

Outline notes for PS06
Math 126

Definitions. (Ch. 14) Mersenne prime. (Ch. 15) Perfect number, $\sigma(n)$ (sum of all divisors of n).

Problem outlines.

2. (14.1) Suggestion: Use contrapositive (can also be phrased as contradiction).
Assume: $a \geq 2$, $n \geq 1$, n is not a power of 2. (What does this tell you about n ?)
Conclude: $a^n + 1$ is composite.

4. Draw pictures for specific examples, generalize. For example, the divisor lattice for 5 has two vertices/dots, one labelled 1, which you draw lower, and one labelled 5, which you draw higher. These two dots are connected by a line, since $5 = 1(5)$, and 5 is prime.

5.

(c) *Assume:* $\gcd(m, n) = 1$, a divides mn .

Conclusion 1: There exist numbers c and d such that c divides m , d divides n , and $a = cd$.

Conclusion 2: These numbers c and d are unique. In other words, if c_1 and c_2 divide m , d_1 and d_2 divide n , and $a = c_1d_1 = c_2d_2$, then $c_1 = c_2$ and $d_1 = d_2$.