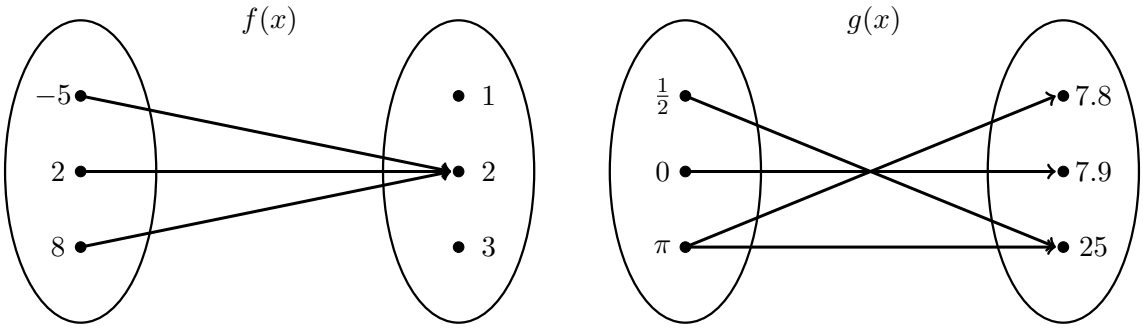
Name: _____

MATH 101
Winter 2021
HW 4: Due 01/07

"Sometimes I get so bored I just want to scream, and then sometimes I actually do scream. I just sort of feel out what the situation calls for."
–Kelly Kapoor, The Office

Problem 1. (10pt) Determine if the relations $f(x)$ and $g(x)$ shown below are functions. Explain why or why not.

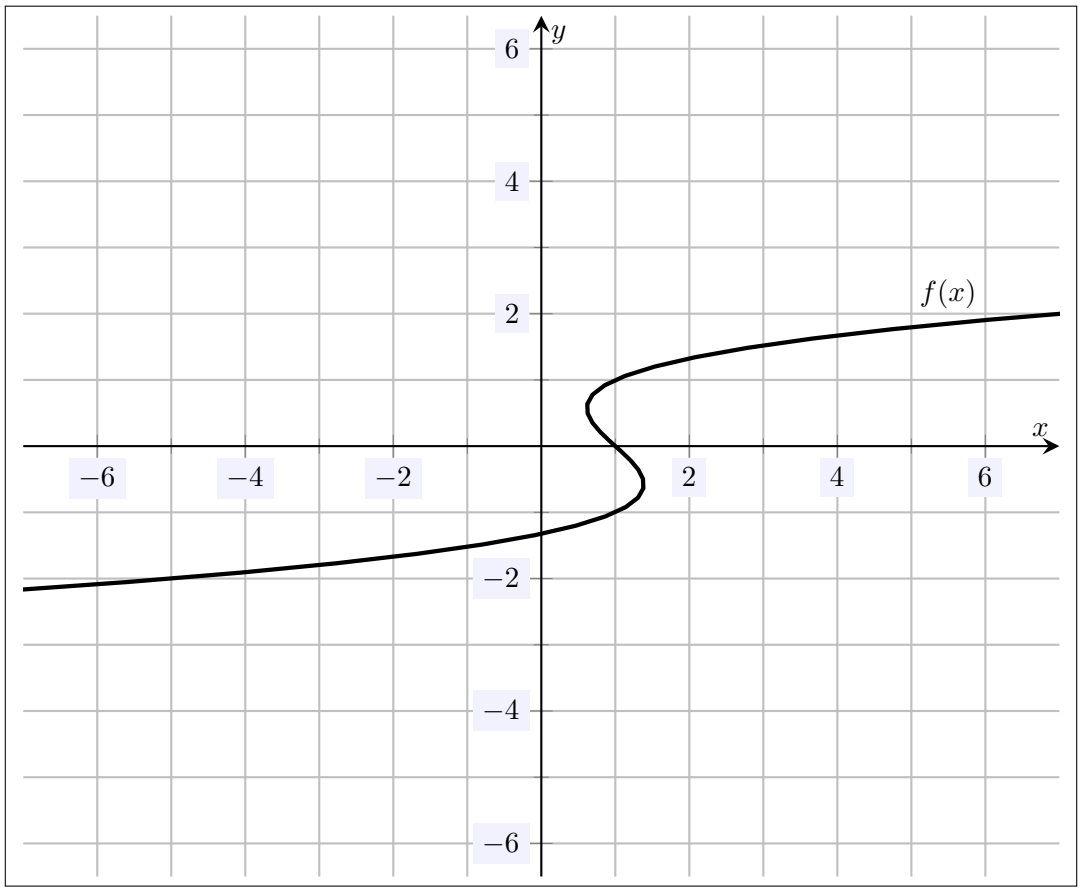


Problem 2. (10pt) Determine if the relations $f(x)$ and $g(x)$ shown below are functions. Explain why or why not.

x	$f(x)$
1	5
2	5
3	6
4	6
5	10

x	$g(x)$
1	6
2	8
3	10
4	12
1	13

Problem 3. (10pt) Determine if the relation below is a function or not. If it is a function, explain why. If it is not a function, explain why.

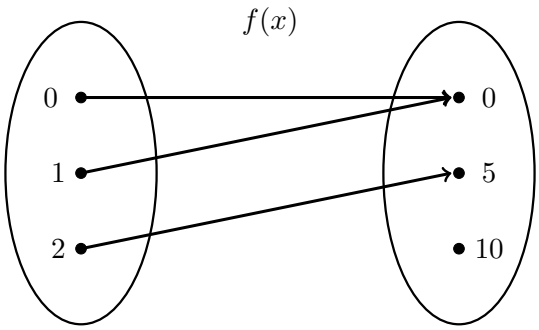


Problem 4. (10pt) Determine if the relations $f(x)$ and $g(x)$ shown below are functions. Explain why or why not.

$$f(x) = 6.73 - 13.54x$$

$$g(x) = \frac{6x - 5}{3x^2 + 1}$$

Problem 5. (10pt) Suppose $f(x)$ is the function given below.



(a) What is the domain of $f(x)$?

(b) What is the codomain of $f(x)$?

(c) What is the range of $f(x)$?

Problem 6. (10pt) Determine whether the point $(2, -1)$ is on the graph of $f(x) = 2x^2 - 5x + 3$. Determine also whether the point $(1, 0)$ is on the graph of $f(x)$. For each, explain why or why not.

Problem 7. (10pt) Suppose $f(x)$ and $g(x)$ are the functions given below.

x	-3	-2	-1	0	1	2	3
$f(x)$	3	-2	1	6	4	-7	0
$g(x)$	2	1	0	3	-5	-5	-4
$h(x)$	0	1	0	3	0	-1	6

Compute the following:

(a) $(f+g)(1) =$

(b) $(f-g)(-2) =$

(c) $(-2h)(3) =$

(d) $\left(\dfrac{h}{g}\right)(0) =$

(e) $f(0)\,h(-2) =$

(f) $f(2-h(0)) =$

(g) $(f \circ g)(0) =$

(h) $(g \circ h)(2) =$

(i) $(f \circ g \circ h)(1) =$

(j) $(h \circ g)(-2) =$

Problem 8. (10pt) Suppose $f(x)$ and $g(x)$ are the functions given below.

$$f(x) = 4 - 3x$$

$$g(x) = x^2 - x + 4$$

Compute the following:

(a) $f(2) =$

(b) $g(1) =$

(c) $3f(1) - g(2) =$

(d) $f(x) - g(x) =$

(e) $f(x)\, g(x) =$

(f) $\left(\dfrac{f}{g}\right)(x) =$

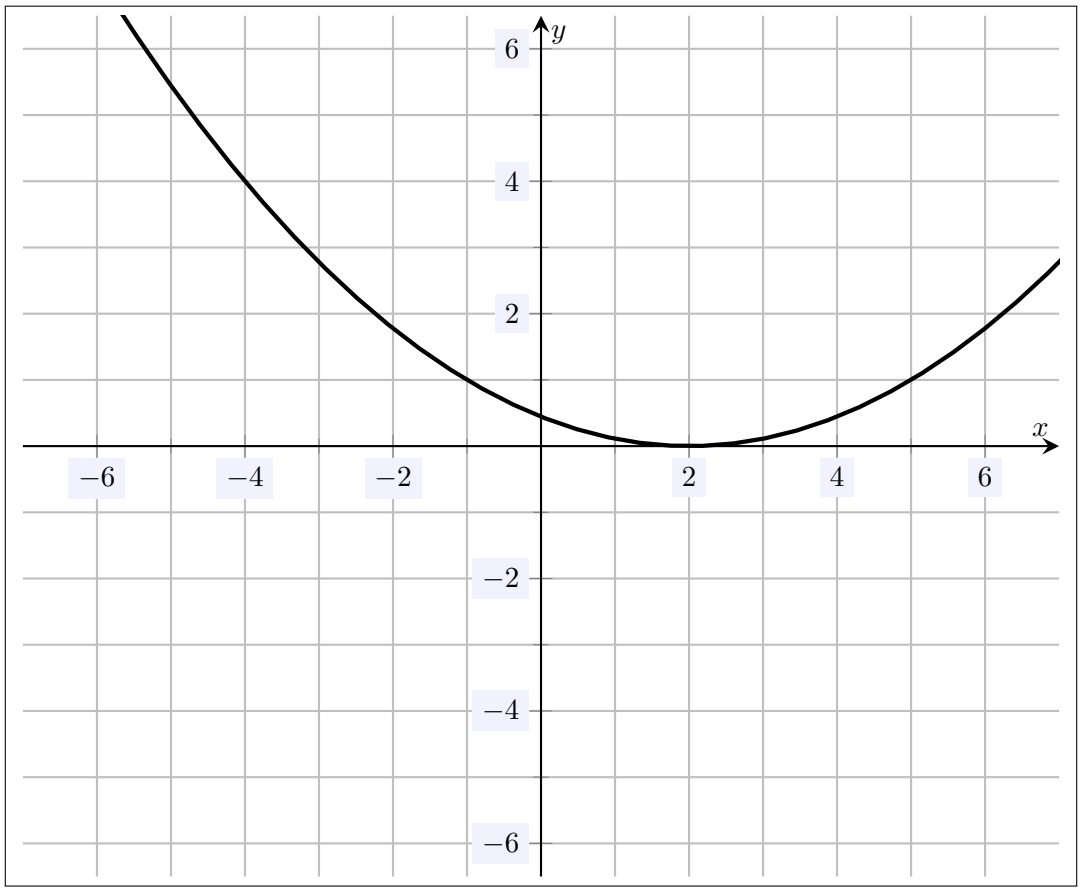
(g) $(f \circ g)(0) =$

(h) $(g \circ f)(1) =$

(i) $(f \circ g)(x) =$

(j) $(g \circ f)(x) =$

Problem 9. (10pt) Given the graph of $f(x)$ below, determine whether $f(x)$ has an inverse function. Explain why or why not.



Problem 10. (10pt) Given the graph of $f(x)$, sketch the function $f^{-1}(x)$. Determine also $f^{-1}(1)$ and $f^{-1}(2)$.