)} - 2 \rightarrow \boxed{\sqrt{-(x-7)}} - 2$$

Ref y
Right 7
Down 2

y-axis reflection - sign
should multiply left/right
transformation, not just letter x.

31. $(x - 2)^2 - 8$

Brian

33. $(x - 13)^3$

Chris

35. $-|x| + 10$
Mike

37. $\sqrt{-x + 6}$
Jan

$$-\sqrt{-x+6}$$



$$-\sqrt{-(x+6)}$$

Ref $x + y$

Left 6

y axis Ref minus sign

multiplies desired

left/right transformation

