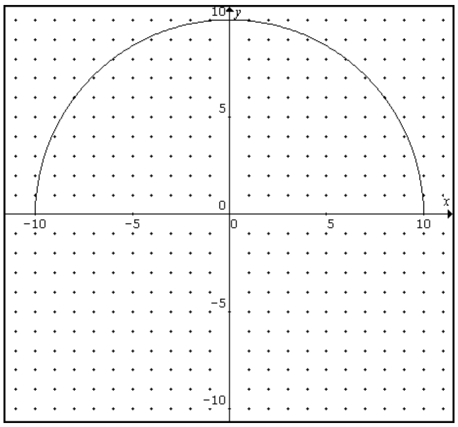
Horizontal Transformations

Date:

An additional transformation of a graph can be applied using a 'k' value. In function notation this value is applied as follows:

$$y = f(x) \text{ becomes } y = f(kx).$$

The impact of this k value can be shown on the graph of a semi-circle. The graph shown is the "upper half" of the circle $x^2 + y^2 = 100$.



Write the equation of the graph in function notation.

$f(x) =$ ____________________

Write the equation of $f(2x)$ and evaluate enough points to sketch the graph.

$f(2x) =$ ____________________

x	-10	-8	-6				0				6	8	10
$f(x)$													
$2x$													
$f(2x)$													

Given that $y = f(kx)$, state the effect on the graph of $y = f(x)$ if:

(i) $k < 0$ ____

(ii) $|k| > 1$ ____

(iii) $|k| < 1$ ____

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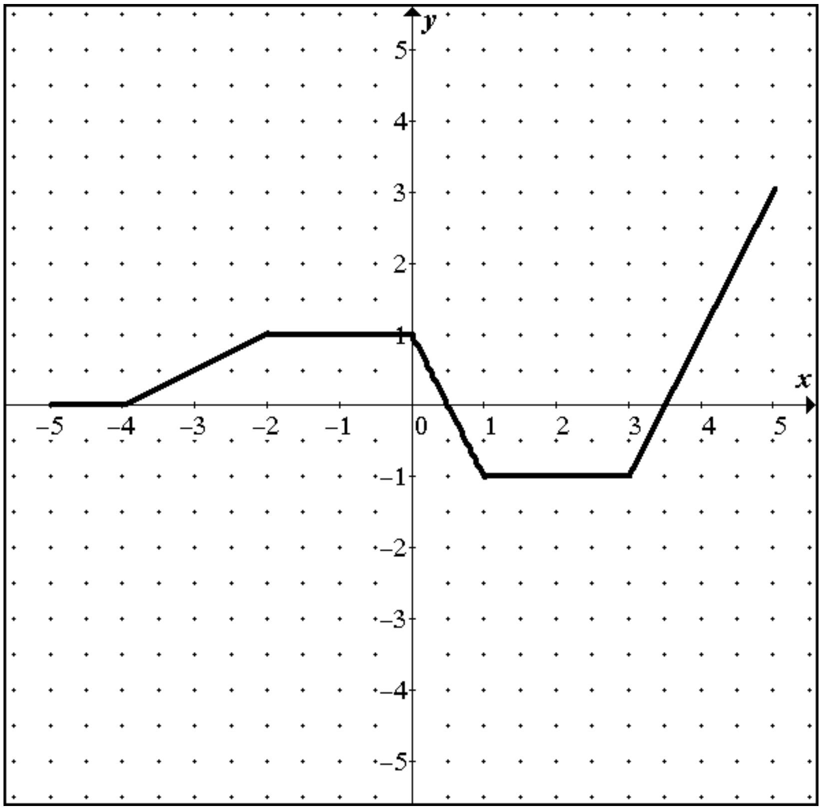
The graph of $y = f(x)$ is shown below.

State: D_f ________________ and R_f _________________.



On the same set of axes, sketch $y = 2f(x)$ and $y = f(2x)$.

For $y = 2f(x)$ state:

D ________________ and

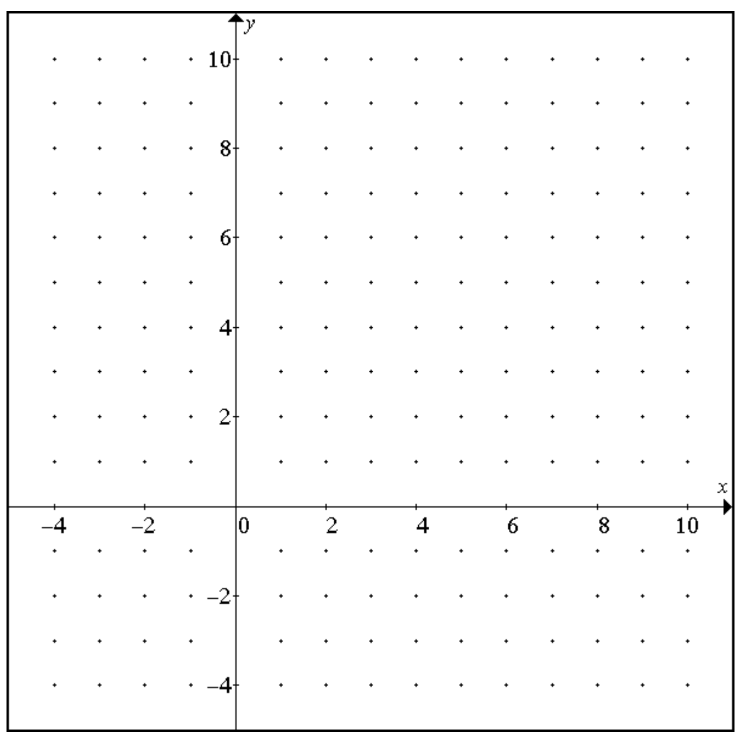
R _________________.

For $y = f(2x)$ state:

D ________________ and

R _________________.

1. On the axes provided, sketch $f(x) = \sqrt{x}$.
   On the same axes, sketch and label:
   (i) $f(-x)$
   (ii) $f(2x)$
   (iii) $f(\frac{1}{2}x)$



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2. Create equations for the given values:

$y = f(x)$	a	k	p	q	Equation
$y = \|x\|$	1	1	3	-2	
$y = x^2$	½	1	-2	3	
$y = \sqrt{x}$	1	½	3	0	
$y = \sqrt{x}$	-1	3	-2	1	
$y = \frac{1}{x}$	-2	3	0	0	
$y = \frac{1}{x}$	3	1	-1	1	
$y = x^3$	1	1	2	-3	
$y = \|x\|$	-2	1	0	-2	

3. Describe, in detail, the transformations on the graph of a function $y = g(x)$ needed to produce:

a) $y = g(x-4)$ ______________________________

b) $y = 5g(x)$ ______________________________

c) $y = g(x)-5$ ______________________________

d) $y = g(\frac{1}{4}x)$ ______________________________

e) $y = g(x-2)-1$ ______________________________

f) $y = 3g(x+1)$ ______________________________

g) $y = 2-g(x)$ ______________________________

h) $y = g(-2x)$ ______________________________

i) $y = \frac{1}{4}g(x)+2$ ______________________________

j) $y = g(1-x)$ ______________________________

k) $y = g(\frac{x}{3}-2)$ ______________________________

l) $y = 3-3g(2x)$ ______________________________