

Review 2
AP Calc AB - 69

21. At $x = 0$, which of the following is true of the function f defined by $f(x) = x^2 + e^{-2x}$?
- (A) f is increasing.
(B) f is decreasing.
(C) f is discontinuous.
(D) f has a relative minimum.
(E) f has a relative maximum.
22. $\frac{d}{dx}(\ln e^{2x}) =$
- (A) $\frac{1}{e^{2x}}$ (B) $\frac{2}{e^{2x}}$ (C) $2x$ (D) 1 (E) 2
24. If $\sin x = e^y$, $0 < x < \pi$, what is $\frac{dy}{dx}$ in terms of x ?
- (A) $-\tan x$ (B) $-\cot x$ (C) $\cot x$ (D) $\tan x$ (E) $\csc x$
28. The function defined by $f(x) = \sqrt{3} \cos x + 3 \sin x$ has an amplitude of
- (A) $3 - \sqrt{3}$ (B) $\sqrt{3}$ (C) $2\sqrt{3}$ (D) $3 + \sqrt{3}$ (E) $3\sqrt{3}$
30. If a function f is continuous for all x and if f has a relative maximum at $(-1, 4)$ and a relative minimum at $(3, -2)$, which of the following statements must be true?
- (A) The graph of f has a point of inflection somewhere between $x = -1$ and $x = 3$.
(B) $f'(-1) = 0$
(C) The graph of f has a horizontal asymptote.
(D) The graph of f has a horizontal tangent line at $x = 3$.
(E) The graph of f intersects both axes.

34. Which of the following is an equation of a curve that intersects at right angles every curve of the family $y = \frac{1}{x} + k$ (where k takes all real values)?

- (A) $y = -x$ (B) $y = -x^2$ (C) $y = -\frac{1}{3}x^3$ (D) $y = \frac{1}{3}x^3$ (E) $y = \ln x$

36. The approximate value of $y = \sqrt{4 + \sin x}$ at $x = 0.12$, obtained from the tangent to the graph at $x = 0$, is

- (A) 2.00 (B) 2.03 (C) 2.06 (D) 2.12 (E) 2.24

44. The fundamental period of the function defined by $f(x) = 3 - 2 \cos^2 \frac{\pi x}{3}$ is

- (A) 1 (B) 2 (C) 3 (D) 5 (E) 6

45. If $\frac{d}{dx}(f(x)) = g(x)$ and $\frac{d}{dx}(g(x)) = f(x^2)$, then $\frac{d^2}{dx^2}(f(x^3)) =$

- (A) $f(x^6)$ (B) $g(x^3)$ (C) $3x^2g(x^3)$
(D) $9x^4f(x^6) + 6xg(x^3)$ (E) $f(x^6) + g(x^3)$