

Quiz 2 will cover the following material: (all handouts posted on the web site so far)

1. All material covered on Quiz 1
2. Definite and indefinite integrals
3. Graph, state the basic properties of, and differentiate all 12 trigonometric functions.
4. Derive the formula for  $\frac{d}{dx}(\sin^{-1} x)$ ,  $\frac{d}{dx}(\cos^{-1} x)$ ,  $\frac{d}{dx}(\tan^{-1} x)$ ,  $\frac{d}{dx}(\sec^{-1} x)$ ,  $\frac{d}{dx}(\csc^{-1} x)$ ,  $\frac{d}{dx}(\cot^{-1} x)$
5. Apply the fundamental theorem to compute definite integrals and differentiate functions defined using definite integrals.

## Sample Quiz 2

1. Sketch the graph of  $f(x) = \sec^{-1} x$  and state its basic properties.
2. Derive the formula for  $\frac{d}{dx}(\cos^{-1} x)$ .
3. Differentiate each of the following:

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

b)  $m(x) = \sqrt{x + \sqrt{x}}$

c)  $p(t) = \cos^{-1}(t^3)$

d)  $f(x) = \int_0^{1/x} \sqrt{t^2 + 1} dt$

e)  $f(y) = \int_0^y \left(\frac{1}{\sqrt{x}} - 1\right)^3 dx$

f)  $f(y) = \left[ \int_0^y \left(\frac{1}{\sqrt{x}} - 1\right) dx \right]^3$

g)  $f(\theta) = \tan^{-1}(5\theta^7)$

h)  $f(x) = \int_{\sin x}^2 \frac{1}{\sqrt{t^4 + 1}} dt$

4. Compute each of the following integrals.

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

d)  $\int_{1/2}^1 \frac{1}{\sqrt{1-x^2}} dx$

g)  $\int_{-2}^5 \frac{1}{x^2} dx$

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

e)  $\int \sqrt{3t+5} dt$

h)  $\int_0^1 \frac{1}{1+y^2} dy$

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

f)  $\int \sin 3\theta \cos 3\theta d\theta$

i)  $\int_0^{\pi/4} \sin 2\theta d\theta$

## Answers

1. see handout on trigonometric functions

2. see handout on differentiating trigonometric functions

3. a)  $\frac{2x^3 + x}{(x^4 + x^2 + 2)\sqrt{x^2 + x^4 + 1}}$     b)  $\frac{1}{2\sqrt{x + \sqrt{x}}}\left(1 + \frac{1}{2\sqrt{x}}\right)$     c)  $-\frac{3t^2}{\sqrt{1 - t^6}}$     d)  $-\frac{1}{x^2}\sqrt{\frac{1}{x^2} + 1}$

e)  $\left(\frac{1}{\sqrt{y}} - 1\right)^3$     f)  $3y\left(\frac{1}{\sqrt{y}} - 1\right)(2 - \sqrt{y})^2$     g)  $\frac{35\theta^6}{25\theta^{14} + 1}$     h)  $\frac{-\cos x}{\sqrt{\sin^4 x + 1}}$

4. a)  $4 - \frac{8}{3}\sqrt{2}$     b)  $\sin^{-1} y + C$     c)  $\tan x - x + C$     d)  $\frac{\pi}{3}$     e)  $\frac{2}{9}\sqrt{3t + 5}(3t + 5) + C$

f)  $-\frac{1}{12}\cos 6\theta + C$     g) undefined    h)  $\frac{\pi}{4}$     i)  $\frac{1}{2}$