

# Chapter 1.3: Inverse Functions

## Calculus I

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1. Consider  $f(x)$  given below:

$x$	$f(x)$
-2	-6
-1	-4
0	-2
1	0
2	2
3	4

- (a) What is  $f^{-1}(0)$ ?
- (b) What is  $f^{-1}(-4)$ ?
- (c) Graph  $f(x)$ .
- (d) Graph  $f^{-1}(x)$ .
- (e) How are the graphs of  $f(x)$  and  $f^{-1}(x)$  related? Why?
2. Let  $f(x) = (x + 3)^5$
- (a) Write  $f(x)$  as a compound function:  $f(x) = g(h(x))$ .
- (b) Determine  $g^{-1}(x)$  and  $h^{-1}(x)$  and use this information to find  $f^{-1}(x)$ .
3. Which of the following functions are invertible?
- (a)  $f(x) = 3x + 2$
- (b)  $g(x) = x^2$
- (c) The cost  $c$  of  $x$  pounds of lentils purchased in bulk.
- (d)  $h(t)$ , the number of hamburgers eaten by Jamie McKown on day  $t$ , where  $t$  is measured in days since January 1, 2010.
- (e)  $H(t)$ , the total, cumulative number of hamburgers eaten by Jamie McKown on day  $t$ , where  $t$  is measured in days since January 1, 2010.
4. Let  $S(Q)$  give the fraction of TAB patrons consuming salads as a function of the quality of lunch entree. Assume that the lunch quality  $Q$  is measured on a scale of 1 to 5, with 5 indicating yumminess and 1 indicating in-edibility.
- (a) Sketch a possible graph for  $S(Q)$ .
- (b) What is the range of  $S$ ?
- (c) What is the domain of  $S$ ?
- (d) Sketch the inverse of  $S(Q)$ .
- (e) What is the meaning of  $S(4.2) = 0.5$ ?
- (f) What is the meaning of  $S^{-1}(0.78) = 3.9$ ?