

Name:

## Math 116 Exam 2

February 23, 2023

### **Directions:**

1. WRITE YOUR NAME ON THIS TEST!
2. Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer.
3. Unless otherwise indicated, DO NOT convert irrational numbers such as  $\sqrt{3}$  or  $\pi$  into decimal approximations; just leave them as they are.
4. If you have a question, raise your hand or come up and ask me.

1) a) Is the following use of partial fractions correct? If not, how do you fix the set-up?

$$\frac{2}{(6-s)^2(s^2+8)} = \frac{A}{6-s} + \frac{B}{6-s} + \frac{C}{s^2+8}.$$

b) In order to evaluate  $\int_0^2 \sqrt{36-x^2} dx$ , substitute  $x =$  \_\_\_\_\_  
and  $dx =$  \_\_\_\_\_.

c) In order to integrate  $e^x \cos(x)$ , choose  $u =$  \_\_\_\_\_ and  $dv =$  \_\_\_\_\_.

2) Compute the partial fraction decomposition of  $\frac{s^2 + 1}{s(s^2 - 4)}$ .

3) Recall that the Laplace Transform of a function  $f$  is defined as

$$\mathcal{L}\{f\}(w) = \int_0^{\infty} f(t)e^{-wt} dt.$$

Compute  $\mathcal{L}\{f\}(7)$  if

$$f(t) = (t + 2)^2.$$

4) Find the value of the integral

$$\int_0^{\ln(\sqrt{3})} \frac{e^x}{\sqrt{e^{2x} + 1}} dx.$$