MCR3U9 **Semester 1, 2015 - 2016**

Grade 11 Pre-AP Functions
Quiz – Unit 1 – Function Notation, Translations, Reflections

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Victim: Mr. Solutions You did it again Mr. S.!!

KU	APP	COM
23 /23	8 /8	5 /5

Modified True/False **(6 KU)**

State whether each statement is ***true*** or ***false***. If false, ***change*** the ***underlined part*** to make the statement true.

1. **T/F** F ✓ $f(2+3)=f(2)+f(3)$ **Change:** $f(5)$ ✓

2. **T/F** F ✓ If $g(3)=-1$ then $(-1,3)$ lies of the graph of g. **Change:** $(3,-1)$ ✓

3. **T/F** F ✓ $y=h(x)$ means that the value of y is found by multiplying the value of h by the value of x. **Change:** applying the function h to x ✓

4. **T/F** F ✓ If $g(x)=f(x-3)$, the graph of g is obtained by translating the graph of f three units to the left. **Change:** translating three units right ✓

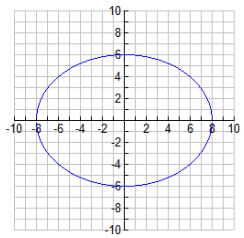
5. **T/F** F ✓ The graph of g is obtained by reflecting f in the y-axis, translating three to the right and shifting five units down. Therefore, $g(x)=-f(x+3)+5$. **Change:** $g(x)=f(-(x-3))-5$ ✓

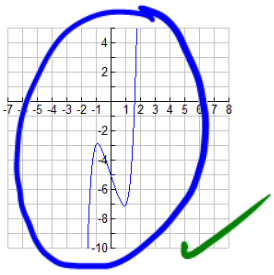
6. **T/F** F ✓ The symbol $f(u)$ is read "f u." **Change:** "f of u" ✓

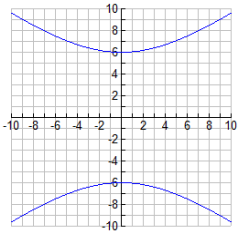
or $g(x)=f(-x+3)-5$

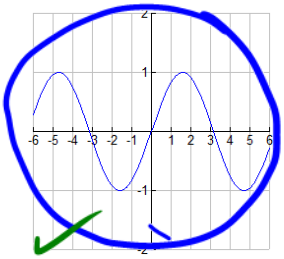
✓ = ½ mark

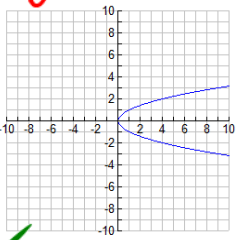
7. Circle the relations that are functions. **(5 KU)**







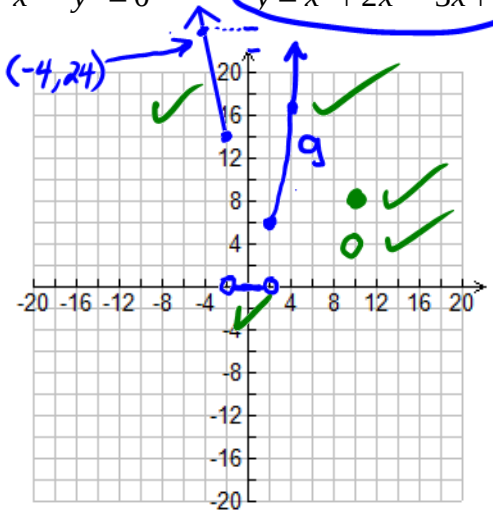




$\{(0,2),(1,2),(2,2)\}$ ✓ $\{(1,1),(1,2),(1,3),(1,5)\}$ $y=\pm\sqrt{16-x^2}$ $x^2-y^2=0$ ✓ $y=x^3+2x^2-3x+1$ ✓

8. Sketch a graph of the following piecewise-defined function

$$g(x)=\begin{cases}4-5x, & x\le -2\\ 0, & -2<x<2\\ x^2+1, & x\ge 2\end{cases}$$



In addition, state the domain and range of g. **(8 APP)**

Domain = $\mathbb{R}$ ✓

Range = $\{y\in\mathbb{R} \mid y=0 \text{ or } y\ge 5\}$ ✓

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

Horizontal Transformations	***Vertical Transformations***
1. Reflect in the y-axis 2. Translate six units to the left	1. Reflect in the x-axis 2. Translate four units up

(a) Write the transformation using function notation. **(2 KU)**

$g(x)=-f(-(x+6))+4$

(or $g(x)=-f(-x-6)+4$ or $g(x)=-f(x+6)+4$)

(b) Write the transformation using mapping notation. **(2 KU)**

$(x,y)\rightarrow(-x-6,-y+4)$

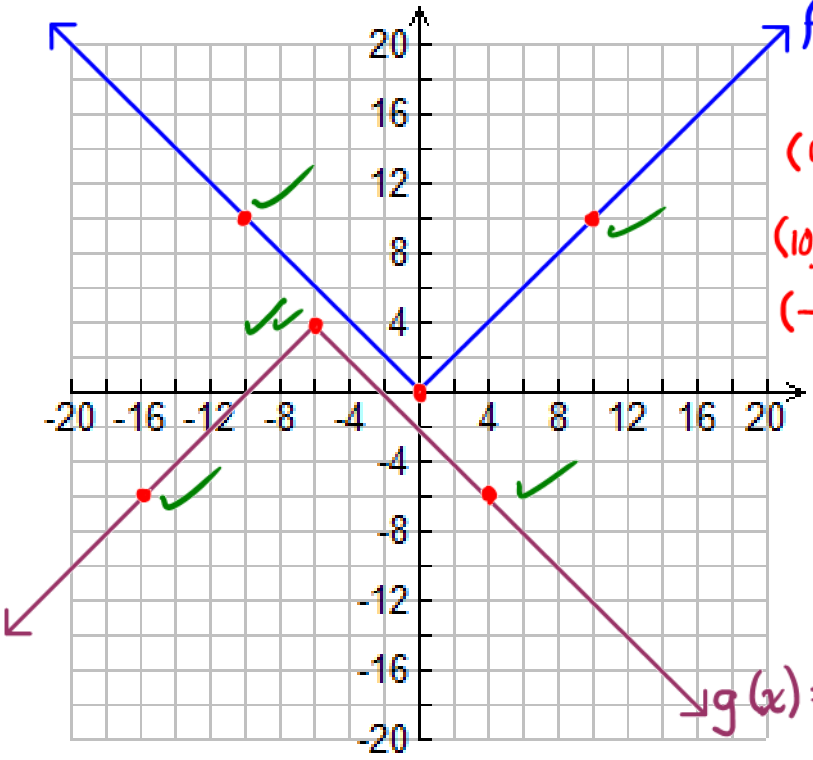
(or $(x,y)\rightarrow(x-6,-y+4)$)

(c) Write the equation of g using absolute value notation. **(2 KU)**

$g(x)=-|-(x+6)|+4$

(or $g(x)=-|-x-6|+4$ or $g(x)=-|x+6|+4$)

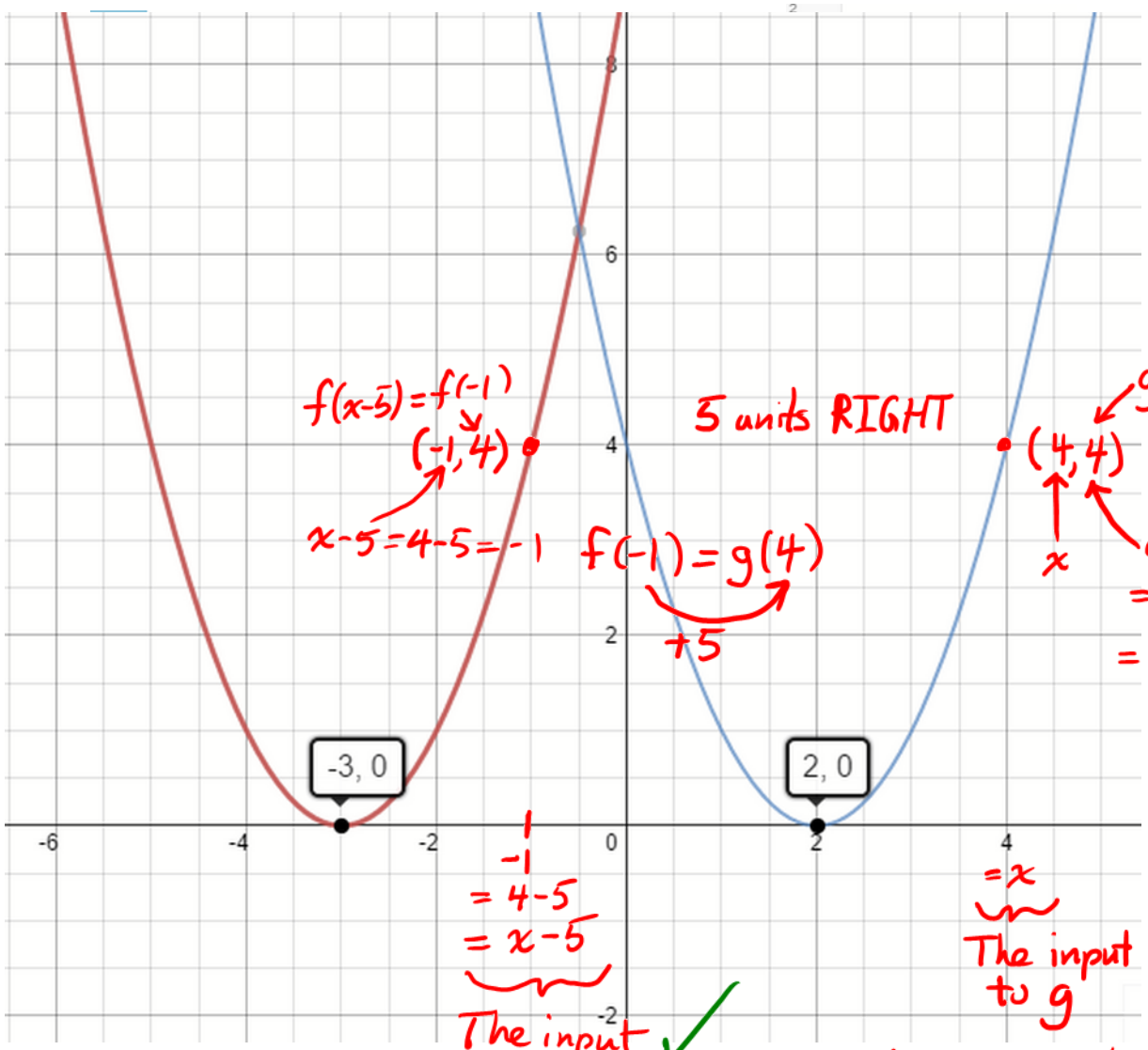
(d) On the given grid, sketch the graphs of both f and g. The graph of g should be generated entirely by using the given transformations. Do not use a table of values! **(6 KU)**



10. Suppose that $g(x)=f(x-5)$. Explain why the graph of g is obtained by translating the graph of f five units to the ***right***, ***NOT*** five units to the left. Use at least one diagram to illustrate your answer. **(5 COM)**

The statement $g(x)=f(x-5)$ MEANS that for input x, g has the same output as f has for input $x-5$. Since $x-5$ is five units to the LEFT of x, the graph of f must be five units to the left of that of g. Therefore, the graph of g must be five units to the RIGHT of that of f.

(Diagram on next page)


-3, 0
2, 0
f(x-5)=f(-1)
(-1,4)
x-5=4-5=-1
5 units RIGHT
f(-1)=g(4)
+5
g(4)
(4,4)
x
g(x)
=f(x-5)
=f(-1)
-1
=4-5
=x-5
The input to f is 5 units to the left of the input to g
=x
The input to g
This means that the graph of g is obtained by shifting the graph of f 5 units to the right!