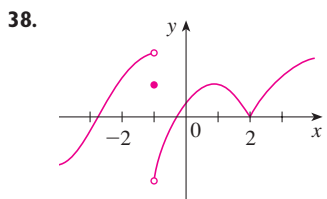
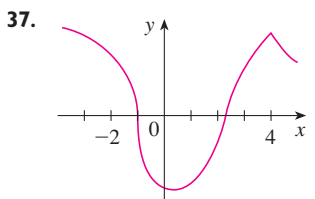
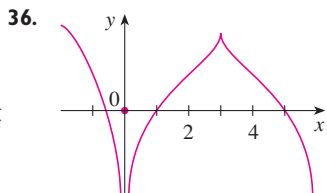
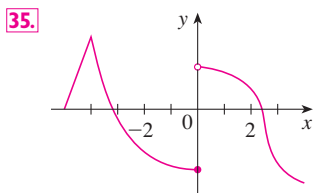


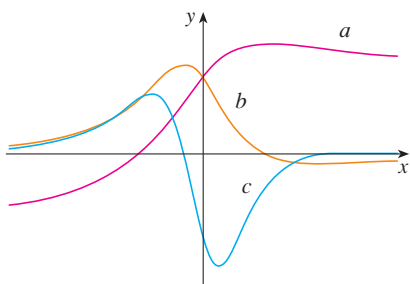
35–38 The graph of f is given. State, with reasons, the numbers at which f is not differentiable.



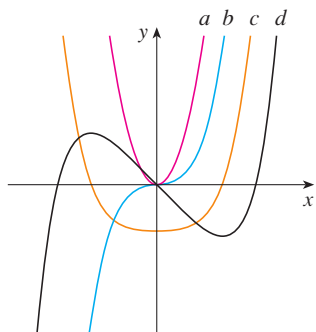
39. Graph the function $f(x) = x + \sqrt{|x|}$. Zoom in repeatedly, first toward the point $(-1, 0)$ and then toward the origin. What is different about the behavior of f in the vicinity of these two points? What do you conclude about the differentiability of f ?

40. Zoom in toward the points $(1, 0)$, $(0, 1)$, and $(-1, 0)$ on the graph of the function $g(x) = (x^2 - 1)^{2/3}$. What do you notice? Account for what you see in terms of the differentiability of g .

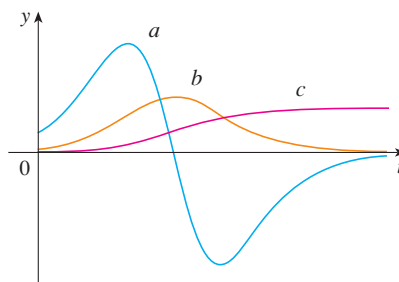
41. The figure shows the graphs of f , f' , and f'' . Identify each curve, and explain your choices.



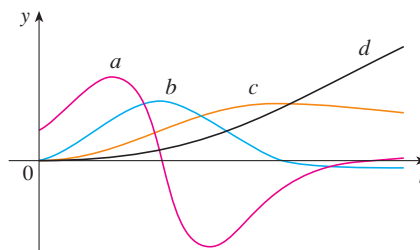
42. The figure shows graphs of f , f' , f'' , and f''' . Identify each curve, and explain your choices.



43. The figure shows the graphs of three functions. One is the position function of a car, one is the velocity of the car, and one is its acceleration. Identify each curve, and explain your choices.



44. The figure shows the graphs of four functions. One is the position function of a car, one is the velocity of the car, one is its acceleration, and one is its jerk. Identify each curve, and explain your choices.

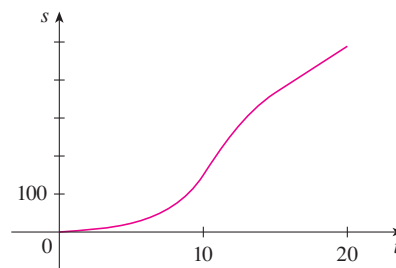


45–46 Use the definition of a derivative to find $f'(x)$ and $f''(x)$. Then graph f , f' , and f'' on a common screen and check to see if your answers are reasonable.

45. $f(x) = 1 + 4x - x^2$ **46.** $f(x) = 1/x$

47. If $f(x) = 2x^2 - x^3$, find $f'(x)$, $f''(x)$, $f'''(x)$, and $f^{(4)}(x)$. Graph f , f' , f'' , and f''' on a common screen. Are the graphs consistent with the geometric interpretations of these derivatives?

48. (a) The graph of a position function of a car is shown, where s is measured in feet and t in seconds. Use it to graph the velocity and acceleration of the car. What is the acceleration at $t = 10$ seconds?



(b) Use the acceleration curve from part (a) to estimate the jerk at $t = 10$ seconds. What are the units for jerk?