

AP Calculus AB
Final Review WS Answers

II. #7 $f(x) = |\sin x|$ $f(-x) = |\sin(-x)|$ EVEN
 $f(-x) = |-\sin(x)|$
 $f(-x) = |\sin(x)|$

III.
 #1: 1 #2: 1 #3: $-\infty$ #4: DNE #5: DNE
 #6: -1

#7: $\frac{1}{6}$ #8: 1 #9: $-\infty$ #10: $\frac{2}{3}$ #11: e

IV. #2: -1 #3: $\frac{3}{e}$

V. (1) $\left. \begin{array}{l} \lim_{x \rightarrow 2^-} f(x) = 4 \\ \lim_{x \rightarrow 2^+} f(x) = 4 \end{array} \right\} \lim_{x \rightarrow 2} f(x) = 4$ Therefore, the limit exists.

$\left. \begin{array}{l} \lim_{x \rightarrow 2} f(x) = 4 \\ f(2) = 4 \end{array} \right\}$ Therefore, f is continuous at $x = 2$

(2) $f'(x) = \begin{cases} 2x, & x \leq 2 \\ 2, & x > 2 \end{cases} \quad \left. \begin{array}{l} \lim_{x \rightarrow 2^-} f'(x) = 4 \\ \lim_{x \rightarrow 2^+} f'(x) = 2 \end{array} \right\} f \text{ is not differentiable at } x = 2$

VI. (1) $f'(x) = x^2 e^{2x} (2x + 3)$ (2) $f'(x) = \frac{1 - \ln x}{x^2}$ (3)

$$f'(x) = \frac{-2x \sin(x^2)}{\sqrt{1 - \cos^2(x^2)}}$$

VII. (1) $\frac{dy}{dx} = \frac{3x^2 - 8xy}{4x^2 - 3}$ (2) $\frac{d^2y}{dx^2} = -\frac{1}{y^3}$

VIII. (1) $\frac{d^2y}{dx^2} = -\frac{2}{7}$, so the curve has a local maximum at $(3, 2)$.

IX. (1) $g'(2) = \frac{1}{4}$

X. (7) $\frac{dy}{dt} = -\frac{5}{3}$ feet per second

XI. (1) $c = \frac{5}{4}$ (2) $c = \pi$ (3) $f(0) = 2, f(1) = -1$
 $-1 < 0 < 2$

Absolute Max: 4 at $x = 4$
(4) Absolute Min: $-\frac{9}{4}$ at $x = \frac{3}{2}$

XII. (1) $\cos(x)$ (2) $-\cos(x)$ (3) $3x^2 \cos(x^3)$

XIV. (1a) 59 (1b) 54 (1c) 56.5 (2) 50

XV. (1) $\ln(x^2 + 5) + C$ (2) $\frac{5}{27}(2 + 3x^3)^{\frac{3}{5}} + C$

XVI. (2) $(y^2 + 1)^{\frac{1}{2}} = \sin(x) + 2$ $y = \sqrt{(\sin(x) + 2)^2 - 1}$

XVII. (1) 39
