CALCULUS – Worksheet #5

In each of problems 1 – 10, a function is given.

In each problem, choose the alternative that is the derivative, $\frac{dy}{dx}$, of the function.

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1. $y = (4x + 1)^2(1 - x)^3$ A) $(4x + 1)^2(1 - x)^2(5 - 20x)$ B) $(4x + 1)(1 - x)^2(4x + 11)$
C) $5(4x + 1)(1 - x)^2(1 - 4x)$ D) $(4x + 1)(1 - x)^2(11 - 20x)$ E) $-24(4x + 1)(1 - x)^2$

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2. $\frac{2-x}{3x+1}$ A) $-\frac{7}{(3x+1)^2}$ B) $\frac{6x-5}{(3x+1)^2}$ C) $\frac{9}{(3x+1)^2}$ D) $\frac{7}{(3x+1)^2}$ E) $\frac{7-6x}{(3x+1)^2}$

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

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4. $y = \frac{2}{(5x+1)^3}$ 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) $\frac{30}{(5x+1)^4}$

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5. $y = 3x^{\frac{2}{3}} - 4x^{\frac{1}{2}} - 2$

A) $2x^{\frac{1}{3}} - 2x^{-\frac{1}{2}}$ B) $3x^{-\frac{1}{3}} - 2x^{-\frac{1}{2}}$ C) $x^{\frac{5}{3}} - 8x^{\frac{3}{2}}$ D) $\frac{2}{x^{\frac{1}{3}}} - \frac{2}{x^{\frac{1}{2}}} - 2$ E) $2x^{-\frac{1}{3}} - 2x^{-\frac{1}{2}}$

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6. $y = 2\sqrt{x} - \frac{1}{2\sqrt{x}}$ A) $x + \frac{1}{x\sqrt{x}}$ B) $x^{-\frac{1}{2}} + x^{-\frac{3}{2}}$ C) $\frac{4x-1}{4x\sqrt{x}}$ D) $\frac{1}{\sqrt{x}} + \frac{1}{4x\sqrt{x}}$ E) $\frac{4}{\sqrt{x}} + \frac{1}{x\sqrt{x}}$

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7. $y = \frac{x}{\sqrt{1-x^2}}$ A) $\frac{1-2x^2}{(1-x^2)^{\frac{3}{2}}}$ B) $\frac{1}{1-x^2}$ C) $\frac{1}{\sqrt{1-x^2}}$ D) $\frac{1-2x^2}{(1-x^2)^{\frac{1}{2}}}$ E) none

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8. $y = \cos x^2$ A) $2x \sin x^2$ B) $-\sin x^2$ C) $-2 \sin x \cos x$ D) $-2x \sin x^2$ E) $\sin 2x$

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9. $y = \sin^2 3x + \cos^2 3x$ A) $-6 \sin 6x$ B) 0 C) $12 \sin 3x \cos 3x$ D) $6(\sin 3x + \cos 3x)$ E) 1

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10. $y = x \ln^3 x$

A) $\frac{3 \ln^2 x}{x}$ B) $3 \ln^2 x$ C) $3x \ln^2 x + \ln^3 x$ D) $3(\ln x + 1)$ E) none of these

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11. Find $\frac{dy}{dx}$ if $x^3 - xy + y^3 = 1$

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

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12. Find f'(x) using definition of derivative if $f(x) = 3x^2 - 2$. SHOW ALL WORK.
