HW1 (10/12 繳交)

11–34 Evaluate the limit, if it exists.

[1-6] 11

11. $\lim_{x \to -2} (3x - 7)$

[1-6] 17

17. $\lim_{x \to -2} \dfrac{x^2 - x - 6}{3x^2 + 5x - 2}$

[1-6] 24

24. $\lim_{x \to 2} \dfrac{2 - x}{\sqrt{x + 2} - 2}$

[1-6] 40

40. If $2x \leq g(x) \leq x^4 - x^2 + 2$ for all x, evaluate $\lim_{x \to 1} g(x)$.

[1-6] 41

41. Prove that $\lim_{x \to 0} x^4 \cos \dfrac{2}{x} = 0$.

19–32 Prove the statement using the ε, δ definition of a limit.

[1-7] 19

19. $\lim_{x \to 9} \left(1 - \frac{1}{3}x\right) = -2$

[1-7] 25

25. $\lim_{x \to 0} x^2 = 0$

[1-7] 36

36. Prove that $\lim_{x \to 2} \frac{1}{x} = \frac{1}{2}$.

[1-8] 35

Use continuity to evaluate the limit.

35. $\lim_{x \to 2} x\sqrt{20 - x^2}$

[1-8] 41

41–42 Show that f is continuous on $(-\infty, \infty)$.

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

55–58 Use the Intermediate Value Theorem to show that there is a solution of the given equation in the specified interval.

[1-8] 55

55. $-x^3 + 4x + 1 = 0, \quad (-1, 0)$

[1-8] 57

57. $\cos x = x, \quad (0, 1)$

5–8 Find an equation of the tangent line to the curve at the given point.

[2-1] 5

5. $y = 2x^2 - 5x + 1, \ (3, 4)$

23–26 Find $f'(a)$.

[2-1] 23

23. $f(x) = 2x^2 - 5x + 3$

[2-1] 27

27. Find an equation of the tangent line to the graph of $y = B(x)$ at $x = 6$ if $B(6) = 0$ and $B'(6) = -\frac{1}{2}$.

[2-1] 57

57–58 Determine whether $f'(0)$ exists.

57. $f(x) = \begin{cases} x \sin \dfrac{1}{x} & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}$

19–30 Find the derivative of the function using the definition of derivative. State the domain of the function and the domain of its derivative.

[2-2] 19

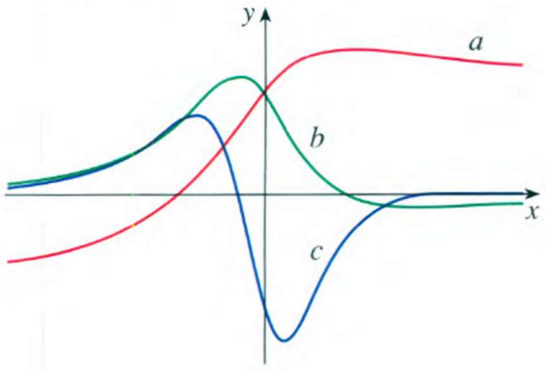
19. $f(x) = 3x - 8$

[2-2] 20

20. $f(x) = mx + b$

[2-2] 47

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



61. Derivatives of Even and Odd Functions Recall that a function f is called *even* if $f(-x) = f(x)$ for all x in its domain and *odd* if $f(-x) = -f(x)$ for all such x. Prove each of the following.

(a) The derivative of an even function is an odd function.

(b) The derivative of an odd function is an even function.