

## MA212: Review Assignment

Any problems marked with \* require the use of maple. All other problems are to be done by hand. Any problems marked with # can be submitted for review by the grader.

1. Compute the following indefinite integrals by hand.

(a)  $\int -3xe^{3x^2} dx$

(b) #  $\int \frac{1}{u(\ln(u)+1)} du$

2. Compute the following definite integrals by hand.

(a)  $\int_0^\pi x \sin(x) dx$

(b)  $\int_1^a \frac{1}{t} dt$

(c) #  $\int_0^\infty se^{-s} ds$

3. # If  $\frac{dy}{dx} = 2\sqrt{x} + \ln(x)$  and  $y(1) = 4/3$ , find  $y(4)$  by using integration techniques.

4. Consider the following functions defined on  $x \in (-\pi/2, \pi/2)$ .

$$\sin(x) \qquad -\cos(x + \pi/2) \qquad \frac{\sin(2x)}{2 \cos(x)} \qquad \sin(x - \pi) \qquad \cos(x - \pi/2)$$

Four of these are equal. Which four? Prove your answer.

5. Define  $f(t) = \int_0^t e^{x^2} dx$ .

(a) \*Use Maple to compute  $f(t)$ . The answer probably won't mean much to you.

(b) \*Use Maple to plot  $f(t)$  on  $[-2, 3]$ .

(c) \*Use Maple to compute  $f(1)$  to three decimal places.

6. # If  $xy^2 + \sin(x + y) = 4$ , find an expression for  $\frac{dy}{dx}$ .

7. # Expand the following function in a partial fraction decomposition.

$$\frac{3x^2 - x + 1}{x(x^2 + 1)}$$

8. Compute the following quantities.

$$\begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}, \qquad \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} 5 \\ 6 \end{pmatrix}.$$