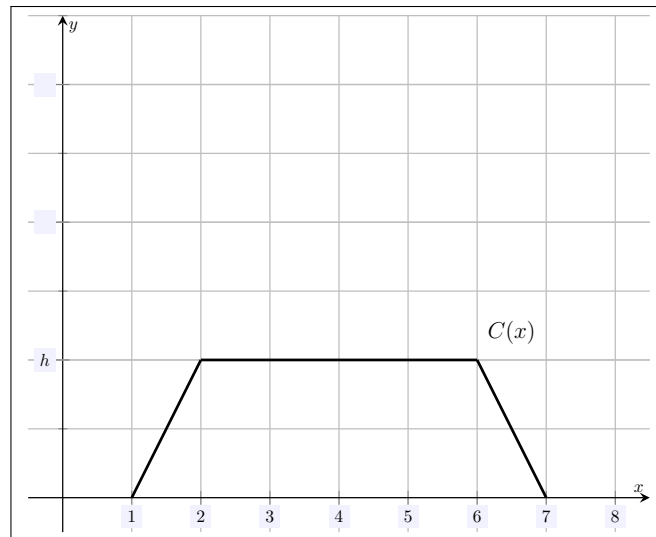


Name: _____
MATH 107
Winter 2022
HW 18: Due 01/19

*"Probability theory is nothing but
common sense reduced to calculation."
– Pierre-Simon Laplace*

Problem 1. (10pt) Consider the curve $C(x)$ given below.



- (a) Find the value of h that makes $C(x)$ a density curve.
- (b) Find $P(x \leq 3)$.

Problem 2. (10pt) Suppose Mork and Mindy are both underpaid workers. Mork's job has salaries that follow a distribution with mean \$52,000 and standard deviation \$6,000 but Mork himself makes \$41,000. Mindy's job has a salary distribution with mean \$88,000 and standard deviation \$3,000 and Mindy makes \$75,000. Assume both company's salaries are normally distributed. Compared to other workers at their company, who makes less? Explain.

Problem 3. (10pt) Suppose that a random variable, X , is drawn from a normal distribution with mean 22.7 and standard deviation 5.1. Compute the following:

- (a) $P(X = 22.7)$
- (b) $P(X \leq 18)$
- (c) $P(X > 30)$
- (d) $(18 \leq X \leq 30)$

Problem 4. (10pt) Suppose the exam scores for a college entrance exam were normally distributed with mean 74 and standard deviation 6.2. What is the minimal score a student needs to be in the top 10% of exam takers?

Problem 5. (10pt) Watch Stand-Up Math's "How to estimate a population using statisticians" on YouTube. Being as detailed as possible, comment on what you learned and how it relates to the course material.