NAME AND SECTION:_____

INSTRUCTOR'S NAME:_____

1. Compute the following definite integrals and for each one of them check by taking the derivative.

   (a)
   $$F(x) = \int \cos(10x)dx$$

   (b)
   $$F(x) = \int e^{\sin x} \cos(x)dx$$

(c)

$$F(x) = \int x^2 \sin(x^3) dx$$

(d)

$$F(x) = \int e^{e^x} e^x dx$$

(e)

$$F(x) = \int \frac{-2x}{\sqrt{1-x^2}} dx$$

2. Find (and check) the following indefinite integral:

$$F(x) = \int \cos^3(x)dx$$

Hint: Use the equality $\cos^2(x) = 1 - \sin^2(x)$ and apply the substitution $u = \sin(x)$.

3. Find (and check) the following indefinite integral:

$$F(x) = \int \cos^5(x)dx$$

4. Compute the following indefinite integral:

$$F(x) = \int \sqrt{1 - x^2} dx$$

(a) Apply the substitution $\sin(\theta) = x$ and using the fact that $\sin^2(\theta) + \cos^2(\theta) = 1$ simplify the previous equation

(b) Using the trigonometric equality

$$\cos^2(\theta) = \frac{1 + \cos(2\theta)}{2}$$

integrate the expression you found in the previous question

(c) Substitute back in your expression $\sin^{-1}(x) = \theta$ and write down the indefinite integral of the function you started with

Hint: Remember that $\cos(\theta) = \sqrt{1 - \sin^2(\theta)}$

(d) Check that what you have found in the last question is right by taking the derivative.

Are you now convinced that substitution rules are important?