

MATH 113: DISCRETE STRUCTURES
HOMEWORK DUE MONDAY WEEK 3

Problem 1. Your movie collection consists of five films directed by Werner Herzog, four films directed by Lana and Lilly Wachowski, and three films directed by Alejandro Jodorowsky. Give (good) examples of questions about your movie collection which have the following answers:

- (a) $12 = 5 + 4 + 3$,
- (b) $60 = 5 \cdot 4 \cdot 3$,
- (c) $360 = 5 \cdot 4 \cdot 3 \cdot 3!$.

Problem 2. In the number theory chapter, we will study divisibility properties of integers. We say that an integer d *divides* an integer n when there exists an integer k such that $n = dk$. (As long as $n \neq 0$, this is the same as the fraction n/d being an integer.) In this problem, you may assume common facts about integers, like the uniqueness of prime factorizations.

The number 169,400 has prime factorization

$$169,400 = 2^3 \cdot 5^2 \cdot 7 \cdot 11^2.$$

Use the multiplicative counting principle to count the number of positive integers that divide 169,400.