Practice
Derivatives of Trig Functions and Chain Rule

Find the derivative of each function. Be sure to indicate the derivative in proper notation. Do only the most obvious simplifications.

1. $y = \frac{3}{7}\cos x$	2. $y = \csc 5x$	3. $y = -3\sin^2 x$
4. $y = \tan 7x^2$	5. $y = 2x\cot x$	6. $y = \frac{x}{2\sin x}$
7. $y = \tan 8x + \cos\frac{1}{8}x$	8. $y = \cos^3 x^3$	9. $y = \cos(\sin x)$
10. $y = \cos^2(3x)\sin(4x)$	11. $y = \sin\sqrt[3]{3x}$	12. $y = \sqrt[3]{\sin 3x}$

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Derivatives of Trig Functions and Chain Rule

Find the derivative of each function. Be sure to indicate the derivative in proper notation. Do only the most obvious simplifications.

1. $y = \frac{3}{7}\cos x$

Ans: $y' = -\frac{3}{7}\sin x$

2. $y = \csc 5x$

Ans: $y' = -5\csc(5x)\cot(5x)$

3. $y = -3\sin^2 x$

Ans: $y' = -6\sin x\cos x$

4. $y = \tan 7x^2$

Ans: $y' = 14x\sec^2(7x^2)$

5. $y = 2x\cot x$

Ans: $y' = -2x\csc^2 x + 2\cot x$

6. $y = \frac{x}{2\sin x}$

Ans: $y' = \frac{\sin x - x\cos x}{2\sin^2 x}$

7. $y = \tan 8x + \cos\frac{1}{8}x$

Ans: $y' = 8\sec^2(8x) - \frac{1}{8}\sin\left(\frac{1}{8}x\right)$

8. $y = \cos^3 x^3$

Ans: $y' = -9x^2\left[\cos\left(x^3\right)\right]^2\left[\sin\left(x^3\right)\right]$

9. $y = \cos(\sin x)$

$y' = -\sin(\sin x)(\cos x)$

10. $y = \cos^2(3x)\sin(4x)$

Ans:
$y' = \cos^2(3x)\cos(4x)\cdot 4 +$
$\sin(4x)(2)\cos(3x)(-\sin 3x)\cdot 3$
$y' = 4\cos^2(3x)\cos(4x) +$
$-6\sin(4x)\cos(3x)(\sin 3x)$

11. $y = \sin\sqrt[3]{3x}$

$y' = \cos(3x)^{1/3}\left(\frac{1}{3}(3x)^{-2/3}(3)\right)$

Ans: $y' = \frac{\cos(3x)^{1/3}}{(3x)^{2/3}}$

12. $y = \sqrt[3]{\sin 3x}$

$y = \left[\sin(3x)\right]^{1/3}$

Ans: $y' = \frac{1}{3}\left[\sin(3x)\right]^{-2/3}\cos(3x)\cdot 3$

$y' = \frac{\cos(3x)}{\left[\sin(3x)\right]^{2/3}}$