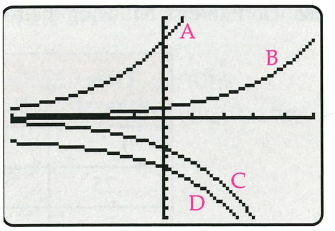
14. $f(x) = c^x$
$g(x) = -3c^x$
$h(x) = c^{x+5}$
$k(x) = -3c^x - 2$



In Exercises 15–19, determine whether the function is even, odd, or neither (see Special Topics 3.4.A).

15. $f(x) = 10^x$

16. $g(x) = 2^x - x$

17. $f(x) = \dfrac{e^x + e^{-x}}{2}$

18. $f(x) = \dfrac{e^x - e^{-x}}{2}$

19. $f(x) = e^{-x^2}$

20. [redacted] explain why $e^x + e^{-x}$ is approximately equal to e^x when x is large.

In Exercises 21–24, find the average rate of change of the function.

21. $f(x) = x2^x$ as x goes from 1 to 3

22. $g(x) = 3^{x^2-x}$ as x goes from -1 to 1

23. $h(x) = 5^{-x^2}$ as x goes from -1 to 0

24. $f(x) = e^x - e^{-x}$ as x goes from -3 to -1

In Exercises 25–28, find the difference quotient of the function.

25. $f(x) = 10^x$

26. $g(x) = 5^{x^2}$

27. $f(x) = 2^x + 2^{-x}$

28. $f(x) = e^x - e^{-x}$

In Exercises 29–36, find a viewing window (or windows) that shows a complete graph of the function.

29. $k(x) = e^{-x}$

30. $f(x) = e^{-x^2}$

31. $f(x) = \dfrac{e^x + e^{-x}}{2}$

32. $h(x) = \dfrac{e^x - e^{-x}}{2}$

33. $g(x) = 2^x - x$

34. $k(x) = \dfrac{2}{e^x + e^{-x}}$

35. $f(x) = \dfrac{5}{1 + e^{-x}}$

36. $g(x) = \dfrac{10}{1 + 9e^{-x/2}}$

In Exercises 37–42, list all asymptotes of the graph of the function and the approximate coordinates of each local extremum.

37. $f(x) = x2^x$

38. $g(x) = x2^{-x}$

39. $h(x) = e^{x^2/2}$

40. $k(x) = 2^{x^2-6x+2}$

41. $f(x) = e^{-x^2}$

42. $g(x) = -xe^{x^2/20}$

43. The population of a colony of fruit flies t days from now is given by the function $p(t) = 100 \cdot 3^{t/10}$.
(a) What will the population be in 15 days? In 25 days?
(b) When will the population reach 2500?

44. If current rates of deforestation and fossil fuel consumption continue, then the amount of atmospheric carbon dioxide in parts per million (ppm) will be given by $f(x) = 375e^{.00609x}$, where $x = 0$ corresponds to 2000.*
(a) What is the amount of carbon dioxide in 2003? In 2022?
(b) In what year will the amount of carbon dioxide reach 500 ppm?

45. The pressure of the atmosphere $p(x)$ (in pounds per square inch) is given by

$$p(x) = ke^{-.0000425x},$$

where x is the height above sea level (in feet) and k is a constant.
(a) Use the fact that the pressure at sea level is 15 pounds per square inch to find k.
(b) What is the pressure at 5000 feet?
(c) If you were in a spaceship at an altitude of 160,000 feet, what would the pressure be?

46. (a) The function $g(t) = 1 - e^{-.0479t}$ gives the percentage of the population (expressed as a decimal) that has seen a new TV show t weeks after it goes on the air. What percentage of people have seen the show after 24 weeks?
(b) Approximately when will 90% of the people have seen it?

[redacted]

*Based on projections from the International Panel on Climate Change.