AP Calculus In-Class Four – Differentiation

2.3 Implicit Differentiation; 2.4 Estimating a Derivative; 2.5 Derivative of the Inverse of a Function

1. Find $\frac{dy}{dx}$

(a) $x^3 - y^3 = 1$

(g) $\begin{cases} x = \cos^3 \theta \\ y = \sin^3 \theta \end{cases}$

(j) $\begin{cases} x = t^2 + 1 \\ y = 2t^3 \end{cases}$

2. Find $\frac{d^2y}{dx^2}$

(a) $xy - x^2 + y^3 = 5$

(b) $\begin{cases} x = t^3 + t \\ y = 2t^2 - 3 \end{cases}$

(c) $\begin{cases} x = 4cos^2 \theta \\ y = 3sin^2 \theta \end{cases}$

3. From the values of f shown in the table below, estimate $f'(3.04)$.

x	2.98	3.00	3.02	3.04	3.06
$f(x)$	- 5.00	- 4.20	-3.00	-2.00	- 1.20

4. Using the values shown in the table in Q3, estimate $(f^{-1})'(-2)$.

5. Find $\frac{dy}{dx}$

(a) $y = sin^{-1}(2x)$

(b) $y = tan^{-1}(x^3)$

(c) $y = \text{arcsec}(e^x)$