

vertical  $+K$  "up"  $K$  units  
 $-K$  down " $K$ " units

(A)  $f(x) = \frac{1}{2}(3)^{x-4} + 1$

pf:  $f(x) = 3^x$   
shifts / transformation

- vertical compression ( $\frac{1}{2}$ )  $0 < a < 1$
- horiz. shift right "4" units
- vertical "up 1 unit"
- growth  $|3| > 1$   $b=3$

(B) pf:  $f(x) = .45^x$

Shifts

- vertical stretch  $a > 1$   $a=2$
- horiz. shift = none
- vertical shift down "6" units
- decay  $|.45| < 1$   $0 < .45 < 1$