

MA 2310: Practice Test 1

1 Some PreCalc

1. Compute

- (a) $\cos(3\pi/4)$
- (b) $\sin(7\pi/6)$
- (c) $\tan(-\pi/6)$
- (d) $\cos(\sec^{-1}(x))$
- (e) $\tan(\sec^{-1}(\frac{x-1}{x^2+1}))$
- (f) $\cos(\sin^{-1}(x))$

2 Limits and Continuity

- 2. See the Ch 2 mastery quiz.
- 3. Be able to compute limits from graphs.

3 Derivatives

- 4. Be able to graph the derivative given the graph of a function.
- 5. Compute $f'(x)$ for $f(x) = x^3$ from the definition.
- 6. Prove the product rule.
- 7. Use implicit differentiation to show

$$\frac{d}{dx}[\sin^{-1}(x)] = \frac{1}{\sqrt{1-x^2}}$$

8. Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$, $\frac{d^3y}{dx^3}$ for

$$y = \cos(3x + 1)$$

9. Find the derivatives of the following functions.

- (a) $f(x) = \sec(x^3)$
- (b) $f(x) = \frac{e^x+1}{e^x}$
- (c) $f(x) = \frac{(x+1)^2}{(x+2)^3}$
- (d) $f(x) = \tan(x)\sqrt{3x^2+1}$
- (e) $f(x) = \tan^{-1}(x)\sqrt{3x^2+1}$

10. Find the derivatives implicitly for

- $3y^2 + 4y + 2 = \cos(x)$

- $y^2 + y + xy = e^{xy} - \sec(x)$
- $\sqrt{y^2 + y} = x^3 y^2 - \cot(y)$

11. Find the second derivative implicitly for

- $3y^2 + 4y + = 2 - \cos(x)$

12. Find the line tangent to $f(x)$ at the given point for $f(x) = x^2 + x + 1 - e^{x^2 - 1}$ at $x = 1$.

13. Find the line tangent to $f(x)$ at the given point for $f(x) = \cos(x)$ at $x = 1$.

14. Let $f(x) = x^2$.

- Find the secant line to $f(x)$ at the given points for $f(x) = x^2$ from $x = 1$ to $x = 1.1$. Graph $f(x)$ and the secant line on a single graph.
- Find the tangent line to $f(x)$ at the given point for $f(x) = x^2$ at $x = 1$. Graph $f(x)$ and the tangent line on a single graph.
- What do the first two parts of this question have to do with each other?