

## PORTFOLIO PROOFS B

**Instructions.** Choose one of the following statements and prove it. Use  $\text{\LaTeX}$  to write your proof nicely. Drop your proof (both pdf and tex) in your OneDrive folder by the end of the day Wednesday, October 27.

1. Let  $n \in \mathbb{N}$ . If  $n \geq 2$ , then  $\sqrt[n]{2}$  is irrational.
2. If  $a \in \mathbb{Z}$ , then  $4 \nmid (a^2 - 3)$ .
3. For any natural numbers  $a$  and  $b$ ,  $a = \text{lcm}(a, b)$  if and only if  $b \mid a$ .
4. Let  $C$  be a circle in  $\mathbb{R}^2$  centered at  $(1, 1)$ . Then either  $(2, 3) \notin C$  or  $(0, 2) \notin C$ . (Note that  $C$  is just the circle itself, not the interior).