Trig 3.2

Identify families of graphs*
Sketch graphs of related functions*
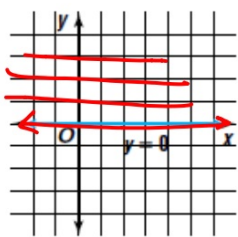Identify transformations of graphs*

family of graphs

parent graph

reflection

translation

dilation
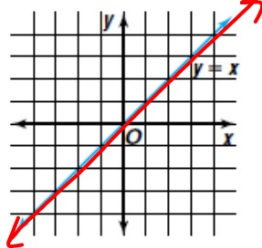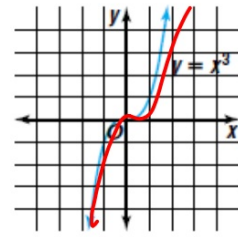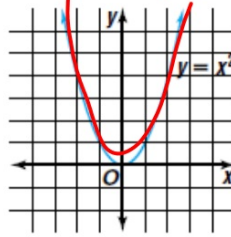
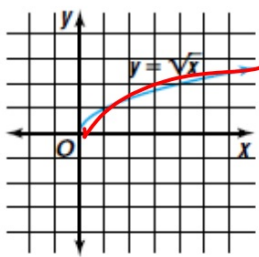*constant function*

linear $(-\frac{1}{2})$ *identity function*

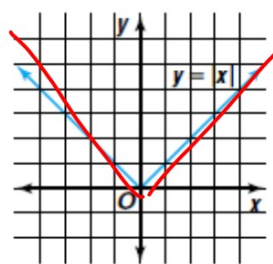p. 137

polynomial functions

$y = x$

$y = x^2$

$y = x^3$

square root function

$y = \sqrt{x}$

absolute value function

$y = |x|$

greatest integer function

$y = [\![x]\!]$
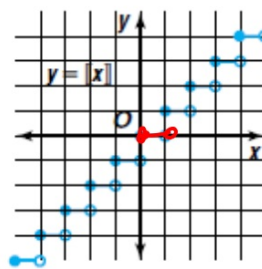
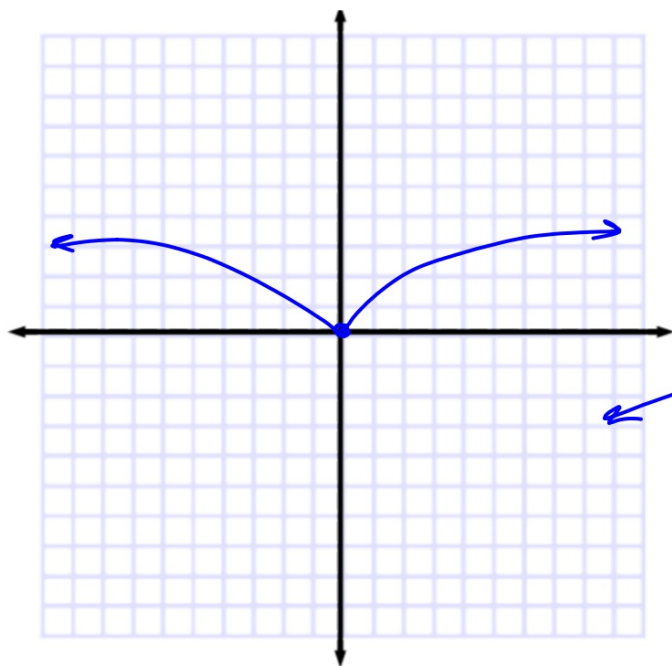*rational function*

$y = \frac{1}{x}$ or x^{-1}
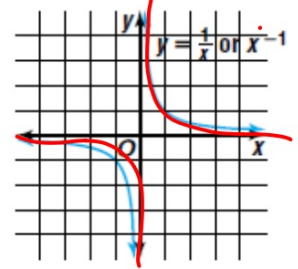
card matching activity

If you have to graph a bunch of ordered pairs...
Work smarter, not harder!
Consider symmetry, reflection, etc.

1 Graph $f(x) = |x|$ and $g(x) = -|x|$. Describe how the graphs of $f(x)$ and $g(x)$ are related.

reflect over
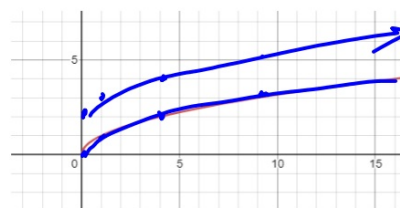x-axis

Where is $\sqrt{}$ rea not real?

2 Use the parent graph $y = \sqrt{x}$ to sketch the graph

a. $y = \sqrt{x} + 2$
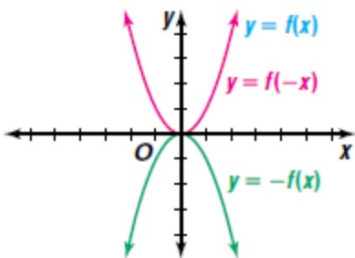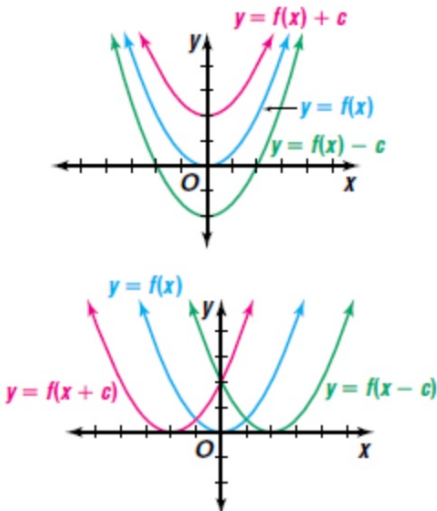
b. $y = \sqrt{x - 4}$

$(x-3)^2$

$13 - 4/1 \text{ odd}$
$13 - 33 \text{ } 0$

c. $y = \sqrt{x + 3} - 1$
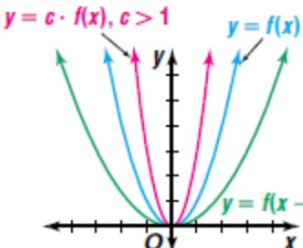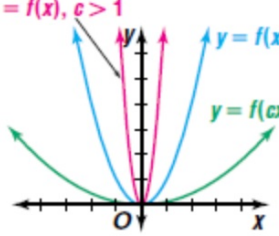
Change to the Parent Function $y = f(x)$, $c > 0$	Change to Parent Graph	Examples
Reflections $y = -f(x)$ $y = f(-x)$	Is reflected over the *x*-axis. Is reflected over the *y*-axis.	
Translations $y = f(x) + c$ $y = f(x) - c$	Translates the graph *c* units up. Translates the graph *c* units down.	
$y = f(x + c)$ $y = f(x - c)$	Translates the graph *c* units left. Translates the graph *c* units right.	

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Change to the Parent Function $y = f(x)$, $c > 0$	Change to Parent Graph	Examples
Dilations $y = c \cdot f(x)$, $c > 1$ $y = c \cdot f(x)$, $0 < c < 1$	Expands the graph vertically. Compresses the graph vertically. stretch/squish	
$y = f(cx)$, $c > 1$ $y = f(cx)$, $0 < c < 1$	Compresses the graph horizontally. Expands the graph horizontally. Opposite as above	

4 Observe the graph of each function. Describe how the graphs in parts b and c relate to the graph in part a.

a. $f(x) = (x - 2)^2 - 3$

b. $y = |f(x)|$
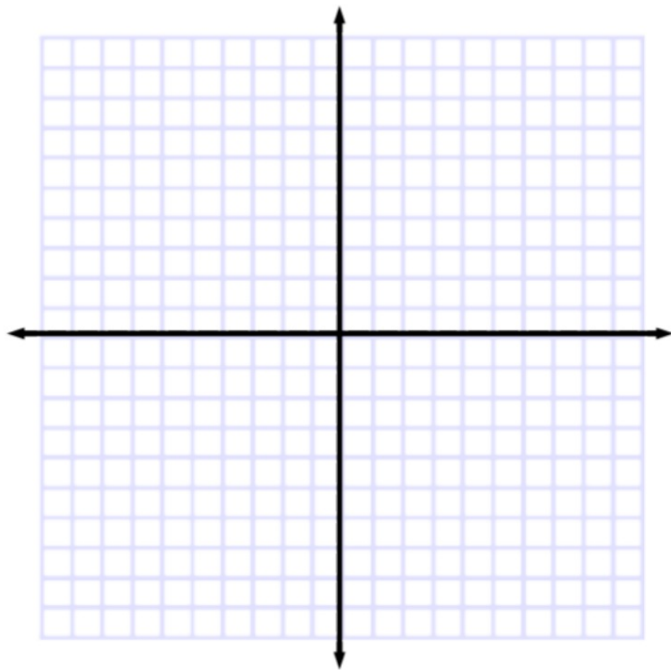
**5** **ENTERTAINMENT** A traveling circus invites local schools to send math and science teams to its Science Challenge Day. One challenge is to write an equation that most accurately predicts the height of the flight of a human cannonball performer at any given time. Students collect data by witnessing a performance and examining time-lapse photographs of the flight. Using the performer's initial height of 15 feet and the photographs, one team records the data at the right. Write the equation of the related parabola that models the data.

Time (seconds)	Height (feet)
0	15
1	39
2	47
3	39
4	15

What do we need to know?
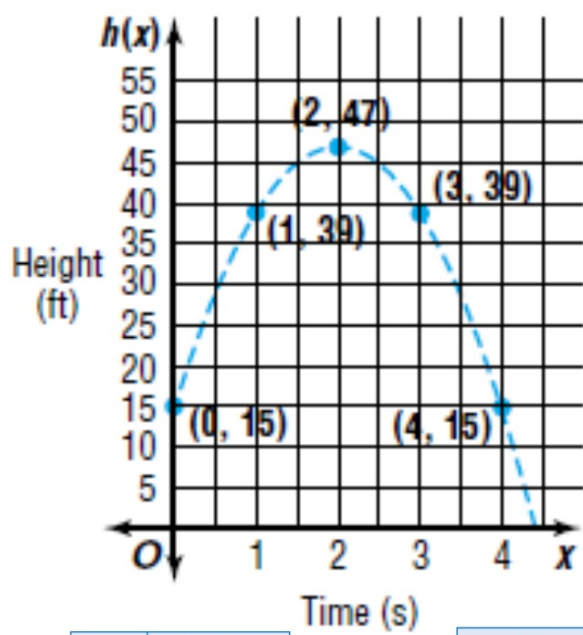
x	$f(x) = x^2$
−2	4
−1	1
0	0
1	1
2	4

x Time (seconds)	h(x) Height (feet)
0	15
1	39
2	47
3	39
4	15