

## Math 3C, First Day Problems

1. A certain school has 100 students. The algebra class has 50 students and the biology class has 60 students. We are interested in the number of students taking both algebra and biology.

(a) What is the smallest that number could possibly be? [10.]

(b) What is the largest that number could possibly be? [50.]

(c) Given the additional information that exactly 10 students take neither algebra nor biology, what can we say now about the number? [20.]

2. A certain school has 100 students. The chemistry class has 10 students and the drawing class has 15 students. We are interested in the number of students taking neither chemistry nor drawing.

(a) What is the smallest that number could possibly be? [75.]

(b) What is the largest that number could possibly be? [85.]

(c) Given the additional information that nobody is allowed to take both chemistry and drawing, what can we say now about the number? [75.]

3. Review problem:

$$\int_0^{\infty} x e^{-\lambda x} dx = \frac{1}{\lambda^2} \quad (\lambda > 0)$$

This problem involves integration by parts (§7.2), improper integrals (§7.4), and L'Hôpital's rule (§5.5). We will need this integral for the expected value of the exponential distribution in §12.5.4.

4. Review problem:

$$\int_0^{\infty} x e^{-x^2/2} dx = 1$$

This problem involves substitution (§7.1), .... We will need this integral for the expected value of the normal distribution in §12.5.2.