**Math 16A, Section 3 - Fall 2017**
**Instructor: Christopher O'Neill**
**Practice Exam 2**

**Last Name:** _____ **First Name:** _____

**Directions:**

- The use of a calculator, cell phone, laptop or computer is prohibited.
- TURN OFF cell phones and put them away. If a cell phone is seen during the exam, your exam will be collected and you will receive a zero.
- Answer all of the questions, and present your solutions in the space provided. *Show all your work* neatly and concisely and *clearly indicate your final answer*. You will be graded not merely on the final answer, but on the quality and correctness of the work leading up to it.

**The UC Davis Code of Academic Conduct**

I will conduct myself with honesty, fairness, and integrity.

Signature: _____

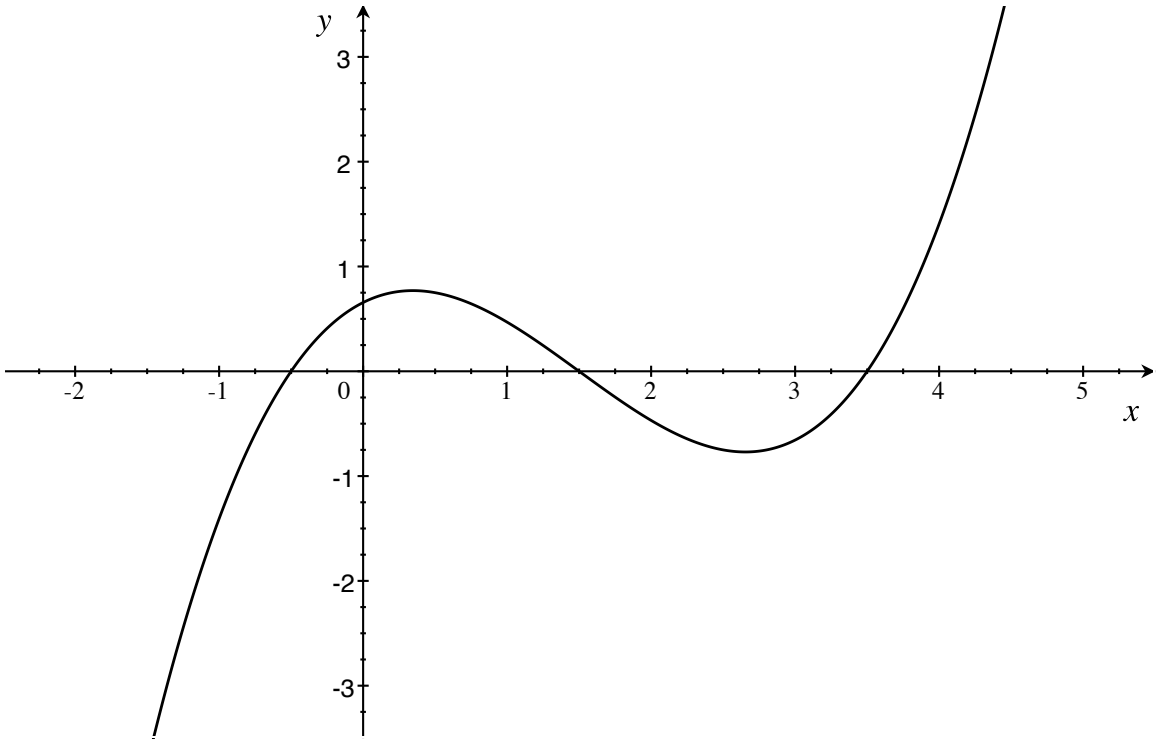
(1) Using the graph of $f(x)$ below, complete each statement with either "<", ">", or "=".

$f(1)$ ____ 0 $f'(1)$ ____ 0

$f(2)$ ____ 0 $f'(2)$ ____ 0

$f(3)$ ____ 0 $f'(3)$ ____ 0

$f(4)$ ____ 0 $f'(4)$ ____ 0



(2) Find each of the following derivatives. You may use any derivative rule we learned in this class.

(a) $\dfrac{d}{dx}\left[2x^7 + 7x - 57 - \dfrac{9}{\sqrt{x}}\right]$

(b) $\dfrac{d}{dx}\left[\left(4 - \dfrac{1}{x^2}\right)(x^2 - 3x)\right]$

(c) $\dfrac{d}{dx}\left[\dfrac{x}{(1-x)^3}\right]$

(d) $\dfrac{d}{dx}\left[((2x-4)(x+5))^{17}\right]$

(e) $\dfrac{d}{dx}\left[\sec^7(x)-\tan^5(x)\right]$

(3) Find the derivative of $f(x)$ **using the definition of derivative**. Note: you will **not** get credit for using derivative rules.

$f(x) = x^2 + 2x + 1$

(4) Find the equation for the tangent line to $f(x)$ at the specified point $x = a$. You may use any of the derivative rules we have learned in this class.

$$f(x) = \frac{x^2 + 4}{3x + 2}, \quad a = 6.$$

(5) Find an equation for $\frac{dy}{dx}$ using implicit differentation.

$$(x+y)^3 = x^3 + y^3$$

## Trigonometric Identities

$$\begin{aligned}
\sin(A+B) &= \sin(A)\cos(B)+\cos(A)\sin(B)\\
\sin(A-B) &= \sin(A)\cos(B)-\cos(A)\sin(B)\\
\cos(A+B) &= \cos(A)\cos(B)-\sin(A)\sin(B)\\
\cos(A-B) &= \cos(A)\cos(B)+\sin(A)\sin(B)
\end{aligned}$$

$$\begin{aligned}
\sin(2A) &= 2\sin(A)\cos(A)\\
\cos(2A) &= \cos^2(A)-\sin^2(A)
\end{aligned}$$

$$\sin^2(A)+\cos^2(A)=1$$

$$\tan^2(A)+1=\sec^2(x)$$

$$1+\cot^2(A)=\csc^2(x)$$