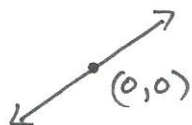


# Family of Graphs

Types:

## Polynomial

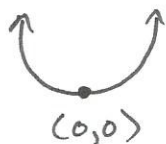
① Linear  $y = x$



D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

② quadratic

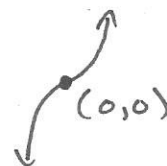
$$y = x^2$$



D:  $(-\infty, \infty)$   
R:  $[0, \infty)$

③ cubic

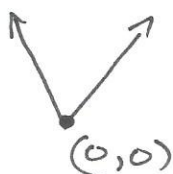
$$y = x^3$$



D:  $(-\infty, \infty)$   
R:  $(-\infty, \infty)$

④ Absolute Value

$$y = |x|$$



D:  $(-\infty, \infty)$   
R:  $[0, \infty)$

⑤ Square Root

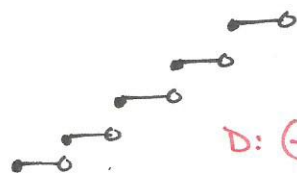
$$y = \sqrt{x}$$



D:  $[0, \infty)$   
R:  $[0, \infty)$

⑥ Greater Integer

$$y = \lceil x \rceil$$



D:  $(-\infty, \infty)$   
R: all integers

## Transformations

generic form  $y = a(cx \pm h) \pm k$

$h \Rightarrow$  horizontal shift  $\begin{cases} + \text{ left} \\ - \text{ right} \end{cases}$

$k \Rightarrow$  vertical shift  $\begin{cases} + \Rightarrow \text{ up} \\ - \Rightarrow \text{ down} \end{cases}$

$c$  is  $- \Rightarrow$  horizontal flip  
"reflection" right to left

$a$  is  $- \Rightarrow$  vertical flip  
"reflection" up to down

$c > 1 \Rightarrow$  horizontal "skinny" compression

$a > 1 \Rightarrow$  vertical stretch "skinny"

$c < 1 \Rightarrow$  horizontal stretch "wider"

$a < 1 \Rightarrow$  vertical compression "wider"

refers just to #

refers just to #