Math 1210 Final Review Practice Worksheet (not to be turned in)

Match the following:

Theorem or definition	**Paraphrased**
$\lim_{x\to c} f(x) = L$: For every $\varepsilon > 0$ there exists a $\delta > 0$ such that if $0 < \lvert x - c \rvert < \delta$, then $\lvert f(x) - L \rvert < \varepsilon$.	a) Given two *y*-values, the function does not skip any *y*-values between them.
$f(x)$ is continuous at *c*: The following conditions are satisfied: i. $f(c)$ is defined. ii. $\lim_{x\to c} f(x)$ exists. iii. $\lim_{x\to c} f(x) = f(c)$	b) What function has derivative *f* ?
Intermediate Value Theorem: If *f* is continuous on [*a*,*b*] and *c* is between $f(a)$ and $f(b)$, inclusive, then there exists $x \in [a,b]$ such that $f(x) = c$.	c) We can get as close as we like to the *y*-value by getting close to the *x*-value.
Squeezing Theorem: Suppose $g(x) \le f(x) \le h(x)$ for all *x* near *c*. If $\lim_{x\to c} g(x) = L$ and $\lim_{x\to c} h(x) = L$, then $\lim_{x\to c} f(x) = L$.	d) *f* attains its average slope.
Derivative: $f'(x) = \lim_{h\to 0} \frac{f(x+h) - f(x)}{h}$	e) For $\frac{0}{0}$ or $\frac{\infty}{\infty}$, the limit of the ratio of two functions is the limits of the ratio of their derivatives.
L'Hôpital's Rule: For *f* and *g* differentiable near *a*, suppose $\lim_{x\to a} f(x) = \lim_{x\to a} g(x) = 0$ or $\lim_{x\to a} f(x) = \lim_{x\to a} g(x) = \infty$. If $\lim_{x\to a} \frac{f'(x)}{g'(x)}$ exists or is $\pm\infty$, then $\lim_{x\to a} \frac{f(x)}{g(x)} = \lim_{x\to a} \frac{f'(x)}{g'(x)}$.	f) Somewhere between two *x*-intercepts, a function has slope 0.
Extreme Value Theorem: If *f* is continuous on [*a*,*b*], then *f* has both an absolute maximum and an absolute minimum on [*a*,*b*].	g) Gives a formula for evaluating definite integrals using antiderivatives.
Mean-Value Theorem: If *f* is continuous on [*a*,*b*] and differentiable on (*a*,*b*), then $\exists c \in (a,b)$ such that $f'(c) = \frac{f(b) - f(a)}{b - a}$.	h) The function approaches the actual value of the function.
Rolle's Theorem: Let *f* be continuous on [*a*,*b*] and differentiable on (*a*,*b*). If $f(a) = 0$ and $f(b) = 0$, then $\exists c \in (a,b)$ such that $f'(c) = 0$.	i) The limit of the sum of the area of rectangles as their width approaches 0.
Antiderivative: *F* is an antiderivative of *f* if $F' = f$.	j) The derivative undoes the integral.

Fundamental Theorem of Calculus (FTC) Part I: If f is continuous on $[a,b]$ and F is any antiderivative of f, then $\int_a^b f(x)\,dx = F(b) - F(a)$.	k) The derivative is the slope of the secant line as it approaches the tangent line.
Definite integral of f from a to b: $\int_a^b f(x)\,dx = \lim_{\max \Delta x_k \to 0} \sum_{k=1}^{n} f(x_k^*)\Delta x_k$	l) We can find a limit by sandwiching it between two other limits.
Fundamental Theorem of Calculus (FTC) Part II: If f is continuous on $[a,b]$, then $\frac{d}{dx}\left[\int_a^x f(t)\,dt\right] = f(x)$	m) A function has absolute max and mins on a closed interval.
Mean-Value Theorem for Integrals: Let f be continuous on $[a,b]$. Then $\exists x^* \in [a,b]$ such that $\int_a^b f(x)\,dx = f(x^*)(b-a)$.	n) f attains its average height.

Find $\sin\theta,\ \cos\theta,\ \tan\theta,\ \cot\theta,\ \csc\theta,\ \sec\theta$ for $\theta = 0, \frac{\pi}{2}, \pi, -\frac{\pi}{2}, -\frac{\pi}{4}, \frac{\pi}{6}, \frac{4\pi}{3}$.

Find

$$\sin^{-1}\frac{1}{2}, \cos^{-1}\frac{-\sqrt{3}}{2}, \sin^{-1}\frac{1}{\sqrt{2}}, \tan^{-1}1, \tan^{-1}\sqrt{3}, \cot^{-1}(-1), \tan^{-1}0, \cos^{-1}(-1), \sin^{-1}1, \sin^{-1}0, \cos^{-1}0, \tan^{-1}\frac{-1}{\sqrt{3}},$$

$$\sec^{-1}2, \sec^{-1}(-1), \csc^{-1}\frac{-2}{\sqrt{3}}, \csc^{-1}0 \quad (\,just \quad kidding\,)$$