Name: SOLUTIONS

TICKET-IN-THE-DOOR

In order to be prepared for class you must watch the module and complete the following activity. This is due first thing when you get to class.

Given y = f(x) describe in words the transformation when k is a positive constant:

- y = k f(x)
  - when 0<k<1 VERTICAL COMPRESSION by factor of K (WIDE)
  - when k > 1 VERTICAL STRETCH by factor of K (Narrow)

Check your understanding:

1. The domain of $f(x)$ is $-6 \le x \le 8$ and the range is $6 \le y \le 12$. If $g(x) = 3f(x-6)$, what is the domain and range of $g(x)$? Domain: $0 \le x \le 14$
   RANGE: $18 \le y \le 36$

2. The Us population in millions is P(t) today and t is in the years. Write in words the meaning of the following with respect to the context of the problem.
   a) P(t) – 10 The U.S. population is 10 million less than today's population @ time t.
   b) P(t) + 10 The U.S. population is 10 million more than today's pop @ time t.
   c) P(t+10) Today's U.S. population in millions 10 years earlier.
   d) .10 P(t) 10 percent of today's U.S. population @ time t years.
   e) P(t) + .10 The U.S. population is 100,000 more than today's pop @ time t.

3. The graph of $f(x)$ contains the point (3,–2). What corresponding point must be on the graph of $g(x) = 2f(x-9)$?

Sol: (12, –4)

4. The graph of $g(x)$ is the graph of $f(x)$ after it has been vertically stretched or shrunk. The point (3, 6) lies on the graph of $f(x)$. The corresponding point on the graph of $g(x)$ is $(3,12)$. What is a possible formula for $g(x)$ in terms of $f(x)$?

Sol: $g(x) = 2 \cdot f(x)$

SOLUTIONS

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Given y f(x) describe in words the transformation when k is a positive constant:

- y f(k x)
  - when 0<k<1 HORIZONTAL STRETCH by factor of $\frac{1}{k}$
  - when k > 1 HORIZONTAL COMPRESS by factor of $\frac{1}{k}$

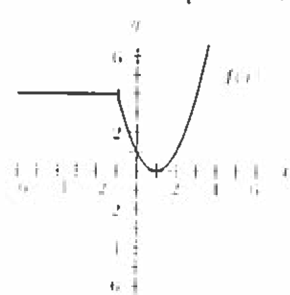
Check your understanding:

1. The graph of $h(x)$ contains the point (5, 10). What is the corresponding point on the graph of $y = h(5x)$? $(-1, 10) \Rightarrow$ HORIZONTAL COMPRESSION by $\frac{1}{5}$

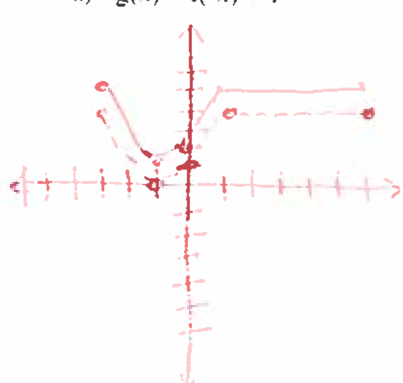
2. The point $(2, -8)$ lies on the graph of f. If the graph of f is compressed vertically by a factor of $\frac{1}{5}$ and stretched horizontally by a factor of 11, what point must lie on the transformed graph? $\frac{1}{5}f\left(\frac{1}{11}x\right)$
$\left(22, -\frac{8}{5}\right)$

3. The graph of a function f has been stretched vertically by a factor of 8, compressed horizontally by a factor of 6, and then shifted up 2 units and shifted 6 units to the left. The new graph is produced by a function g. Find a formula for g in terms of f. $g(x) = 8 \cdot f(6(x+6)) + 2$

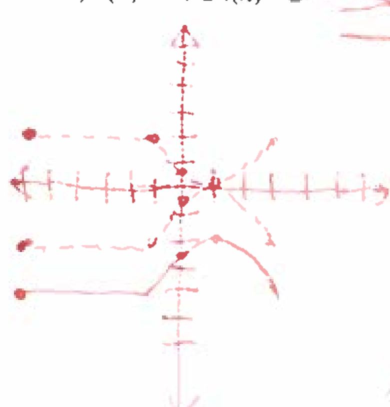
4. The graph of the function f(x) is show below. Graph the following transformations. Then list in words the transformation used.



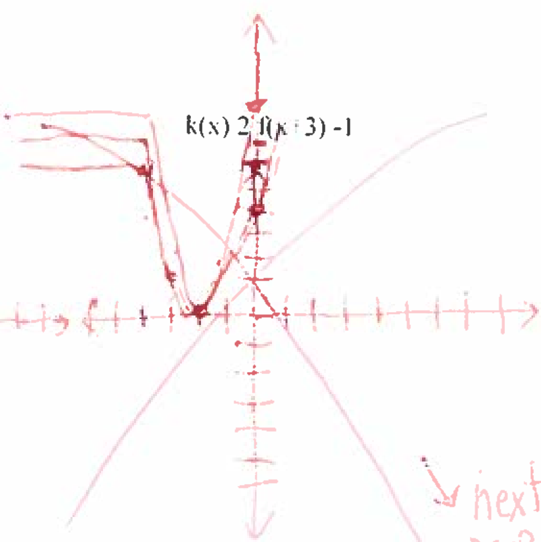
a) g(x) f(-x) + 1



b) h(x) 1 2 f(x) 2



k(x) 2 f(x 3) -1



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(c) $2f(x+3)-1$