

AP Calculus AB
4.3 After Day 1 (inverse Trig)

Name Me

Find $\frac{dy}{dx}$:

1. $y = \cos^{-1}(1-2x)$

$$\frac{dy}{dx} = \frac{-1}{\sqrt{1-(1-2x)^2}} \cdot -2$$

$$= \frac{2}{\sqrt{1-(1-4x+4x^2)}} = \frac{2}{\sqrt{4x-4x^2}}$$

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

$$\frac{dy}{dx} = \cos(3x^2) \cdot (6x)$$

$$= 6x \cos(3x^2)$$

3. $7 = x^2 - xy + y^2$

$$0 = 2x - (y + xy') + 2yy'$$

$$0 = 2x - y - xy' + 2yy'$$

$$-2x + y = y'(-x + 2y)$$

$$y' = \frac{-2x + y}{-x + 2y}$$

4. $y = \tan^3(7x)$

$$y = (\tan(7x))^3$$

$$\frac{dy}{dx} = 3(\tan(7x))^2 (\sec^2(7x) \cdot 7)$$

$$= 21 \tan^2(7x) \sec^2(7x)$$

5. $y = \sec^{-1}(\sqrt{x})$

$$\frac{dy}{dx} = \frac{1}{|\sqrt{x}| \sqrt{|\sqrt{x}-1|}} \cdot \frac{1}{2} x^{-1/2}$$

$$= \frac{1}{2\sqrt{x} |\sqrt{x}-1|}$$

6. $x \sin y = y$

$$\sin y(1) + x \cos y \cdot y' = y'$$

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

$$\sin y = y'(1 - x \cos y)$$

$$y' = \frac{\sin y}{1 - x \cos y}$$

alt. below

7. $y = \csc^{-1}(\sqrt{2x-1})$

$$\frac{dy}{dx} = \frac{-1}{|\sqrt{2x-1}| \sqrt{|\sqrt{2x-1}-1|}} \cdot \frac{1}{2} (2x-1)^{-1/2} \cdot 2$$

$$= \frac{-1}{\sqrt{2x-1} |\sqrt{2x-1}-1| \sqrt{2x-1}}$$

8. $y = \sin(\tan^{-1} x)$

$$\frac{dy}{dx} = \cos(\tan^{-1} x) \cdot \frac{1}{1+x^2}$$

$$= \frac{\cos(\tan^{-1} x)}{1+x^2}$$

9. $y^3 + x^2 y = 1$

$$3y^2 y' + y(2x) + x^2 y' = 0$$

$$3y^2 y' + x^2 y' = -2xy$$

$$y'(3y^2 + x^2) = -2xy$$

$$y' = \frac{-2xy}{3y^2 + x^2}$$