

Homework 11

$$2) 4x^3y^3 = -2y \quad \frac{dy}{dx} = ?$$

$$4x^3 \cdot 3y^2 \cdot \frac{dy}{dx} + y^3 \cdot 12x^2 \cdot \frac{dx}{dx} = -2 \frac{dy}{dx}$$

$$12x^3y^2 \frac{dy}{dx} + 12x^2y^3 = -2 \frac{dy}{dx}$$

$$12x^3y^2 \frac{dy}{dx} + 2 \frac{dy}{dx} = -12x^2y^3$$

$$\frac{dy}{dx} (12x^3y^2 + 2) = -12x^2y^3$$

$$\frac{dy}{dx} = \frac{-12x^2y^3}{12x^3y^2 + 2}$$

$$3) 7\sin(xy^2) = 5$$

$$7\cos(xy^2) \left(x \cdot 2y \frac{dy}{dx} + y^2 \cdot \frac{dx}{dx} \right) = 0$$

$$14xy \cos(xy^2) \frac{dy}{dx} + 7y^2 \cos(xy^2) = 0$$

$$14xy \cos(xy^2) \frac{dy}{dx} = -7y^2 \cos(xy^2)$$

$$\frac{dy}{dx} = \frac{-\cancel{7}y^2 \cancel{\cos(xy^2)}}{2\cancel{14}xy \cancel{\cos(xy^2)}}$$

$$\frac{dy}{dx} = \frac{-y}{2x}$$

Homework 10

$$1) \frac{d}{dx} (15 \sin(-\pi x) \tan(\frac{2}{3}\pi x))$$

$$= 15 \sin(-\pi x) \sec^2(\frac{2}{3}\pi x) (\frac{2}{3}\pi) + \tan(\frac{2}{3}\pi x) (15 \cos(-\pi x))$$

$$= 10\pi \sin(-\pi x) \sec^2(\frac{2}{3}\pi x) - 15\pi \tan(\frac{2}{3}\pi x) \cos(-\pi x)$$

$$4^x = 4^x \cdot \ln 4$$

$$e^x = e^x \cdot \ln e = e^x$$

$$4^{\cos x} = 4^{\cos x} \cdot \ln 4 \cdot (-\sin x)$$

11.9

$$\frac{1}{1+x^2} = \frac{1}{1+u^2}$$

$$\frac{d}{dx} (-\arctan(x^2)) = -\frac{1}{1+(x^2)^2} \cdot (x^2)' = \frac{-2x}{1+x^4}$$