A Book of Abstract Algebra | (2nd Edition)

Chapter AB, Problem 3E

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Problem

Prove that the following are true for any integers a, b, and c:

1|*a* and (–1)|*a*.

Step-by-step solution

Step 1 of 3

Objective:-

The objective is to prove $1 \mid a \ \ and \ \ (-1) \mid a.$

Comment

Step 2 of 3

Proof:-

The number 1 is factor of each number because on multiply by the number remains same.

Hence, 1 divides each number *a.*

$a = 1 \cdot a \qquad \qquad .....(1)$

Thus, mathematically $1 \mid a.$

Proved

Comment

Step 3 of 3

The number 1 is factor of each number because on multiply by the number remains same.

Hence, 1 divides each number *a*.

$$a = 1 \cdot a$$
$$a = (-1)(-1) \cdot a \qquad \{\text{since } (-1)(-1) = 1\}$$
$$a = (-1)(-a)$$
$$a = (-1)b \qquad \{Let\ (-a) = b\}$$

Thus, mathematically $(-1) \mid a.$

Proved

Proved

Comment