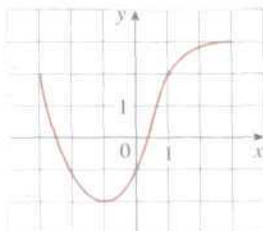


Start Your Semester Right Review – Math 85: Calculus I

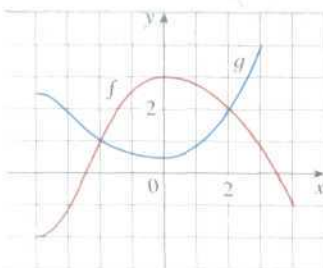
1. The graph of a function f is given.

- State the value of $f(-1)$.
- Estimate the value of $f(2)$.
- For what values of x is $f(x) = 2$?
- Estimate the values of x such that $f(x) = 0$.
- State the domain and range of f .
- On what interval is f increasing?



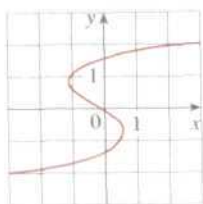
2. The graphs of f and g are given.

- State the values of $f(-4)$ and $g(3)$.
- For what values of x is $f(x) = g(x)$?
- Estimate the solution of the equation $f(x) = -1$.
- On what interval is f decreasing?
- State the domain and range of f .
- State the domain and range of g .

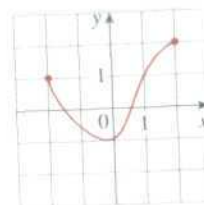


3. Determine whether the curve is the graph of a function of x . If it is, state the domain and range of the function.

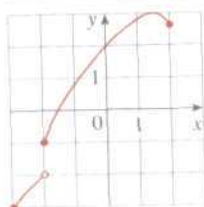
(a)



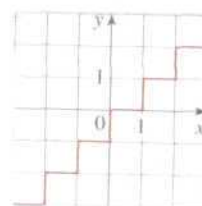
(b)



(c)



(d)



4. You put some ice cubes in a glass, fill the glass with cold water, and then let the glass sit on a table. Describe how the temperature of the water changes as time passes. Then sketch a rough graph of the temperature of the water as a function of the elapsed time.

5. If $f(x) = 3x^2 - x + 2$, find

$f(2)$, $f(-2)$, $f(a)$, $f(-a)$, $f(a+1)$, $2f(2)$, $f(2a)$, $f(a^2)$, $[f(a)]^2$, and $f(a+h)$.

6. Find the domains of the following functions:

a) $f(x) = \frac{x}{3x-1}$

b) $g(u) = \sqrt{u} + \sqrt{4-u}$

Find the domain and sketch the graph of the following functions:

7. $f(x) = 5$

8. $F(x) = \frac{1}{2}(x+3)$

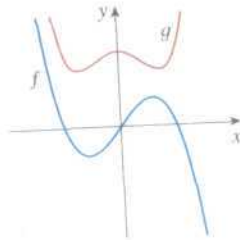
9. $f(t) = t^2 - 6t$

10. $H(t) = \frac{4-t^2}{2-t}$

11. $f(x) = \begin{cases} 2x+3 & \text{if } x < -1 \\ 3-x & \text{if } x \geq -1 \end{cases}$

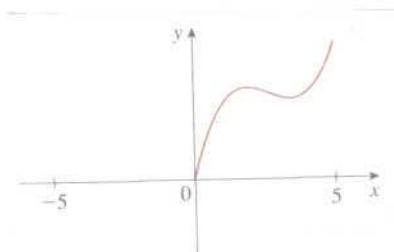
12. $f(x) = \begin{cases} x+2 & \text{if } x \leq -1 \\ x^2 & \text{if } x > -1 \end{cases}$

13. The graphs of f and g are shown below. Decide whether each function is even, odd, or neither. Explain your reasoning.



14. A function f has domain $[-5, 5]$ and a portion of the graph is shown.

- a) Complete the graph of f if it is known that f is even.
- b) Complete the graph of f if it is known that f is odd.



Determine whether f is even, odd, or neither. If f is even or odd, use symmetry to sketch its graph.

15. $f(x) = x^2 + x$ 16. $f(x) = x^4 - 4x^2$ 17. $f(x) = x^3 - x$

Find $f + g, f - g, fg,$ and f/g and state their domains:

18. $f(x) = x^3 + 2x^2, g(x) = 3x^2 - 1$ 19. $f(x) = \sqrt{1+x}, g(x) = \sqrt{1-x}$

Find the functions $f \circ g, g \circ f, f \circ f,$ and $g \circ g$ and their domains:

20. $f(x) = 2x^2 - x, g(x) = 3x + 2$ 21. $f(x) = \sin x, g(x) = 1 - \sqrt{x}$

22. $f(x) = x + \frac{1}{x}, g(x) = \frac{x+1}{x+2}$

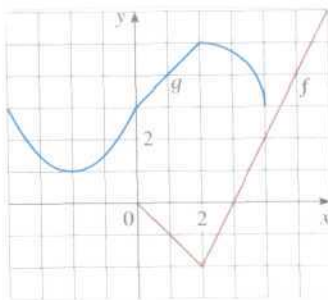
Express the function in the form $f \circ g$:

23. (a) $F(x) = (x^2 + 1)^{10}$ (b) $F(x) = \sin(\sqrt{x})$

24. Express the function $H(x) = \sqrt[3]{\sqrt{x} - 1}$ in the form $f \circ g \circ h$.

25. Use the given graphs of f and g to evaluate each expression or explain why it is unbounded.

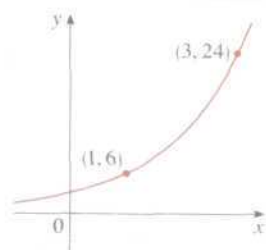
a) $f(g(2))$ b) $g(f(0))$ c) $(f \circ g)(0)$
 d) $(g \circ f)(6)$ e) $(g \circ g)(-2)$ f) $(f \circ f)(4)$



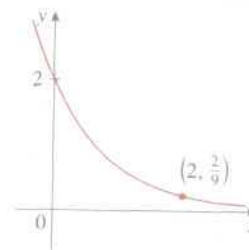
26. Graph $y = e^x, y = e^{-x}, y = 8^x,$ and $y = 8^{-x}$ on a common graph. How are these graphs related?

Find the exponential function $f(x) = Ca^x$ whose graph is given:

27.



28.

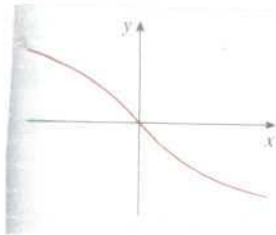


29. Under ideal conditions, a certain bacteria population is known to double every three hours. Suppose that there are initially 100 bacteria.

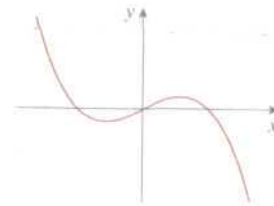
- What is the size of the population after 15 hours?
- What is the size of the population after t hours?
- Estimate the size of the population after 20 hours.
- Graph the population function and estimate the time for the population to reach 50,000.

30. Determine whether the following functions are one-to-one:

a)



b)

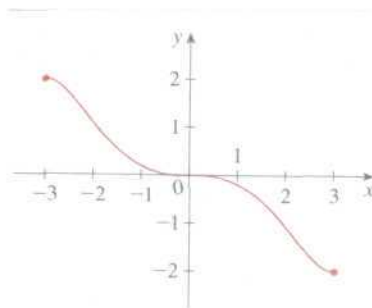


Determine whether the following functions are one-to-one:

31. $f(x) = \frac{1}{2}(x+5)$ 32. $g(x) = |x|$ 33. $f(t)$ is the height of a football t seconds after kickoff.

34. The graph of f is given.

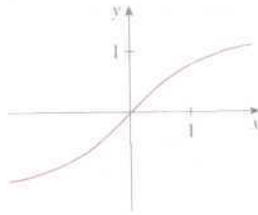
- Why is f one-to-one?
- State the domain and the range of f^{-1} .
- Estimate the value of $f^{-1}(1)$.



Find a formula for the inverse of the function:

35. $f(x) = \sqrt{10-3x}$ 36. $f(x) = e^{x^3}$ 37. $y = \ln(x+3)$

38. Use the graph of f to sketch the graph of f^{-1} .



Find the exact value of each expression:

39. (a) $\log_2 64$ (b) $\log_6 \frac{1}{36}$

40. (a) $\log_{10} 1.25 + \log_{10} 80$ (b) $\log_5 10 + \log_5 20 - 3\log_5 2$

41. (a) $2^{(\log_2 3 + \log_2 5)}$ (b) $e^{3\ln 2}$

Express the given quantity as a single logarithm:

42. $2\ln 4 - \ln 2$

43. $\ln x + a\ln y - b\ln z$

Solve each equation for x :

44. (a) $2\ln x = 1$

(b) $e^{-x} = 5$

45. (a) $e^{2x+3} - 7 = 0$

(b) $\ln(5 - 2x) = -3$