Unit 2 Differentiation AP Review MC WS

Find the derivative, $\frac{dy}{dx}$ *of the function:*

1)

$y = \sqrt{3-2x}$

(A) $\frac{1}{2\sqrt{3-2x}}$ **(B)** $-\frac{1}{\sqrt{3-2x}}$ **(C)** $-\frac{(3-2x)^{3/2}}{3}$

(D) $-\frac{1}{3-2x}$ **(E)** $\frac{2}{3}(3-2x)^{3/2}$

2)

$y = \frac{2}{(5x+1)^3}$

(A) $-\frac{30}{(5x+1)^2}$ **(B)** $-30(5x+1)^{-4}$ **(C)** $\frac{-6}{(5x+1)^4}$

(D) $-\frac{10}{3}(5x+1)^{-4/3}$ **(E)** $\frac{30}{(5x+1)^4}$

3)

$y = 2\sqrt{x} - \frac{1}{2\sqrt{x}}$

(A) $x + \frac{1}{x\sqrt{x}}$ **(B)** $x^{-1/2} + x^{-3/2}$ **(C)** $\frac{4x-1}{4x\sqrt{x}}$

(D) $\frac{1}{\sqrt{x}} + \frac{1}{4x\sqrt{x}}$ **(E)** $\frac{4}{\sqrt{x}} + \frac{1}{x\sqrt{x}}$

4)

$y = \ln \frac{e^x}{e^x - 1}$

(A) $x - \frac{e^x}{e^x - 1}$ **(B)** $\frac{1}{e^x - 1}$ **(C)** $-\frac{1}{e^x - 1}$

(D) 0 **(E)** $\frac{e^x - 2}{e^x - 1}$

Find the derivative $\frac{dy}{dx}$

5) $y = \tan^{-1}\frac{x}{2}$

(A) $\frac{4}{4+x^2}$ **(B)** $\frac{1}{2\sqrt{4-x^2}}$ **(C)** $\frac{2}{\sqrt{4-x^2}}$

(D) $\frac{1}{2+x^2}$ **(E)** $\frac{2}{x^2+4}$

6) $x + \cos(x+y) = 0$

(A) $\csc(x+y) - 1$ **(B)** $\csc(x+y)$ **(C)** $\frac{x}{\sin(x+y)}$

(D) $\frac{1}{\sqrt{1-x^2}}$ **(E)** $\frac{1-\sin x}{\sin y}$

7) $3x^2 - 2xy + 5y^2 = 1$

(A) $\frac{3x+y}{x-5y}$ **(B)** $\frac{y-3x}{5y-x}$ **(C)** $3x + 5y$

(D) $\frac{3x+4y}{x}$ **(E)** none of these

8) If a point moves on the curve $x^2 + y^2 = 25$, then, at $(0, 5)$, $\frac{d^2y}{dx^2}$ is

(A) 0 **(B)** $\frac{1}{5}$ **(C)** -5 **(D)** $-\frac{1}{5}$ **(E)** nonexistent

9) $\lim_{h\to 0} \frac{\sqrt[3]{8+h}-2}{h}$ is

(A) 0 **(B)** $\frac{1}{12}$ **(C)** 1 **(D)** 192 **(E)** ∞

11. If $g(\theta) = \tan^2(5\theta)$, then $g'(\theta) =$

(a) $2\tan(5\theta)$.
(b) $2\tan(5\theta)\sec^2(5\theta)$.
(c) $10\tan(5\theta)\sec^2(5\theta)$.
(d) $10\tan^2(5\theta)\sec(5\theta)$.
(e) $10\tan^2(5\theta)\sec^2(5\theta)$.

In Questions 57–64, differentiable functions f and g have the values shown in the table.

x	f	f'	g	g'
0	2	1	5	–4
1	3	2	3	–3
2	5	3	1	–2
3	10	4	0	–1

58. If $B = f \cdot g$, then $B'(2) =$

(A) –20 **(B)** –7 **(C)** –6 **(D)** –1 **(E)** 13

62. If $M(x) = f(g(x))$, then $M'(1) =$

(A) –12 **(B)** –6 **(C)** 4 **(D)** 6 **(E)** 12

63. If $P(x) = f(x^3)$, then $P'(1) =$

(A) 2 **(B)** 6 **(C)** 8 **(D)** 12 **(E)** 54

68. A differentiable function f has the values shown. Estimate $f'(1.5)$.

x	1.0	1.2	1.4	1.6
$f(x)$	8	10	14	22

(A) 8 **(B)** 12 **(C)** 18 **(D)** 40 **(E)** 80

85. Suppose $y = f(x) = 2x^3 - 3x$. If $h(x)$ is the inverse function of f, then $h'(-1) =$

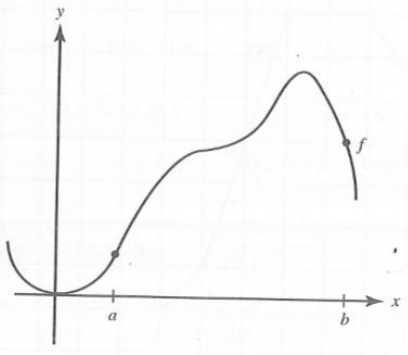
(A) -1 **(B)** $\frac{1}{5}$ **(C)** $\frac{1}{3}$ **(D)** 1 **(E)** 3

86. Suppose $f(1) = 2, f'(1) = 3$, and $f'(2) = 4$. Then $(f^{-1})'(2)$

(A) equals $-\frac{1}{3}$ **(B)** equals $-\frac{1}{4}$ **(C)** equals $\frac{1}{4}$

(D) equals $\frac{1}{3}$ **(E)** cannot be determined

103. At how many points on the interval $[a,b]$ does the function graphed satisfy the Mean Value Theorem?



(A) none **(B)** 1 **(C)** 2 **(D)** 3 **(E)** 4