

Math 100 – WORKSHEET 10
IMPLICIT DIFFERENTIATION; INVERSE TRIG FUNCTIONS

1. IMPLICIT DIFFERENTIATION

- (1) Find the line tangent to the curve $y^2 = 4x^3 + 2x$ at the point $(2, 6)$.
- (2) (Final, 2015) Let $xy^2 + x^2y = 2$. Find $\frac{dy}{dx}$ at the point $(1, 1)$.
- (3) (Final 2012) Find the slope of the line tangent to the curve $y + x \cos y = \cos x$ at the point $(0, 1)$.
- (4) Find y'' (in terms of x, y) along the curve $x^5 + y^5 = 10$ (ignore points where $y = 0$).
- (5) Find y' if $(x + y) \sin(xy) = x^2$.

2. INVERSE TRIG FUNCTIONS

(1) Evaluation

(a) (Final 2014) Evaluate $\arcsin\left(-\frac{1}{2}\right)$; Find $\arcsin\left(\sin\left(\frac{31\pi}{11}\right)\right)$.

(b) (Final 2015) Simplify $\sin(\arctan 4)$

(c) Find $\tan(\arccos(0.4))$

(2) Differentiation

(a) Find $\frac{d}{dx}(\arcsin(2x))$

(b) Find the line tangent to $y = \sqrt{1 + (\arctan(x))^2}$ at the point where $x = 1$.

(c) Find y' if $y = \arcsin(e^{5x})$. What is the domain of the functions y, y' ?