

Derivatives review 2
AP Calc AB

1. If $y = x^2e^x$, then $\frac{dy}{dx} =$
- (A) $2xe^x$ (B) $x(x + 2e^x)$ (C) $xe^x(x + 2)$
(D) $2x + e^x$ (E) $2x + e$
2. If $f(x) = (2x + 1)^4$, then the 4th derivative of $f(x)$ at $x = 0$ is
- (A) 0 (B) 24 (C) 48 (D) 240 (E) 384
6. If $f(x) = x$, then $f'(5) =$
- (A) 0 (B) $\frac{1}{5}$ (C) 1 (D) 5 (E) $\frac{25}{2}$
6. If $f(x) = \frac{x-1}{x+1}$ for all $x \neq -1$, then $f'(1) =$
- (A) -1 (B) $-\frac{1}{2}$ (C) 0 (D) $\frac{1}{2}$ (E) 1
11. An equation of the line tangent to the graph of $f(x) = x(1 - 2x)^3$ at the point $(1, -1)$ is
- (A) $y = -7x + 6$ (B) $y = -6x + 5$ (C) $y = -2x + 1$
(D) $y = 2x - 3$ (E) $y = 7x - 8$

15. If $f(x) = \sqrt{2x}$, then $f'(2) =$

- (A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{\sqrt{2}}{2}$ (D) 1 (E) $\sqrt{2}$

23. $\frac{d}{dx}\left(\frac{1}{x^3} - \frac{1}{x} + x^2\right)$ at $x = -1$ is

- (A) -6 (B) -4 (C) 0 (D) 2 (E) 6

25. If $f(x) = e^x$, which of the following is equal to $f'(e)$?

- (A) $\lim_{h \rightarrow 0} \frac{e^{x+h}}{h}$ (B) $\lim_{h \rightarrow 0} \frac{e^{x+h} - e^e}{h}$ (C) $\lim_{h \rightarrow 0} \frac{e^{e+h} - e}{h}$
(D) $\lim_{h \rightarrow 0} \frac{e^{x+h} - 1}{h}$ (E) $\lim_{h \rightarrow 0} \frac{e^{e+h} - e^e}{h}$

36. If $y = e^{nx}$, then $\frac{d^n y}{dx^n} =$

- (A) $n^n e^{nx}$ (B) $n! e^{nx}$ (C) $n e^{nx}$ (D) $n^n e^x$ (E) $n! e^x$

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) $3x^2 g(x^3)$
(D) $9x^4 f(x^6) + 6x g(x^3)$ (E) $f(x^6) + g(x^3)$