Derivative Rules

1997 #2

If $f(x) = x\sqrt{2x-3}$, then $f'(x) =$

(A) $\dfrac{3x-3}{\sqrt{2x-3}}$

(B) $\dfrac{x}{\sqrt{2x-3}}$

(C) $\dfrac{1}{\sqrt{2x-3}}$

(D) $\dfrac{-x+3}{\sqrt{2x-3}}$

(E) $\dfrac{5x-6}{2\sqrt{2x-3}}$

1997 #7

$\dfrac{d}{dx}\cos^2(x^3) =$

(A) $6x^2\sin(x^3)\cos(x^3)$

(B) $6x^2\cos(x^3)$

(C) $\sin^2(x^3)$

(D) $-6x^2\sin(x^3)\cos(x^3)$

(E) $-2\sin(x^3)\cos(x^3)$

1997 #76

If $f(x) = \dfrac{e^{2x}}{2x}$, then $f'(x) =$

(A) 1

(B) $\dfrac{e^{2x}(1-2x)}{2x^2}$

(C) e^{2x}

(D) $\dfrac{e^{2x}(2x+1)}{x^2}$

(E) $\dfrac{e^{2x}(2x-1)}{2x^2}$

1997 #4

If $f(x) = -x^3 + x + \dfrac{1}{x}$, then $f'(-1) =$

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

1997 #86

Let $f(x) = \sqrt{x}$. If the rate of change of f at $x = c$ is twice the rate of change at $x = 1$, then $c =$

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

2003 #1

If $y = \left(x^3 + 1\right)^2$, then $\dfrac{dy}{dx} =$

(A) $\left(3x^2\right)^2$ (B) $2\left(x^3+1\right)$ (C) $2\left(3x^2+1\right)$ (D) $3x^2\left(3x^2+1\right)$ (E) $6x^2\left(x^3+1\right)$

2003 #4

If $y = \dfrac{2x+3}{3x+2}$, then $\dfrac{dy}{dx} =$

(A) $\dfrac{12x+13}{(3x+2)^2}$ (B) $\dfrac{12x-13}{(3x+2)^2}$ (C) $\dfrac{5}{(3x+2)^2}$ (D) $\dfrac{-5}{(3x+2)^2}$ (E) $\dfrac{2}{3}$

2003 #9

If $f(x) = \ln\left(x+4+e^{-3x}\right)$, then $f'(0)$ is

(A) $-\dfrac{2}{5}$ (B) $\dfrac{1}{5}$ (C) $\dfrac{1}{4}$ (D) $\dfrac{2}{5}$ (E) nonexistent

2003 #14

If $y = x^2 \sin 2x$, then $\dfrac{dy}{dx} =$

(A) $2x\cos 2x$
(B) $4x\cos 2x$
(C) $2x(\sin 2x + \cos 2x)$
(D) $2x(\sin 2x - x\cos 2x)$
(E) $2x(\sin 2x + x\cos 2x)$

2008 #3

If $y = (x-1)\left(x^2+2\right)^3$, then $f'(x) =$

(A) $6x\left(x^2+2\right)^2$
(B) $6x(x-1)\left(x^2+2\right)^2$
(C) $\left(x^2+2\right)^2\left(x^2+3x-1\right)$
(D) $\left(x^2+2\right)^2\left(7x^2-6x+2\right)$
(E) $-3(x-1)\left(x^2+2\right)^2$

2008 #8

If $f(x) = \cos(3x)$, then $f'\left(\frac{\pi}{9}\right) =$

(A) $\frac{3\sqrt{3}}{2}$ (B) $\frac{\sqrt{3}}{2}$ (C) $-\frac{\sqrt{3}}{2}$ (D) $-\frac{3}{2}$ (E) $-\frac{3\sqrt{3}}{2}$

2008 #12

If $f(x) = e^{(2/x)}$, then $f'(x) =$

(A) $2e^{(2/x)} \ln x$ (B) $e^{(2/x)}$ (C) $e^{\left(-2/x^2\right)}$ (D) $-\frac{2}{x^2}e^{(2/x)}$ (E) $-2x^2e^{(2/x)}$

2008 #13

If $f(x) = x^2 + 2x$, then $\frac{d}{dx}\left(f(\ln x)\right) =$

(A) $\frac{2\ln x + 2}{x}$ (B) $2x \ln x + 2x$ (C) $2 \ln x + 2$ (D) $2 \ln x + \frac{2}{x}$ (E) $\frac{2x+2}{x}$

More Questions

1. If $f(x) = (\ln x)^2$, then $f''\left(\sqrt{e}\right) =$

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

2. Let h be a differentiable function, and let f be the function defined by $f(x) = h(x^2 - 3)$. Which of the following is equal to $f'(2)$?

(A) $h'(1)$ (B) $4h'(1)$ (C) $4h'(2)$ (D) $h'(4)$ (E) $4h'(4)$

3. The table below gives values of the differentiable functions f and g and of their derivatives f' and g', at selected values of x. If $h(x) = f(g(x))$, what is the slope of the graph of h at $x = 2$?

(A) -10

(B) -6

(C) 5

(D) 6

(E) 10

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
-1	-5	1	3	0
0	-2	0	1	1
1	0	-3	0	0.5
2	5	-1	5	2

4. The table below gives values of the differentiable functions f and g and of their derivatives f' and g', at selected values of x. If $h(x) = f(x) \cdot g(x)$, what is the slope of the graph of h at $x = 2$?

(A) -10

(B) -6

(C) 5

(D) 6

(E) 10

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
-1	-5	1	3	0
0	-2	0	1	1
1	0	-3	0	0.5
2	5	-1	5	2

5. The table below gives values of the differentiable functions f and g and of their derivatives f' and g', at selected values of x. If $h(x) = \dfrac{f(x)}{g(x)}$, what is the slope of the graph of h at $x = 2$?

(A) -15

(B) -6

(C) 5

(D) 6

(E) 15

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
-1	-5	1	3	0
0	-2	0	1	1
1	0	-3	0	0.5
2	5	-1	5	2