Exercise 13. Let $x, y \in \mathbb{Z}$. Prove that if xy is odd then x and y are both odd.

Exercise 14. Prove that all prime numbers greater than 2 are odd.

Exercise 15. Show that $\log_2(3)$ is irrational.

Notation: For $a, b \in \mathbb{Z}$ if a divides b we write $a|b$.

Definition: An natural number $p \geq 2$ is called *prime* if the only natural numbers that divide p are 1 and p.

Theorem: Let $a, b \in \mathbb{Z}$ and $p \in \mathbb{N}$. If p is prime and $p|ab$ then $p|a$ or $p|b$.

Recall: $\log_a(x) = y$ if and only if $a^y = x$.