

1. Prove the Divisor Theorem part (6):

Let b and d be integers with $d > 0$. If $b = dt$ for some integer t and $1 < d < b$, then $1 < t < b$.

2. Prove the Divisor Theorem part (7):

Let d be a positive integer. If $d = ds$ for some integer s , then $s = 1$.

3. Let a be an integer. If 2 does not divide a , either prove or disprove that 4 divides $a^2 - 1$.

4. Let $a, b,$ and c be integers. If a divides b and a divides c , prove that a divides $(br + ct)$ for any integer r and t .

5. Consider the set $A = \{36u + 42v \mid u, v \in \mathbb{Z}\}$.

a. How many elements are in the set A ? Support your claim.

b. List at least four distinct elements from the set A .

c. Does set A have a smallest element? Why or why not.

d. Is there a smallest positive element? If so, state it. State why (or why not) we know there exists a smallest element.

e. What is $\gcd(36,42)$? In what way (if any) does this greatest common divisor relate to A ?