MCR3U9 **Semester 2, 2015 - 2016**

Grade 11 Pre-AP Functions
Quiz – Unit 1 – All Transformations

Mr. N. Nolfi
Victim: Mr. Solutions Superb work once again Mr. S. !!

KU	APP	COM
14/14	12/12	10/10

1. Consider the function f defined by the equation $f(x) = |x-5|$. The function g is obtained by performing the following transformations to f:

Horizontal Transformations	***Vertical Transformations***
1. Reflect in the y-axis	1. Reflect in the x-axis
2. Stretch by a factor of 2	2. Stretch by a factor of 3
3. Translate three units to the right	3. Translate 4 units down

(a) Write the transformation using mapping notation. **(4 KU)**

$(x,y) \rightarrow (-2x+3, -3y-4)$ ✓✓✓✓

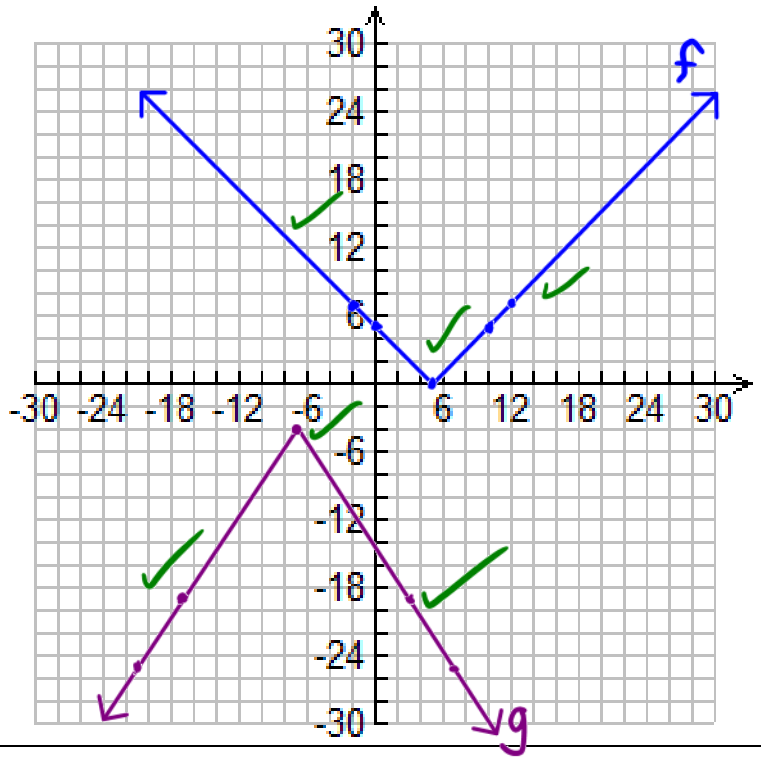
(b) Write the transformation using function notation. **(4 KU)**

$g(x) = -3f\left(-\frac{1}{2}(x-3)\right) - 4$ ✓✓✓✓

(c) Apply the transformation to five key points on f. **(6 KU)**

Pre-Image	Image
(5, 0)	(−7, −4) ✓
(10, 5)	(−17, −19) ✓
(0, 5)	(3, −19) ✓
(12, 7)	(−21, −25) ✓
(−2, 7)	(7, −25) ✓

(d) On the given grid, sketch the graphs of both f and g. **(6 APP)**



(e) Find the equation of g by using your answer to (b) as well as your graph. **(6 APP)**

$g(x) = -3f\left(-\frac{1}{2}(x-3)\right) - 4$

$= -3\left|-\frac{1}{2}(x-3) - 5\right| - 4$

$= -3\left|-\frac{1}{2}x + \frac{3}{2} - 5\right| - 4$

$= -3\left|-\frac{1}{2}x - \frac{7}{2}\right| - 4$

$= -3\left|-\frac{1}{2}(x+7)\right| - 4$ using property $|xy| = |x||y|$

$= -3\left|-\frac{1}{2}\right|\left|x+7\right| - 4$

$= -\frac{3}{2}|x+7| - 4$ (agrees with graph)

Full marks for getting to this point.