

2.3

$$35. f(x) = \left[ (3x^3 + 4x) \right] \left[ (x-5)(x+1) \right]$$

$$= (3x^3 + 4x)(x^2 - 4x - 5)$$

$$f'(x) = (3x^3 + 4x)(2x - 4) + (9x^2 + 4)(x^2 - 4x - 5)$$

$$53. y = (2x \sin x) + (x^2 \cos x)$$

$$y' = \left[ (2x)(\sin x)' + (2x)'(\sin x) \right] +$$

$$\left[ (x^2)(\cos x)' + (x^2)'(\cos x) \right]$$

$$= 2x \cos x + 2 \sin x - x^2 \sin x + 2x \cos x$$

2.4

$$13. f(t) = \sqrt{1-t} = (1-t)^{1/2}$$

$$f'(t) = \frac{1}{2}(1-t)^{-1/2} \cdot (1-t)'$$

$$= \boxed{-\frac{1}{2}(1-t)^{-1/2}}$$

$$= -\frac{1}{2\sqrt{1-t}}$$

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$$f(x) = \cos 3x$$

$$f'(x) = (-\sin 3x) \cdot (3x)'$$

$$= \boxed{-3\sin 3x}$$

$$\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$$

$$\frac{d}{dx}(\operatorname{arcsec} x) = \frac{1}{|x|\sqrt{x^2-1}}$$

$$(\arccos x)' = \frac{-1}{\sqrt{1-x^2}}$$

$$(\operatorname{arccot} x)' = \frac{-1}{1+x^2}$$

$$(\operatorname{arccsc} x)' = \frac{-1}{|x|\sqrt{x^2-1}}$$

$$(\arcsin 3x)' = \frac{1}{\sqrt{1-(3x)^2}} \cdot 3$$

$$f(x) = \arctan(\ln(2x))$$

$$f'(x) = \frac{1}{1 + (\ln 2x)^2} \cdot \frac{1}{2x} \cdot 2$$

arctan u  
ln v  
2x

$$f(x) = \cot\left(5^{\arcsin(4x^3)}\right)$$

$$f'(x) = -\csc^2\left(5^{\arcsin(4x^3)}\right) \cdot 5^{\arcsin(4x^3)} \cdot \ln 5 \cdot \frac{1}{\sqrt{1 - (4x^3)^2}} \cdot 12x^2$$

cot u  
 $5^v$   
arcsin w  
 $4x^3$

$$[a^x]' = a^x \ln a$$

$x^2$   
 $2^x$