AP Calculus AB Midterm Exam Review for Units 1 – 3

The following problems provide a good starting point for your review of Units 1 – 3. It is not wise to assume that this review is sufficient for studying all material from Units 1 – 3. Students are advised to review exams, quizzes, homework, and supplements in addition to working the following problems. Answers for even-numbered problems can be found at the end of this document.

Unit 1: Limits, Continuity, and Rates of Change

p. 129: 45, 46, 52

pp. 140–141: 4, 16, 18, 29 (It is now OK to use L'Hôpital for any limit as long as it applies.)

p. 151: 34, 36, 37

pp. 167–169: 8, 11, 16, 36, 40, 47, 49, 50a

Unit 2: Differentiation

pp. 265–266: 1–5, 7, 8, 11, 13, 15, 20, 21, 22, 27, 28, 31, 32, 35, 39, 60

Unit 3: The Shape of a Curve

p. 289: 10, 12

p. 298: 19, 23

pp. 352–353: 8, 10, 11, 13, 14, 18(a,b)

Stewart Textbook Even Answers

Unit 1

p. 129

46. $(a, b) = \left(\frac{1}{2}, \frac{1}{2}\right)$

52. Since *f* is a linear combination of a cube root function and a linear function, *f* is continuous on $[0, 1]$. Since $f(0) = -1$ and $f(1) = 1$, we have $f(0) < 0 < f(1)$. By IVT, there exists some c on the interval $(0, 1)$ such that $f(c) = 0$.

pp. 140–141

4a. 2

4b. -1

4c. $-\infty$

4d. $-\infty$

4e. ∞

4f. Vertical: $x = 0,\ x = 2$; Horizontal: $y = -1,\ y = 2$

16. 0

18. 2

p. 151

34. $f(x) = \sqrt[4]{x}$, $x = 16$ OR $f(x) = \sqrt[4]{16 + x}$, $x = 0$

36. $f(x) = \tan x$, $x = \frac{\pi}{4}$

pp. 167–169

8. $\frac{1}{3}$

16. $\frac{1}{3}$

36. $y - 2 = 6x$; $y - \frac{1}{2} = \frac{3}{8}(x + 1)$

40. $f(x) = x^6$, $x = 2$

50a. $F'(1950) \approx 0.11,\ F'(1965) \approx -0.16,\ F'(1987) \approx 0.02$

Unit 2

pp. 265–266

2. $y' = \frac{3}{5x^{8/5}} - \frac{1}{2x^{3/2}}$

4. $y' = \frac{\sec^2 x + \sec^2 x \cos x + \tan x \sin x}{(1 + \cos x)^2}$ OR $y' = \frac{\sec^2 x + \sec x + \tan x \sin x}{(1 + \cos x)^2}$

8. $\frac{dy}{dx} = \frac{y \cos x - e^y}{xe^y - \sin x}$

20. $y' = e^{x \sec x}(x \sec x \tan x + \sec x)$

22. $y' = 2x \sec(1 + x^2) \tan(1 + x^2)$

28. $y' = (\cos x)^x (\ln(\cos x) - x \tan x)$

32. $y' = -e^{\cos x} \sin x - e^x \sin(e^x)$

60. Tangent: $y-1=-\frac{4}{5}(x-2)$; Normal: $y-1=\frac{5}{4}(x-2)$

Unit 3

p. 289

10. Since f is continuous on $[-2,\ 2]$ and differentiable on $(-2,\ 2)$, the MVT applies. $c=\pm\frac{2}{\sqrt{3}}$

12. Since f is continuous on $[-2,\ 2]$ and differentiable on $(-2,\ 2)$, the MVT applies. $c=\sqrt{3}$

pp. 352–353

8. $\frac{4}{3}$

10. ∞

14. 1

18a. Increase: $(-2,\ 0)\cup(4,\ \infty)$; Decrease: $(-\infty,\ -2)\cup(0,\ 4)$

18b. Relative Max: $x=0$; Relative Min: $x=-2,\ 4$