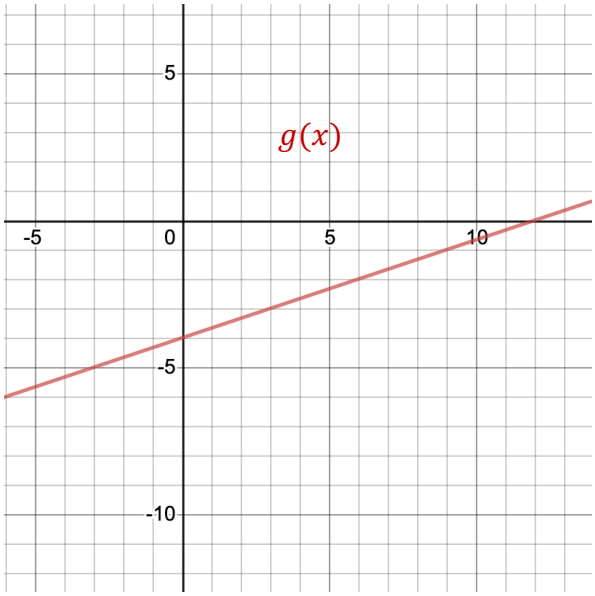
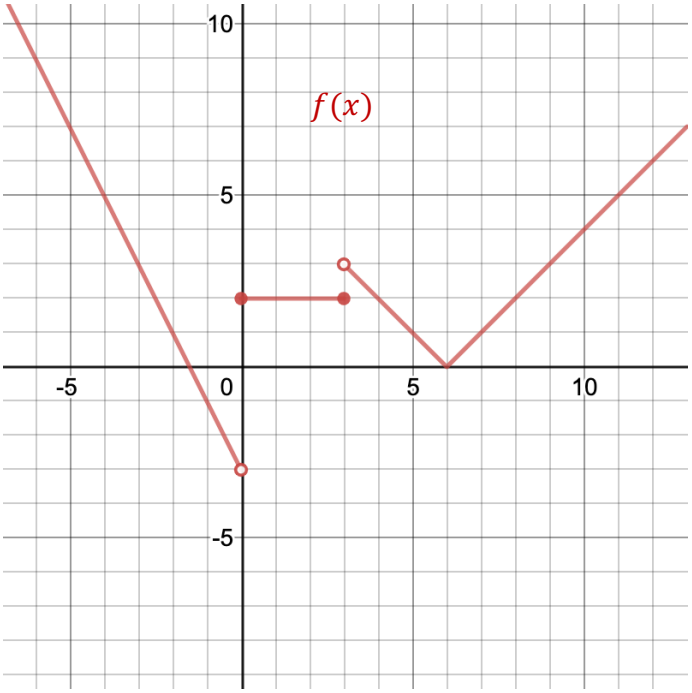
Study Guide for Math 206.5 Exam I

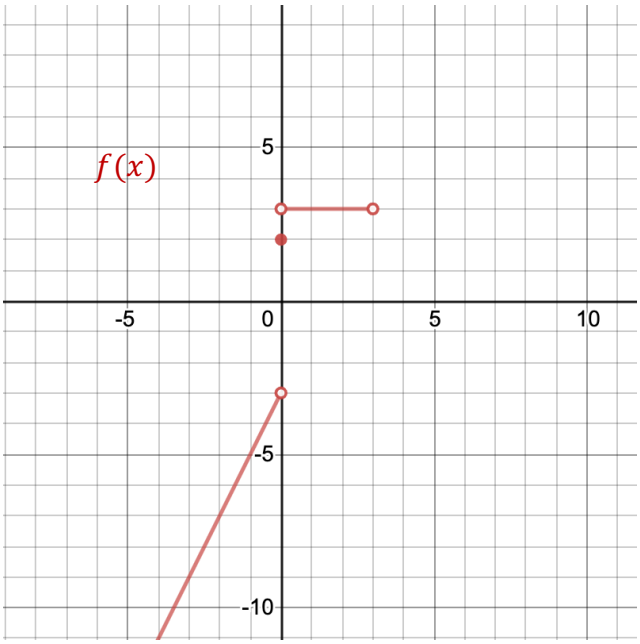
1. Find the formula for the given graph.



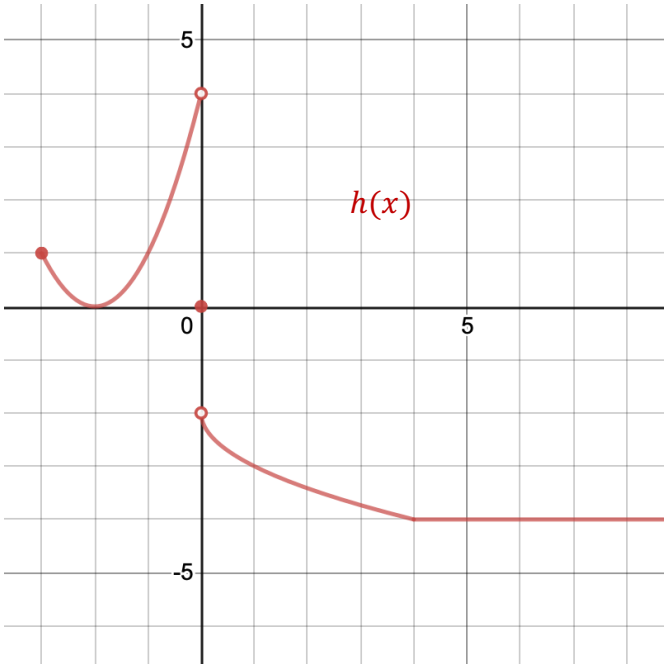
2. Find the formula for the given piecewise function.



3. Find the domain and range.

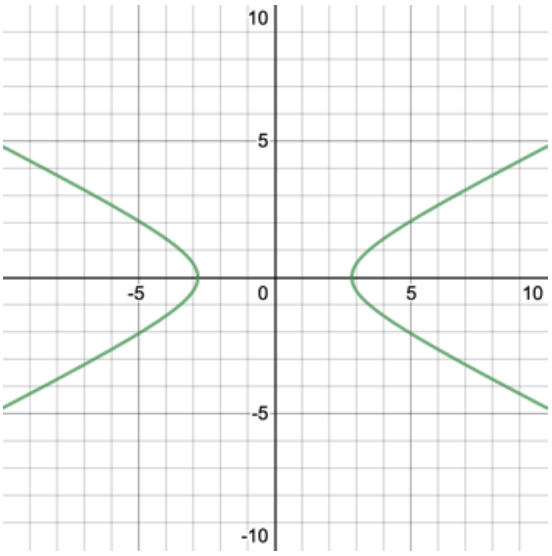


4. Find the domain and range.

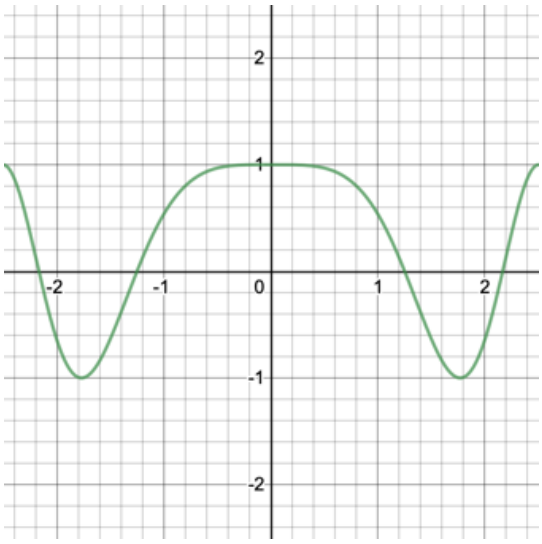


5. For each graph, state whether it represents an even function, an odd function, neither, or not a function

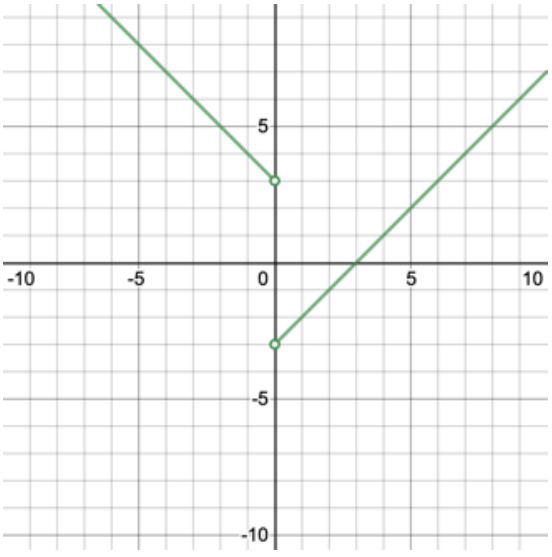
A.



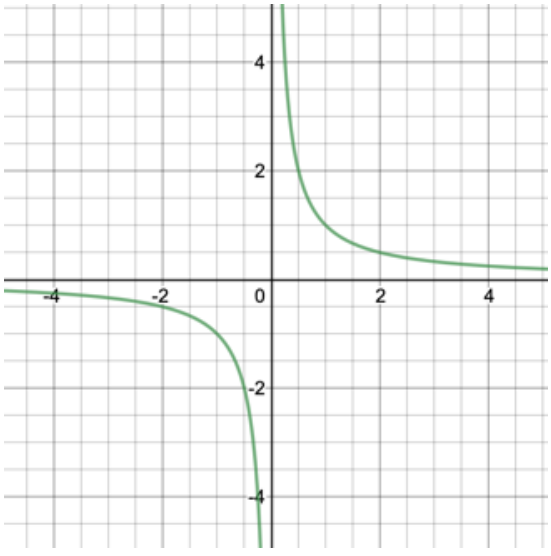
B.



C.

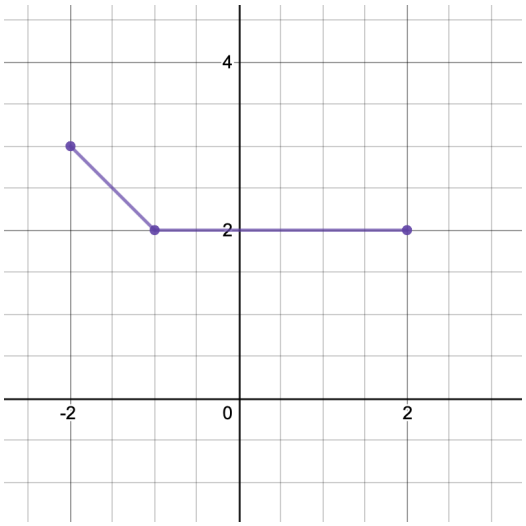


D.



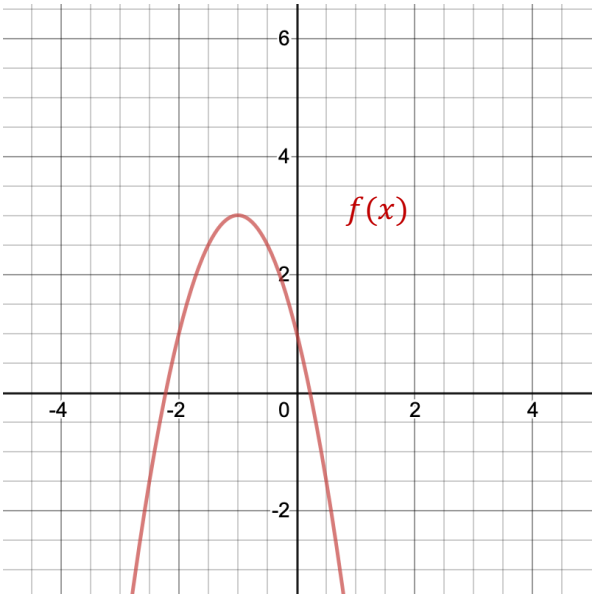
6. For $h(x)$, find the graph of the transformed function $g(x) = -\frac{1}{2}h(x+2)+1$

$h(x)$

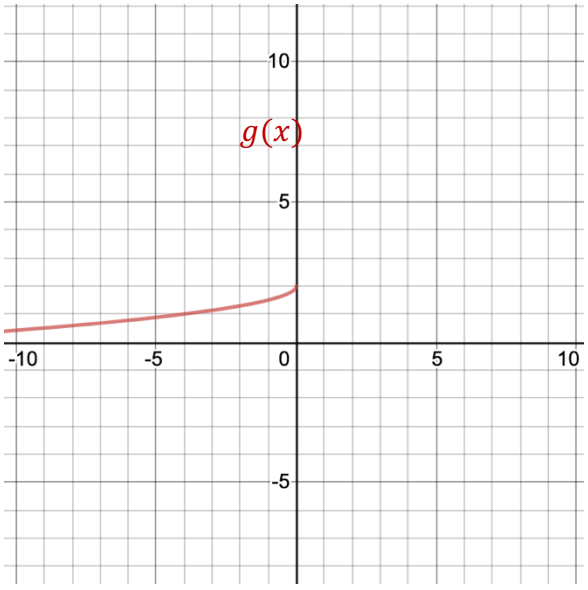


7. Find the formula for the function shown

a.

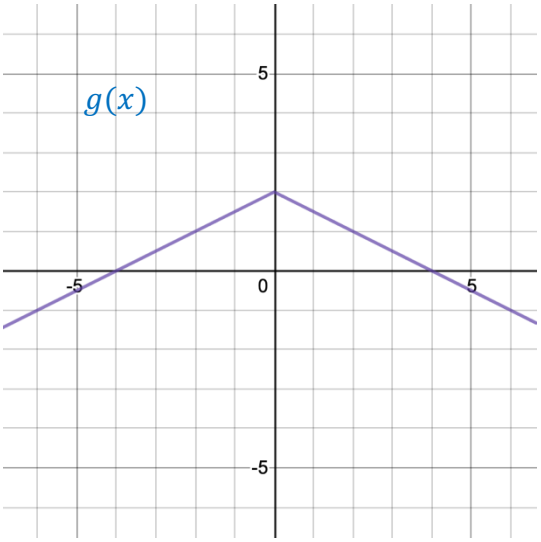


b.

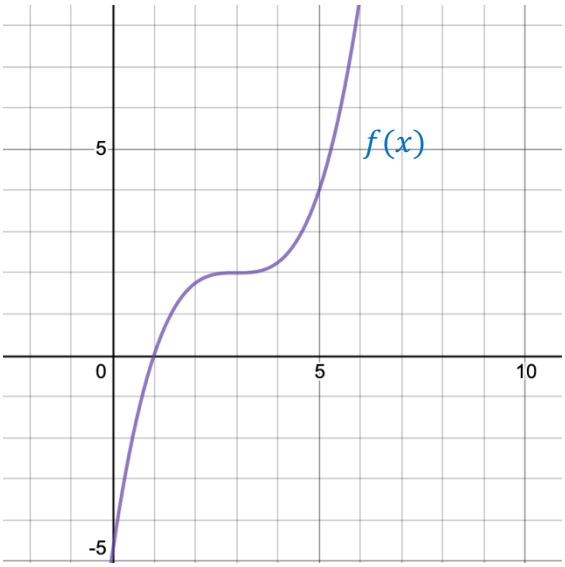


8. Find the formula for the function shown.

a.



b.



9. Graph $3x - 4y = 12$
10. Graph $y = -\frac{1}{3}x + 4$
11. Graph $y = -2$
12. Find the linear function $f(x)$ such that $f(-4) = 1$ and $f(2) = 4$
13. A home business manufactures bracelets. They have found from experience that they can sell 700 bracelets each week if the price per bracelet is $2.00, but only 575 bracelets are sold if the price is $2.50 per bracelet. If the relationship between the number of bracelets sold *u* and the price per bracelet *p* is a linear one, find a formula that gives *u* terms of *p*. (you must use methods developed in class. This problem has more points than the others)
14. Could the given equation represent a function? If not why not?
    a. $x^3 - y^2 = 2$ b. $x^2 + 1 = 17y$
15. For the given functions, find the designated function values:
    $f(x) = x^2 - 2x + 3$ $g(x) = 2 - 5x$
    a. $f(2)$ b. $f(-3)$ c. $g(a + 1)$ d. $f(g(2))$
16. Graph the piecewise function given below:

$$f(x) = \begin{array}{ll} 2x - 1 & x < 0 \\ 5 & x = 0 \\ x + 2 & x > 0 \end{array}$$

17. Given that $f(x) = x^2 - 1$ and $g(x) = 3 - x$ find a. $f[g(x)]$ and b. $g[f(x)]$.

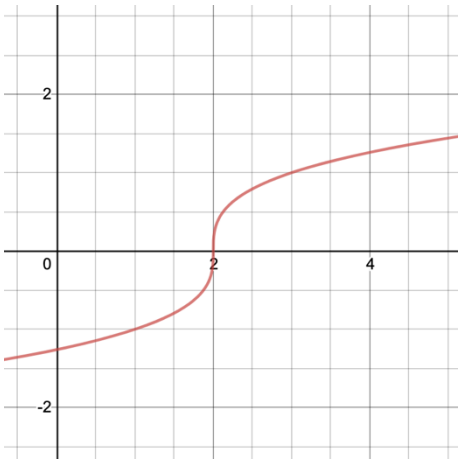
18. For the given function $f(x)$, find $g(x)$, $h(x)$, and $q(x)$ such that $f(x) = q(h[g(x)])$

$$f(x) = 5 - \frac{4}{(3x+2)^2}$$

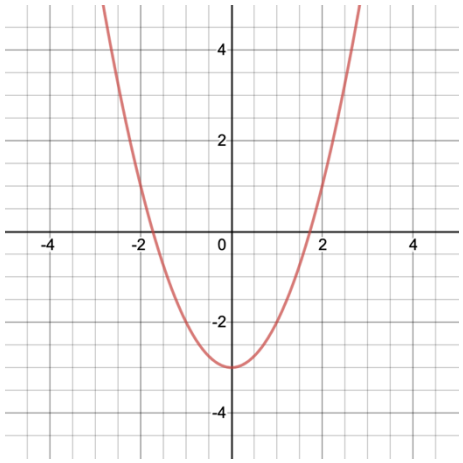
19. Find the inverse function of $f(x) = \frac{x+3}{x-1}$

20. Decide whether the given function is one-to-one and has an inverse. If it does, find $f^{-1}(1)$.

a.

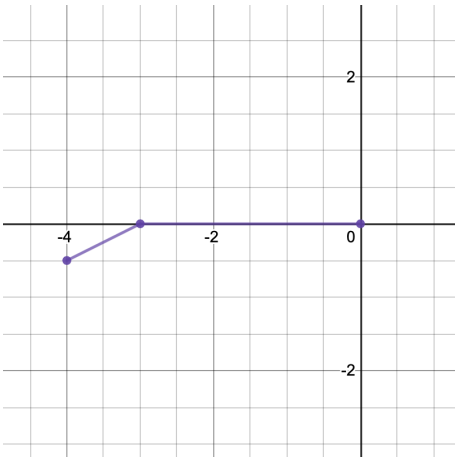


b.

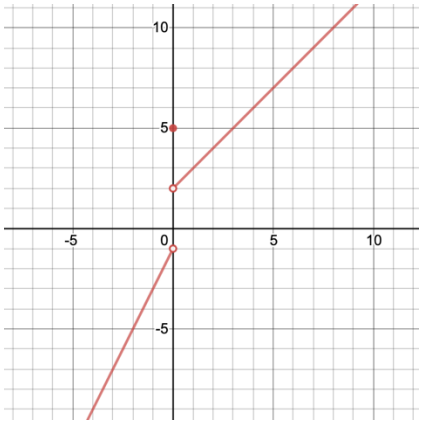


Answers:

1. $g(x) = \frac{1}{3}x - 4$
2. $f(x) = \begin{cases} -2x - 3 & x < 0 \\ 2 & 0 \le x \le 3 \\ |x - 6| & 3 < x \end{cases}$
3. Domain: $(-\infty, 3)$ Range: $(-\infty, -3) \cup 2 \cup 3$
4. Domain: $(-3, \infty)$ Range: $(-4, -2] \cup [0,4)$
5. A. not a function B. even C. neither D. odd
6.



7. a. $f(x) = -2(x+1)^2 + 3$ b. $g(x) = -\frac{1}{2}\sqrt{-x} + 2$
8. a. $g(x) = -\frac{1}{2}|x| + 2$ b. $f(x) = \frac{1}{4}(x-3)^3 + 2$
9. You can do this!
10. You can do this!
11. You can do this!
12. $f(x) = \frac{1}{2}x + 3$
13. $u = number\ of\ bracelets\ sold \quad p = price \quad u = -250p + 1200$
14. a. no, you cannot get y as a single output in terms of x b. yes
15. a. 3 b. 18 c. $-5a - 3$ d. 83
16.



17. a. $f[g(x)] = x^2 - 6x + 8$ b. $g[f(x)] = 4 - x^2$
18. $g(x) = 3x + 2, h(x) = \frac{4}{x^2}, q(x) = 5 - x$, (other answers possible)
19. $f^{-1}(x) = \frac{x+3}{x-1}$
20. a. does have an inverse; $f^{-1}(1) = 3$ b. does not have an inverse.

General Practice

1. Find the linear function (Algebra Builder: equations with 2 variables)
2. Find the piecewise function (above, Lesson 2.4, Lesson 3.2)
3. Find the domain and range from a graph (Lesson 2.3)
4. Find the domain and range from a graph (Lesson 2.3)
5. Vertical line test, even and odd functions (Lesson 2.5-2.6)
6. Graph the transformation of a given function (Lesson 3.3)

7-8. Find the formula of the transformed function (Lesson 3.1-3.2)

9-12. Graph the line (Algebra Builder equations with 2 variables)

13. Find the linear formula (Lesson 1.3)

14. Functions (Lesson 1.3)

15. Newtonian Function Notation (Lesson 2.1)

16. Piecewise Functions Lesson 2.4

17-18. Composition of Functions (Lesson 4.1)

19. Inverse Functions (Lesson 4.2)

20. The Horizontal Line Test (Lesson 4.4)