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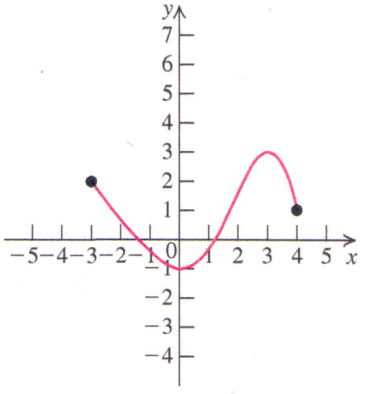
Topics for Test #1

__Definition of a Function
__Identify which relations are functions based on diagrams, ordered pairs, equations, and sketches
__Finding Domain and Range of a Function, Increasing, Decreasing, and Constant Functions
__Relative Minimum and Maximum Values, Even and Odd Functions, Quotient Difference

Donow:

Find the intervals where the function whose graph is shown here is increasing or decreasing.

a. increasing on $(0, 3)$, decreasing on $(-3, 0) \cup (3, 4)$
b. increasing on $(-1, 3)$, decreasing on $(2, -1) \cup (3, 1)$
c. increasing on $(-3, 3)$, decreasing on $(2, -1) \cup (3, 1)$
d. increasing on $(1.2, 4)$, decreasing on $(-3, -1.4)$



In Exercises 9–14, determine the domain and range of each relation. Explain why each non-function is not a function.

9.

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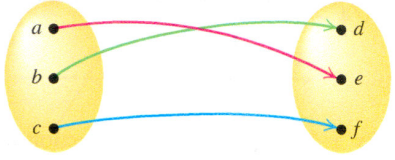

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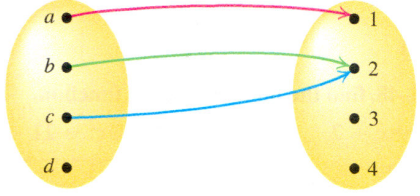

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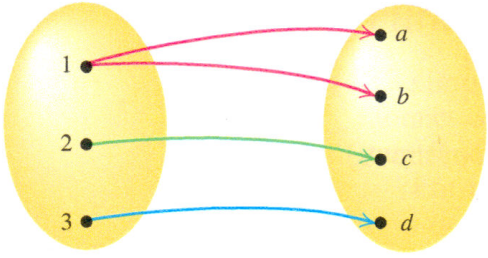


13.

x	0	3	8	0	3	8
y	−1	−2	−3	1	2	2

14.

x	−3	−1	0	1	2	3
y	−8	0	1	0	−3	−8

In Exercises 15–28, determine whether each equation defines y as a function of x.

15. $x + y = 2$

16. $x = y - 1$

17. $y = \dfrac{1}{x}$

18. $xy = -1$

In Exercises 29–32, let $f(x) = x^2 - 3x + 1$, $g(x) = \dfrac{2}{\sqrt{x}}$, and $h(x) = \sqrt{2 - x}$.

29. Find $f(0), g(0), h(0), f(a)$, and $f(-x)$.

30. Find $f(1), g(1), h(1), g(a)$, and $g(x^2)$.

In Exercises 35–48, find the domain of each function.

35. $f(x) = -8x + 7$

36. $f(x) = 2x^2 - 11$

37. $f(x) = \dfrac{1}{x - 9}$

38. $f(x) = \dfrac{1}{x + 9}$

Find the domain of the functions:

a) $f(x) = \sqrt{x}$

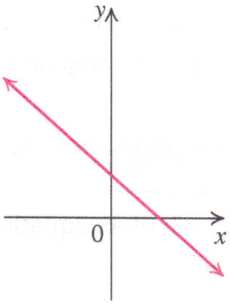
b) $f(x) = \sqrt{1 - x}$

c) $f(x) = \sqrt{x - 1}$

d) $f(x) = \sqrt{1 - x^2}$

In Exercises 49–54, use the vertical-line test to determine whether the given graph represents a function.

51.



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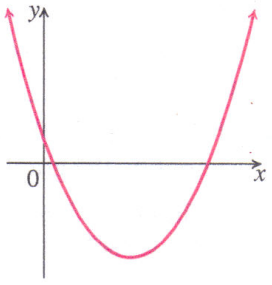

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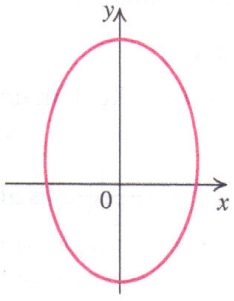

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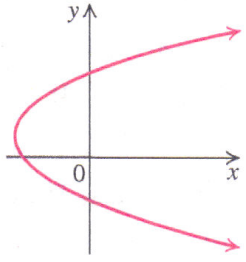

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In Exercises 7–14, the graph of a function is given. For each function, determine the intervals over which the function is increasing, decreasing, or constant.

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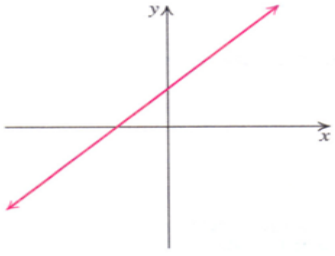

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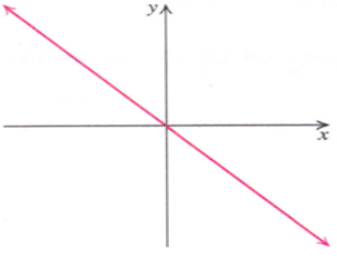

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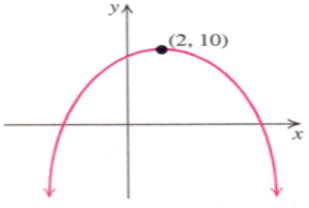

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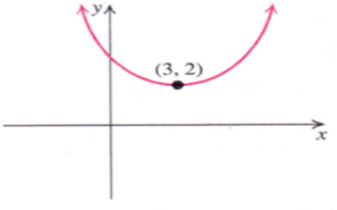

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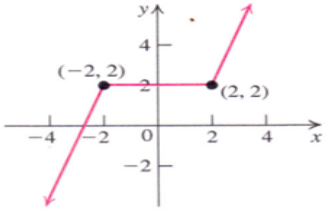

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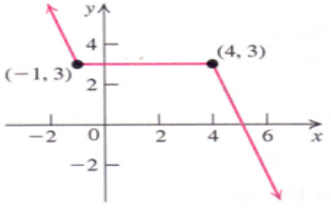
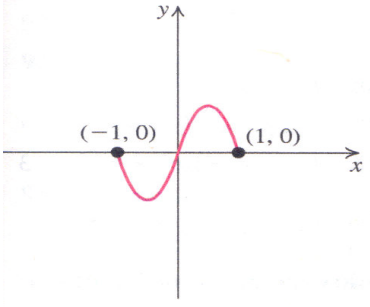


State whether the function is odd, even, or neither. Justify your answer.

27.



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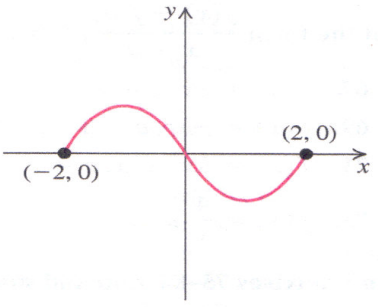

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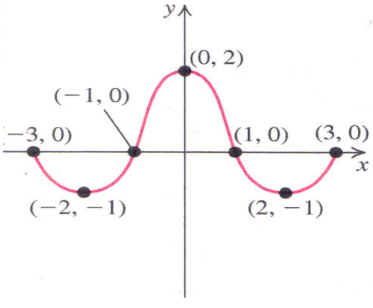

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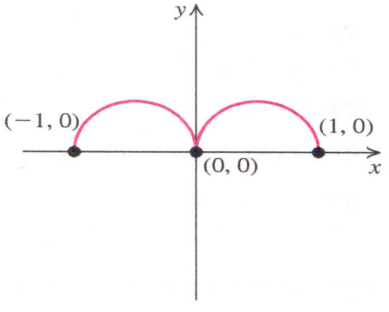

In Exercises 33–46, determine algebraically whether the given function is odd, even, or neither.

33. $f(x) = 2x^4 + 4$

34. $g(x) = 3x^4 - 5$

35. $f(x) = 5x^3 - 3x$

36. $g(x) = 2x^2 + 4x$

37. $f(x) = 2x + 4$

38. $g(x) = 3x + 7$

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