

Part 2: Transforming from a Basic Function to Something NOT so Basic.

$$f(x) \rightarrow \dots \rightarrow a f(b(x-c)) + d$$

The Moves:

1.  $f(x)$  Basic Function

2.  $a f(x)$   $(x, y) \mapsto (x, ay)$

$(1, 1) \mapsto (1, 5)$   
 $\sqrt{x} \mapsto 5\sqrt{x}$  vertical stretch

3.  $a f(bx)$   $(x, y) \mapsto (\frac{1}{b}x, y)$

$(1, 5) \mapsto (\frac{1}{2}, 5)$   
 $5\sqrt{x} \mapsto 5\sqrt{2x}$  horizontal "stretch"

4.  $a f(b(x-c))$   $(x, y) \mapsto (x+c, y)$

$(\frac{1}{2}, 5) \mapsto (\frac{1}{2}+3, 5) = (\frac{7}{2}, 5)$   
 $5\sqrt{2x} \mapsto 5\sqrt{2(x-3)}$  Right Shift

5.  $a f(b(x-c)) + d$   $(x, y) \mapsto (x, y+d)$

$(\frac{7}{2}, 5) \mapsto (\frac{7}{2}, 16)$   
 $5\sqrt{2(x-3)} \mapsto 5\sqrt{2(x-3)} + 11$  up shift

$$\frac{1}{2} + 3 \cdot \frac{2}{2} = \frac{7}{2}$$