

Quiz 1 will cover the following material: (all handouts posted on the web site so far)

1. Differentiate functions using the generalized power rule, product rule, quotient rule, and chain rule.
2. Use implicit differentiation.
3. Graph and state the basic properties of a trigonometric function (all 12 of them)
4. Differentiate a trigonometric function (all 12 of them)
5. Derive the formula for $\frac{d}{dx}(\sin^{-1} x)$, $\frac{d}{dx}(\cos^{-1} x)$, $\frac{d}{dx}(\tan^{-1} x)$, $\frac{d}{dx}(\sec^{-1} x)$, $\frac{d}{dx}(\csc^{-1} x)$, $\frac{d}{dx}(\cot^{-1} x)$

Sample Quiz 1

1. Consider the function $f(x) = \sec x$. State its basic properties (domain, range, increasing/decreasing, asymptotes) and sketch its graph.
2. Derive the formula for $\frac{d}{dx}(\cos^{-1} x)$.
3. Differentiate each of the following:

a) $f(x) = \sqrt{5x^4 + x^2 + 1}$

b) $g(\theta) = \tan(3\theta^2)$

c) $m(x) = 10 \sin x \cos x$

4. Compute each of the following integrals.

a) $\int_0^2 (x - 2\sqrt{x} + 1) dx$

b) $\int \frac{1}{\sqrt{1-y^2}} dy$

c) $\int \tan^2 x dx$

Answers

1. see handout on trigonometric functions
2. see handout on differentiating trigonometric functions
3. a) $f'(x) = \frac{x + 10x^3}{\sqrt{x^2 + 5x^4 + 1}}$ b) $g'(\theta) = 6\theta(\tan^2 3\theta^2 + 1)$ c) $m'(x) = 10 \cos 2x$
4. a) $4 - \frac{8}{3}\sqrt{2}$ b) $\sin^{-1} y + C$ c) $\tan x - x + C$