Worksheet 2.5-2.7

Determine whether the graph is an even function, odd function, or neither.

1. $g(x) = 2x^2 + 3$

$g(-x) = 2(-x)^2 + 3$

$2x^2 + 3$

Even

2. $F(x) = x^4 + x^2$

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

$= x^4 + x^2$

Even

3. $H(x) = -2|x + 1|$

$H(-x) = -2|-x + 1|$

Neither

4. $f(x) = x$

$f(-x) = -x$

Odd

5. $g(x) = \sqrt{x^2 + 2}$

$g(x) = \sqrt{(-x)^2 + 2}$

$\sqrt{x^2 + 2}$

Even

6. $h(x) = 4x^2$

$h(-x) = 4(-x)^2$

$= 4x^2$

Even

7. $g(x) = 4x^5 + 3x^3$

$g(-x) = 4(-x)^5 + 3(-x)^3$

$= -4x - 3x$

Odd

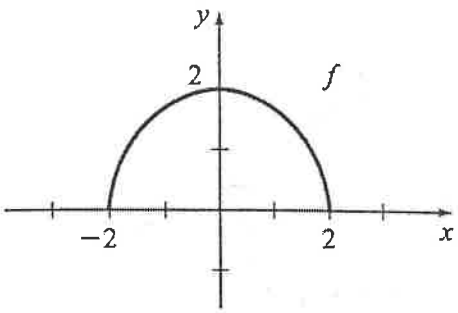
8. $f(x) = 3x^2 - 4x$

$f(-x) = 3(-x)^2 - 4(-x)$

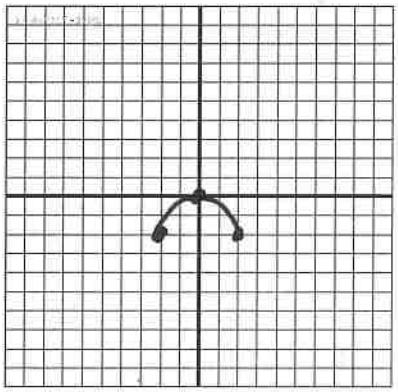
$= 3x^2 + 4x$

Neither

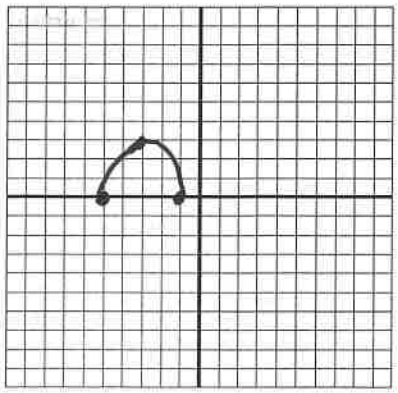
9. Use the graph of f to sketch the graph of



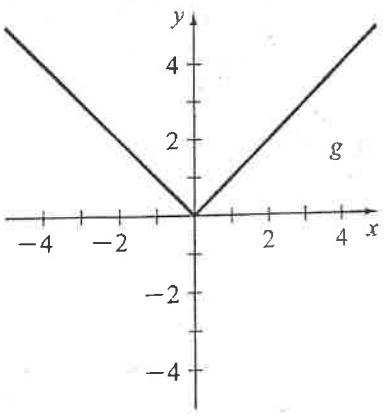
a. $y = f(x) - 2$



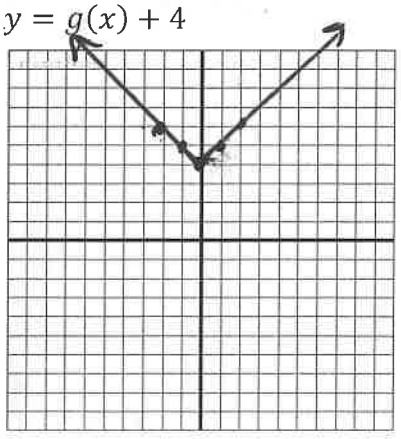
b. $y = f(x + 3)$



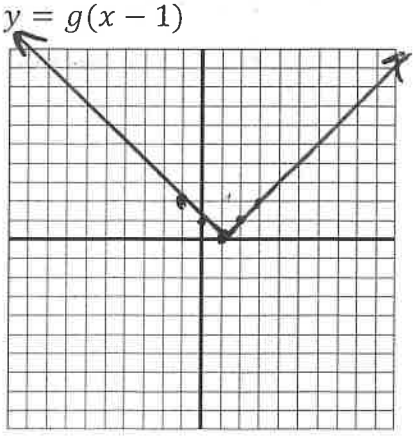
10. Use the graph of g to sketch the graph of



a. $y = g(x) + 4$



b. $y = g(x - 1)$



11. Let f be a function such that $f(-1) = 6, f(0) = -3, f(2) = 5$. Give the coordinates of three points on the graph of: $(-1,6)$ $(0,-3)$ $(2,5)$

a. $y = f(x+2)$
$(x-2, y)$
$(-3,6)$ $(-2,-3)$ $(0,5)$

b. $y = f(x) - 5$
$(x, y-5)$
$(-1,1)$ $(0,-8)$ $(2,0)$

12. Let g be a function such that $g(3) = -7$, and $f(-5) = -1$. Give the coordinates of the two points on the graph of: $(3,-7)$ $(-5,-1)$

a. $y = -g(x)$
$(x,-y)$
$(3,7)$ $(-5,1)$

b. $y = g(-x)$
$(-x, y)$
$(-3,-7)$ $(5,-1)$

Write the equation of a line in slope-intercept form, that satisfies the given conditions.

13. Find the equation of the line whose graph is parallel to the graph of $x - 4y = 8$ and passes through the point $P(-8,5)$.

$-4y = -x + 8$
$y = \frac{1}{4}x - 2$

$m = \frac{1}{4}$ $y - 5 = \frac{1}{4}(x+8)$
$y - 5 = \frac{1}{4}x + 2$
$y = \frac{1}{4}x + 7$

14. Find the equation of the line whose graph is perpendicular to the graph of $-5x - 3y = 9$ and passes through the point $P(10,-7)$.

$-3y = 5x + 9$
$y = -\frac{5}{3} - 3$

$m = \frac{3}{5}$ $y + 7 = \frac{3}{5}(x-10)$
$y + 7 = \frac{3}{5}x - 6$
$y = \frac{3}{5}x - 13$

Write the quadratic function in vertex form.

15. $g(x) = -x^2 - 8x - 3$
$a = -1$ $x = \frac{-b}{2a} = \frac{8}{-2} = -4$
$(-4, 13)$
$y = -(x+4)^2 + 13$

16. $f(x) = 2x^2 - 12x + 11$
$a = 2$ $x = \frac{-b}{2a} = \frac{12}{4} = 3$
$(3, -7)$
$y = 2(x-3)^2 - 7$

17. $h(x) = x^2 + 6x - 7$
$a = 1$ $x = \frac{-b}{2a} = \frac{-6}{2} = -3$
$(-3, -16)$
$y = (x+3)^2 - 16$

Find the maximum or minimum value of the function. State whether the value is a minimum or maximum.

18. $f(x) = x^2 + 4x + 7$
$a = 1$ (Up) $x = \frac{-b}{2a} = \frac{-4}{2} = -2$
$(-2, 3)$
Min = 3

19. $h(x) = -x^2 + 12x - 13$
$a = -1$ (Down) $x = \frac{-b}{2a} = \frac{-12}{-2} = 6$
$(6, 23)$
Max = 23

20. $g(x) = 2x^2 + 16x + 9$
$a = 2$ (Up) $x = \frac{-b}{2a} = \frac{-16}{4} = -4$
$(-4, -23)$
Min = -23

Answer the following.

21. Let $f(x) = x^2 - 3x - 8$, and $g(x) = x + 4$.

a. $(f+g)(x)$
$f(x) + g(x)$
$(x^2 - 3x - 8) + (x + 4)$
$x^2 - 2x - 4$

b. $(f-g)(x)$
$f(x) - g(x)$
$(x^2 - 3x - 8) - (x + 4)$
$x^2 - 4x - 12$

c. $(fg)(x)$
$f(x)g(x)$
$(x^2 - 3x - 8)(x + 4)$
$x^3 + x^2 - 20x - 32$

d. $\left(\frac{f}{g}\right)(x)$
$\frac{f(x)}{g(x)} = \frac{x^2 - 3x - 8}{x + 4}$

22. Let $f(x) = 3x - 7$, and $g(x) = x + 3$.

a. $(f+g)(x)$ $f(x)+g(x)$ $(3x-7)+(x+3)$ $4x-4$

b. $(f-g)(x)$ $f(x)-g(x)$ $(3x-7)-(x+3)$ $2x-10$

c. $(fg)(x)$ $f(x)g(x)$ $(3x-7)(x+3)$ $3x^2+2x-21$

d. $\left(\frac{f}{g}\right)(x)$ $\frac{f(x)}{g(x)} = \frac{3x-7}{x+3}$

23. Let $f(x) = 2x^3 - 3x^2 + x$, and $g(x) = x$.

a. $(f+g)(x)$ $f(x)+g(x)$ $(2x^3-3x^2+x)+(x) = 2x^3-3x^2+2x$

b. $(f-g)(x)$ $2x^3-3x^2$

c. $(fg)(x)$ $2x^4-3x^3+x^2$

d. $\left(\frac{f}{g}\right)(x)$ $2x^2-3x+1$

Evaluate the indicate function, where $f(x) = x^2 - 2x + 3$ and $g(x) = x - 1$.

24. $(f+g)(4)$ $f(x)+g(x) = x^2-x+2$ $(f+g)(4) = 14$

25. $(f+g)\left(\frac{1}{2}\right)$ $f(x)+g(x) = x^2-x+2$ $(f+g)\left(\frac{1}{2}\right) = \frac{1}{4} - \frac{1}{2} + 2$ $\frac{7}{4}$

26. $(f-g)(-2)$ $f(x)-g(x) = x^2-3x+4$ $(f-g)(-2) = 14$

27. $(f-g)(3)$ $f(x)-g(x) = x^2-3x+4$ $(f-g)(3) = 4$

Evaluate the indicate function, where $f(x) = x^2 - x + 4$ and $g(x) = 2x - 1$.

28. $(fg)(3)$ $(fg)(x) = 2x^3-3x^2+9x-4$ $= 52$

29. $\left(\frac{f}{g}\right)(-2)$ $\frac{f(x)}{g(x)} = \frac{x^2-x+4}{2x-1}$ $= -2$

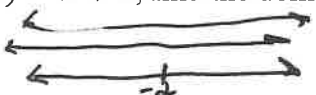
30. $\left(\frac{f}{g}\right)(4)$ $= \frac{x^2-x+4}{2x-1}$ $= \frac{16}{7}$

31. $(fg)(-1)$ $= 2x^3-3x^2+9x-4$ $= -18$

32. If $f(x) = 2x + 6$ and $g(x) = x + 2$, find the domain of $f + g$, $f - g$, fg, and $\frac{f}{g}$.

$D_f \cap D_g$

$D_f = (-\infty, \infty)$ $D_g = (-\infty, \infty)$



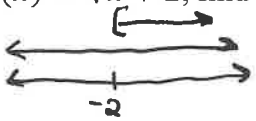
$D_{f+g} = (-\infty, \infty)$ $D_{f-g} = (-\infty, \infty)$ $D_{fg} = (-\infty, \infty)$ $D_{\frac{f}{g}}$ $(-\infty, -2) \cap (-2, \infty)$

$\frac{2x+6}{x+2}$ $x \neq -2$

33. If $f(x) = x^2 - 4$ and $g(x) = \sqrt{x+2}$, find the domain of $f + g$, $f - g$, fg, and $\frac{f}{g}$.

$D_f = (-\infty, \infty)$

$D_g = [-2, \infty)$



$D_{f+g} = [-2, \infty)$ $D_{f-g} = [-2, \infty)$ $D_{fg} = [-2, \infty)$ $D_{\frac{f}{g}} = [-2, \infty)$

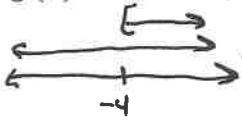
$\frac{x^2-4}{\sqrt{x+2}}$ $x \geq -2$

34. If $f(x) = \sqrt{x+4}$ and $g(x) = x^2 - 16$, find the domain of $f + g$, $f - g$, fg, and $\frac{f}{g}$.

$x \geq -4$

$D_f = [-4, \infty)$

$D_g = (-\infty, \infty)$



$D_{f+g} = [-4, \infty)$ $D_{f-g} = [-4, \infty)$ $D_{fg} = [-4, \infty)$ $D_{\frac{f}{g}} = (-4, 4) \cap (4, \infty)$

$\frac{\sqrt{x+4}}{x^2-16}$ $x \neq \pm 4$

35. If $f(x) = 3x + 5$ and $g(x) = 2x - 7$, find $(f \circ g)(x)$ *and* $(g \circ f)(x)$.

$f(g(x))$
$f(2x-7) = 3(2x-7)+5$
$= 6x - 16$

$g(f(x))$
$g(3x+5) = 2(3x+5) - 7$
$= 6x + 3$

36. If $f(x) = x^2 - 11x$ and $g(x) = x + 2$, find $(f \circ g)(x)$ *and* $(g \circ f)(x)$.

$f(g(x))$
$f(x+2) = (x+2)^2 - 11(x+2)$
$= x^2 - 7x - 18$

$g(f(x))$
$g(x^2-11x) = (x^2-11x) + 2$
$= x^2 - 11x + 2$

37. If $f(x) = -x^3 - 7$ and $g(x) = x + 1$, find $(f \circ g)(x)$ *and* $(g \circ f)(x)$.

$f(g(x))$
$f(x+1) = -(x+1)^3 - 7$
$= -(x^3 + 3x^2 + 3x + 1) - 7 = -x^3 - 3x^2 - 3x - 8$

Evaluate each composition function, where $f(x) = 2x - 1$, $g(x) = x^2 - 3x$, and $h(x) = 4 - x^2$.

38. $(g \circ f)(3)$
$g(f(3))$
$g(5)$
10

39. $(f \circ g)(-2)$
$f(g(-2))$
$f(10)$
19

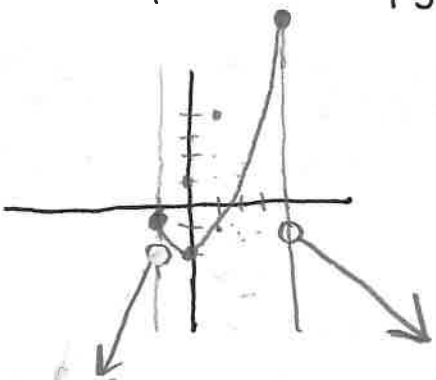
40. $(g \circ h)(0)$
$g(h(0))$
$g(4)$
4

41. $(f \circ f)(4)$
$f(f(4))$
$f(7)$
13

42. $(g \circ f)(c)$
$g(f(c))$
$g(2c-1)$
$4c^2 - 10c + 4$

Graph the following.

43. Let $f(x) = \begin{cases} 3x + 1, & x < -1 \\ x^2 - 2, & -1 \le x \le 4 \\ -x + 3, & x > 4 \end{cases}$



44. Let $f(x) = \begin{cases} 2x - 1, & x < -3 \\ x^2 + 1, & -3 \le x \le 1 \\ -2x, & x > 1 \end{cases}$