Mixed Derivatives Review

Find the derivative of each function.

Formulas

$$\frac{d}{dx}\left[\, x^n \,\right] = nx^{n-1}$$

$$\frac{d}{dx}\left[\, c \,\right] = 0$$

$$\frac{d}{dx}\left[\, fg \,\right] = f'g + fg'$$

$$\frac{d}{dx}\left[\frac{f}{g}\right] = \frac{f'g - fg'}{g^2}$$

$$\frac{d}{dx}\left[\, f(g(x)) \,\right] = f'(g(x)) \cdot g'(x)$$

$$\frac{d}{dx}\left[\, \sin(u) \,\right] = \cos(u) \cdot u'$$

$$\frac{d}{dx}\left[\, \cos(u) \,\right] = -\sin(u) \cdot u'$$

$$\frac{d}{dx}\left[\, \tan(u) \,\right] = \sec^2(u) \cdot u'$$

$$\frac{d}{dx}\left[\, \sec(u) \,\right] = \sec(u)\tan(u) \cdot u'$$

$$\frac{d}{dx}\left[\, \csc(u) \,\right] = -\csc(u)\cot(u) \cdot u'$$

$$\frac{d}{dx}\left[\, \cot(u) \,\right] = -\csc^2(u) \cdot u'$$

$$\frac{d}{dx}\left[\, e^u \,\right] = e^u \cdot u'$$

$$\frac{d}{dx}\left[\, \ln(u) \,\right] = \frac{u'}{u}$$

$$\frac{d}{dx}\left[\, a^u \,\right] = a^u \ln(a) \cdot u'$$

$$\frac{d}{dx}\left[\, \arcsin(u) \,\right] = \frac{u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dx}\left[\, \arccos(u) \,\right] = -\frac{u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dx}\left[\, \arctan(u) \,\right] = \frac{u'}{1+u^2}$$

1. $f(x) = x^2 \sin(x)$

2. $f(x) = (3x + 5)^3$

3. $f(x) = \dfrac{x}{x^2 + 4}$

4. $f(x) = \sin(4x^2)$

5. $f(x) = x^3 \, e^x$

6. $f(x) = x^2 \sin(2x)$

7. $f(x) = \dfrac{\sin(2x)}{x^2}$

8. $f(x) = (x^2 + 1)^3 \, x$

9. $f(x) = \ln(\sin(x))$

10. $f(x) = e^{\sin(x)}$

11. $f(x) = \dfrac{x^2}{e^{2x}}$

12. $f(x) = e^{2x}\cos(x)$

13. $f(x) = (1 + \sin(x))^3$

14. $f(x) = x\ln(x^2 + 2)$

15. $f(x) = \tan(3x^2)$

16. $f(x) = \dfrac{e^{2x}}{x^2 + 3}$

17. $f(x) = x^2(2x + 3)^4$

18. $f(x) = \arctan(2e^x)$

19. $f(x) = \ln(x)\sin(2x)$

20. $f(x) = \dfrac{\sqrt{x^2 + 1}}{x}$