Calc 1

1.4.32

32. Prove that $\lim_{x \to 0^+} \sqrt{x}\,[1 + \sin^2(2\pi/x)] = 0$.

1.4.40

40. Let $f(x) = x - [\![x]\!]$.

(a) Sketch the graph of f.

(b) If n is an integer, evaluate

(i) $\lim_{x \to n^-} f(x)$ (ii) $\lim_{x \to n^+} f(x)$

(c) For what values of a does $\lim_{x \to a} f(x)$ exist?

2.4.36

36. Find $\dfrac{d^{35}}{dx^{35}}(x \sin x)$.

3.3.56

56. Find an equation of the tangent line to the curve $xe^y + ye^x = 1$ at the point $(0, 1)$.

3.5.30

30–31 ▪ Find the derivative of the function. Find the domains of the function and its derivative.

30. $f(x) = \arcsin(e^x)$ **31.** $g(x) = \cos^{-1}(3 - 2x)$

[3.5.36]

35–38 ▪ Find the limit.

35. $\lim_{x \to -1^+} \sin^{-1} x$ **36.** $\lim_{x \to \infty} \arccos\left(\dfrac{1 + x^2}{1 + 2x^2}\right)$

[4.2.16]

16. Let $f(x) = (x + 1)/(x - 1)$. Show that there is no value of c such that $f(2) - f(0) = f'(c)(2 - 0)$. Why does this not contradict the Mean Value Theorem?