

3. Find the equation of the tangent line to $9x^2 + 16y^2 = 52$ through $(2, -1)$.

- (A) $-9x + 8y - 26 = 0$ (B) $9x - 8y - 26 = 0$ (C) $9x - 8y - 106 = 0$
(D) $8x + 9y - 17 = 0$ (E) $9x + 16y - 2 = 0$
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4. What is the slope of the line tangent to the curve $y = \arctan(2x)$ at the point when $x = \frac{1}{2}$?

- (A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 1 (D) 2 (E) 4
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5. If $f(x) = \frac{3x^2+x}{3x^2-x}$ then $f'(x)$ is

- (A) 1 (B) $\frac{6x^2+1}{3x^2-x}$ (C) $\frac{-6}{(3x-1)^2}$
(D) $\frac{-2x^2}{(x^2-x)^2}$ (E) $\frac{36x^2-2x}{(x^2-x)^2}$
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6. If $f(x) = \sqrt{1 + \sqrt{x}}$, find $f'(x)$.

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

7. A curve is generated by the equation $x^2 + 4y^2 = 16$. Determine the number of points on this curve whose corresponding tangent lines are horizontal.

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4
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8. $\frac{d}{dx}(\ln(3x) 5^{2x}) =$

- (A) $\frac{5^{2x}}{x} + 2 \ln(5) \ln(3x) 5^{2x}$ (B) $\frac{5^{2x}}{3x} - 2x \ln(3x) 5^{2x}$ (C) $\frac{5^{2x}}{x} - \ln(5) \ln(3x) 5^{2x}$
(D) $\frac{5^{2x}}{3x} + 2 \ln(3x) 5^{2x}$ (E) $\frac{5^{2x}}{x} + \ln(5) \ln(3x) 5^{2x}$
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9. Let a function f be defined as $f(x) = x^3 - 2x - 4$ for $x \geq 1$. Let $g(x)$ be the inverse function of $f(x)$ and note that $f(2) = 0$. The value of $g'(0) =$

- (A) $\frac{1}{10}$ (B) 1 (C) 4 (D) -2 (E) $-\frac{1}{2}$
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10. $\frac{d}{dx}(\sin^{-1} x + 2\sqrt{x}) =$

- (A) $-\frac{1}{\sin^2 x} + \frac{1}{\sqrt{x}}$ (B) $\frac{1}{\sqrt{1-x^2}} + 4\sqrt[3]{x}$ (C) $\frac{1}{\sqrt{1-x^2}} + \frac{1}{\sqrt{x}}$
(D) $\frac{1}{\sqrt{x^2-1}} + 4\sqrt[3]{x}$ (E) $\frac{1}{\sqrt{x^2-1}} + \frac{1}{\sqrt{x}}$