Circuit Training – Functions 2 Name ___________________________
(Compositions, Transformations, Inverses)

Beginning in the cell marked #1, work the problem and then hunt for the answer in one of the remaining cells. When you find it, mark that problem #2. Work that problem and then hunt for your answer. Proceed in this manner until you complete the circuit. <u>You must write in the final answer.</u>

Answer:

1 Let $f(x) = 3x - 1$ and $g(x) = x^2 - 10$. Find $f(g(4))$

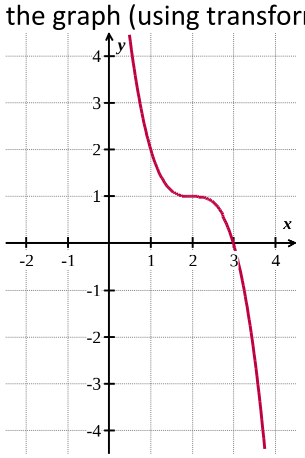
Answer: 3

______ Function values for f and g are given in the table. Use the information given to determine the value of $f(g(6))$

x	$f(x)$	$g(x)$
2	7	-19
6	2	11
10	-4	5
11	18	-3
15	-17	6

Answer: -6

______ The function shown in the graph is based on $y = x^3$. Determine a formula for the function in the graph (using transformations).



Answer: $f^{-1}(x) = \frac{x-9}{4}$

______ Let $f(x) = \frac{4x+9}{1-x}$. Find $f^{-1}(x)$.

Answer: $\dfrac{4x}{6-9x}$

_____ Write a formula for the function created by shifting the graph of $y = x^2$ to the right 3 units and down 7 units.

Answer: $f^{-1}(x) = \dfrac{4-9x}{2x-1}$

_____ Let $f(x) = \sqrt{x-3}$. Find $f^{-1}(x)$.

Answer: $f(x) = -(2x)^3 + 1$

_____ Let $f(x) = 4x + 9$. Find $f^{-1}(x)$.

Answer: -10

_____ Use the values in the table to determine the value of $h(4)$ where $h(x) = f\left(\frac{1}{2}x\right) + 4$

x	$f(x)$
2	-10
4	-12
6	-16
8	-20
10	-14

Answer: $3x^2 - 6x + 13$

_____ Let $h(x) = \dfrac{4}{x-9}$ and $g(x) = \dfrac{6}{x}$. Find $(h \circ g)(x)$. Simplify, if necessary.

Answer: 18

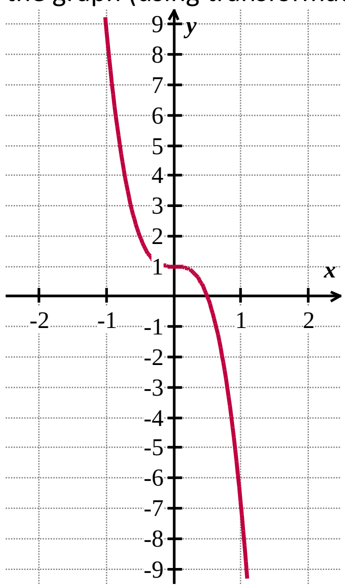
_____ Function values for R and C are given in the table. Use the information given to determine the value of $C(R(8))$

x	$R(x)$	$C(x)$
-3	9	0
5	-14	-3
8	5	11
11	17	2
17	8	-18

Answer: 17 # _____ Let $f(x)=\dfrac{4}{x-9}$ and $g(x)=\dfrac{6}{x}$. Find $g(f(-3))$	Answer: $f^{-1}(x)=-3+\sqrt{x}$ # _____ Let $f(x)=x^2-3$. Find a domain on which $f(x)$ is one-to-one. Write the restricted domain here:______________________________. To progress in the circuit, find $f^{-1}(x)$
Answer: -3 # _____ Let $f(x)=3x-1$ and $g(x)=x^2-10$. Find $(f\circ g)(x)$.	Answer: -18 # _____ Let $g(x)=\sqrt{x+3}$. Find $g(g(33))$.
Answer: $3x^2-31$ # _____ Let $f(x)=x-1$ and $g(x)=3x^2+10$. Find $(g\circ f)(x)$.	Answer: $f^{-1}(x)=\dfrac{x-9}{x+4}$ # _____ Let $f(x)=\dfrac{x+4}{2x+9}$. Find $f^{-1}(x)$.

Answer: $f(x) = -(x-2)^3 + 1$

_____ The function shown in the graph is based on $y = x^3$. Determine a formula for the function in the graph (using transformations).



Answer: $f(x) = (x+7)^2 + 3$

_____ Use the values in the table to determine the value of $h(4)$ where $h(x) = \frac{1}{2} f(x+4)$

x	$f(x)$
2	-10
4	-12
6	-16
8	-20
10	-14

Answer: $f(x) = (x-3)^2 - 7$

_____ Write a formula for the function created by shifting the graph of $y = x^2$ to the left 7 units and up 3 units.

Answer: $f^{-1}(x) = x^2 + 3$

_____ Let $f(x) = (x+3)^2$. Find a domain on which $f(x)$ is one-to-one. Write the restricted domain here:______________________________.

To progress in the circuit, find $f^{-1}(x)$

