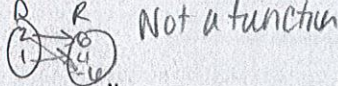


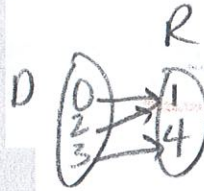
# Level 1

In Exercises 1–6, determine whether each relation is a function. Give the domain and range for each relation.

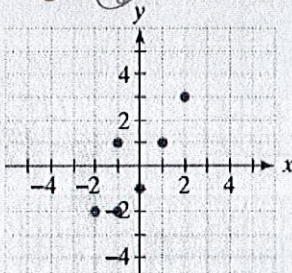
1.  $\{(2, 6), (1, 4), (2, -6)\}$



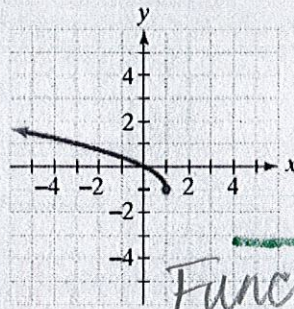
2.  $\{(0, 1), (2, 1), (3, 4)\}$



5.



6.



In Exercises 7–8, determine whether each equation defines  $y$  as a function of  $x$ .

7.  $x^2 + y = 5$

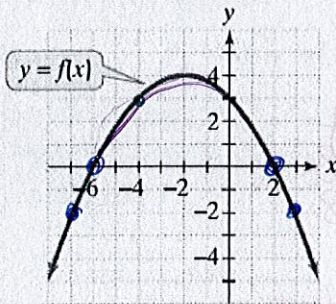
$y = x^2 + 5$   
function

8.  $x + y^2 = 5$

Not a function

# Level 2

Use the graph of  $f$  to solve Exercises 9–24. Where applicable, use interval notation.



- 9. Explain why  $f$  represents the graph of a function
- 10. Find the domain of  $f$ .  $(-\infty, \infty)$
- 11. Find the range of  $f$ .  $(-\infty, 4]$
- 12. Find the  $x$ -intercept(s).  $(-6, 0)$ ,  $(2, 0)$
- 13. Find the  $y$ -intercept.  $(0, 3)$

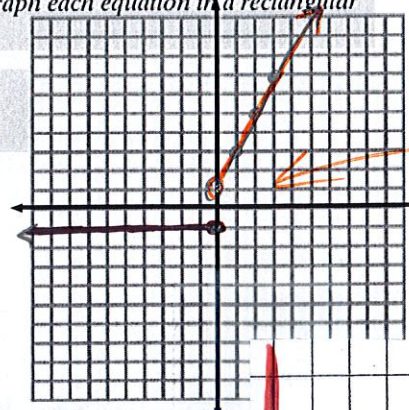
- 14. Find the interval(s) on which  $f$  is increasing.  $(-\infty, -2)$
- 15. Find the interval(s) on which  $f$  is decreasing.  $(-2, \infty)$
- 16. At what number does  $f$  have a relative maximum?  $-2$
- 17. What is the relative maximum of  $f$ ?  $4$
- 18. Find  $f(-4)$ .  $(-4, 3)$
- 19. For what value or values of  $x$  is  $f(x) = -2$ ?  $(-7, -2)$ ,  $(3, -2)$
- 20. For what value or values of  $x$  is  $f(x) = 0$ ?  $(-6, 0)$ ,  $(2, 0)$
- 21. For what values of  $x$  is  $f(x) > 0$ ?  $(-6, 2)$
- 22. Is  $f(100)$  positive or negative? negative
- 23. Is  $f$  even, odd, or neither? neither
- 24. Find the average rate of change of  $f$  from  $x_1 = -6$  to  $x_2 = 4$ .

passes VLT

**Level 3**

In Exercises 25–36, graph each equation in a rectangular coordinate system.

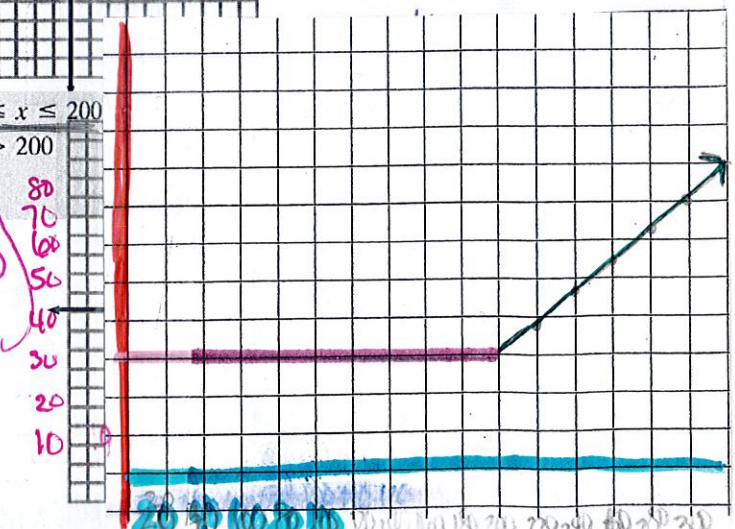
36.  $f(x) = \begin{cases} -1 & \text{if } x \leq 0 \\ 2x + 1 & \text{if } x > 0 \end{cases}$



38. Let  $C(x) = \begin{cases} 30 & \text{if } 0 \leq x \leq 200 \\ 30 + 0.40(x - 200) & \text{if } x > 200 \end{cases}$

- a. Find  $C(150)$ .      b. Find  $C(250)$ .

$y = .40x - 50$   
 (150, 200)      (250, 50)



x	y
220	38
240	46
260	54
280	62

**Level 4 Even odd or neither YOU MUST explain**

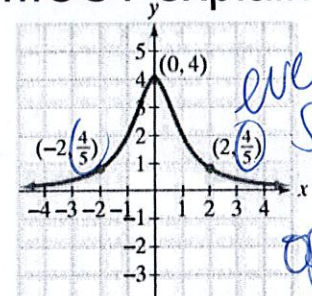
Let  $f(x) = -2x^2 + x - 5$ .

- a. Find  $f(-x)$ . Is  $f$  even, odd, or neither?

$f(-x) = -2(-x)^2 + (-x) - 5 = -2x^2 - x - 5$   
 neither

25.  $f(x) = \frac{1}{5}x^6 - 3x^2$

$f(-x) = \frac{1}{5}(-x)^6 - 3(-x)^2 = \frac{1}{5}x^6 - 3x^2 = f(x)$   
 Even  
 same output



even  
 same output  
 opposite inputs

**Level 5**

In Exercises 39–42, write a function in slope-intercept form whose graph satisfies the given conditions.

39. Slope = -2, passing through (-4, 3)

$y - 3 = -2(x + 4)$   
 $y = -2x - 8 + 3$   
 $y = -2x - 5$

40. Passing through (-1, -5) and (2, 1)

$m = \frac{-5 - 1}{-1 - 2} = \frac{-6}{-3} = 2$   
 $y - 1 = 2(x - 2)$   
 $y = 2x - 4 + 1$   
 $y = 2x - 3$

41. Passing through (3, -4) and parallel to the line whose equation is  $3x - y - 5 = 0$

$3x - 5 = y$        $m = 3$   
 $y - (-4) = 3(x - 3)$   
 $y + 4 = 3x - 9 - 4$   
 $y = 3x - 13$

42. Passing through (-4, -3) and perpendicular to the line whose equation is  $2x - 5y - 10 = 0$

$2x - 10 = 5y$        $m = -\frac{2}{5}$   
 $\frac{2}{5}x - 2 = y$   
 $y - (-3) = -\frac{5}{2}(x + 4)$   
 $y + 3 = -\frac{5}{2}x - 10 - 3$   
 $y = -\frac{5}{2}x - 13$