

Assignment - Implicit and Inverse Trigo-2

Date _____

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y .

1) $\ln 4y^2 = 3x^2 + 3$

2) $\sin 3y^3 = 5x + 5$

3) $x^2 + 2 = \csc 5y^3$

4) $e^{3y^2} = 3x + 4$

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

6) $\cos y^3 = 3x^3 + 2$

Differentiate each function with respect to x .

7) $y = \cos^{-1}(4x^3 + 3)^2$

$$8) y = (\sin^{-1} x^3)^5$$

$$9) y = \tan^{-1} (x^4 + 1)^5$$

$$10) y = \tan^{-1} (5x^3 - 3)^4$$

$$11) y = (\sin^{-1} 3x^5)^2$$



$$12) y = \cos^{-1}(5x^4 + 4)^4$$



Answers to Assignment - Implicit and Inverse Trigo-2 (ID: 1)

$$1) \frac{dy}{dx} = 3yx$$

$$2) \frac{dy}{dx} = \frac{5}{9y^2 \cos 3y^3}$$

$$3) \frac{dy}{dx} = -\frac{2x}{15y^2 \csc 5y^3 \cot 5y^3}$$

$$4) \frac{dy}{dx} = \frac{1}{2ye^{3y^2}}$$

$$5) \frac{dy}{dx} = \frac{2x^2}{9y^5 + 12y^2}$$

$$6) \frac{dy}{dx} = -\frac{3x^2}{y^2 \sin y^3}$$

$$7) \frac{dy}{dx} = -\frac{1}{\sqrt{1 - ((4x^3 + 3)^2)^2}} \cdot 2(4x^3 + 3) \cdot 12x^2$$

$$= -\frac{24x^2(4x^3 + 3)}{\sqrt{1 - (4x^3 + 3)^4}}$$

$$8) \frac{dy}{dx} = 5(\sin^{-1} x^3)^4 \cdot \frac{1}{\sqrt{1 - (x^3)^2}} \cdot 3x^2$$

$$= \frac{15x^2(\sin^{-1} x^3)^4}{\sqrt{1 - x^6}}$$

$$9) \frac{dy}{dx} = \frac{1}{((x^4 + 1)^5)^2 + 1} \cdot 5(x^4 + 1)^4 \cdot 4x^3$$

$$= \frac{20x^3(x^4 + 1)^4}{(x^4 + 1)^{10} + 1}$$

$$10) \frac{dy}{dx} = \frac{1}{((5x^3 - 3)^4)^2 + 1} \cdot 4(5x^3 - 3)^3 \cdot 15x^2$$

$$= \frac{60x^2(5x^3 - 3)^3}{(5x^3 - 3)^8 + 1}$$

$$11) \frac{dy}{dx} = 2\sin^{-1} 3x^5 \cdot \frac{1}{\sqrt{1 - (3x^5)^2}} \cdot 15x^4$$

$$= \frac{30x^4 \sin^{-1} 3x^5}{\sqrt{1 - 9x^{10}}}$$

$$12) \frac{dy}{dx} = -\frac{1}{\sqrt{1 - ((5x^4 + 4)^4)^2}} \cdot 4(5x^4 + 4)^3 \cdot 20x^3$$

$$= -\frac{80x^3(5x^4 + 4)^3}{\sqrt{1 - (5x^4 + 4)^8}}$$