Reflections & Stretches (1.2)

p28 day 3

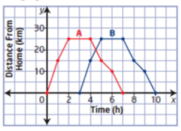
HW: p13#11,12,15

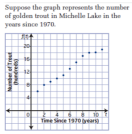
12. Janine is an avid cyclist. After cycling to a lake and back home, she graphs her distance versus time (graph A).

a) If she left her house at 12 noon, briefly describe a possible scenario for Janine's trip.

b) Describe the differences it would make to Janine's cycling trip if the graph of the function were translated, as shown in graph B.

c) The equation for graph A could be written as $y = f(x)$. Write the equation for graph B.





Suppose the graph represents the number of golden trout in Michelle Lake in the years since 1970.

Let the function $f(t)$ represent the number of fish in Michelle Lake since 1970.

Describe an event or a situation for the fish population that would result in the following transformations of the graph. Then, use function notation to represent the transformation.

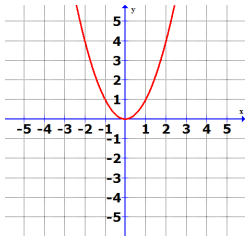
a) a vertical translation of 2 units up

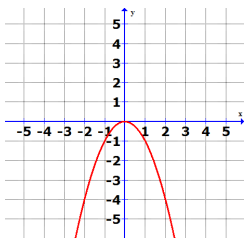
b) a horizontal translation of 3 units to the right

Reflections & Stretches (1.2)

p28 day 3

ex1: Sketch $y = x^2$ and $y = -x^2$

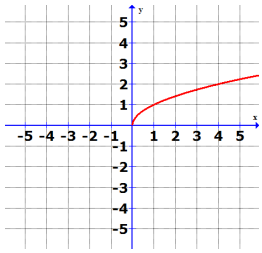


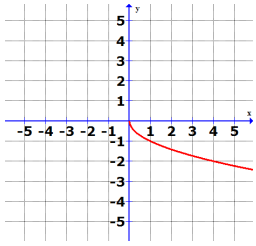


Reflections & Stretches (1.2)

p28 day 3

ex2: Sketch $y = \sqrt{x}$ and $y = -\sqrt{x}$

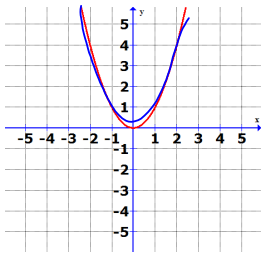


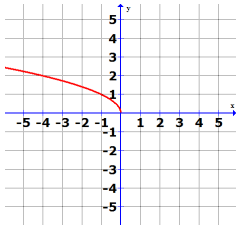


Reflections & Stretches (1.2)

p28 day 3

ex3: Sketch $y = (-x)^2$ and $y = \sqrt{-x}$





Reflections & Stretches (1.2)

p28 day 3

So,

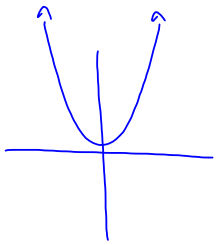
$y = -f(x)$ outside — gives a vertical reflection (in the x-axis)

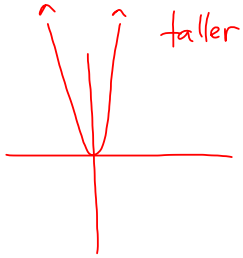
$y = f(-x)$ inside — gives a horizontal reflection (in the y-axis)

Reflections & Stretches (1.2)

p28 day 3

ex4: Sketch $y = x^2$ and $y = 2x^2$

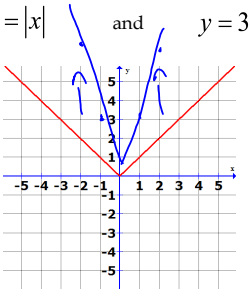




Reflections & Stretches (1.2)

p28 day 3

ex5: Sketch $y = |x|$ and $y = 3|x|$

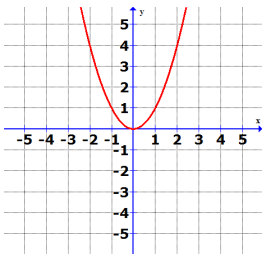


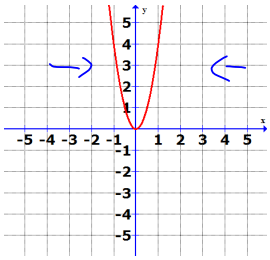
$y = \frac{1}{3}x^2$

Reflections & Stretches (1.2)

p28 day 3

ex6: Sketch $y = x^2$ and $y = (2x)^2$ $Y=4x^2$



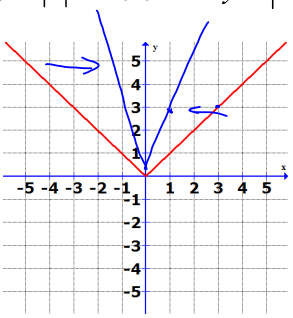


Reflections & Stretches (1.2)

p28 day 3

ex7: Sketch $y = |x|$ and $y = |3x|$

horizontal compression of 3

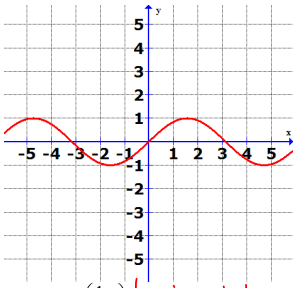


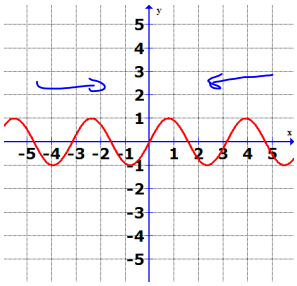
Reflections & Stretches (1.2)

p28 day 3

h comp.

ex8: Sketch $y = \sin x$ and $y = \sin(2x)$





$y = \sin\left(\frac{1}{3}x\right)$ horizontal stretch

Reflections & Stretches (1.2)

p28 day 3

So,

$y = af(x)$ is a vertical stretch

$0 < a < 1$ compression

$y = f(bx)$ is a horizontal compression

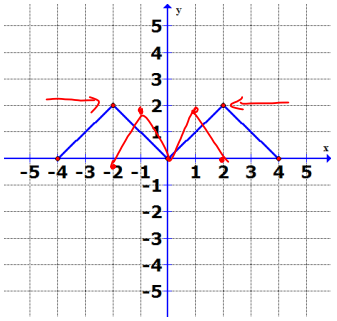
$0 < b < 1$ Stretch

Reflections & Stretches (1.2)

p28 day 3

ex9: Graph y=f(2x), given f(x) in the graph below

horiz compr.



5, 6, 7

Reflections & Stretches (1.2)

p28 day 3

HW: p28#3, 8, 9abe

next: invariant points, mappings