A Book of Abstract Algebra | (2nd Edition)

Chapter AB, Problem 5E

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Problem

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

If $a|b$, then $ac|bc$.

Step-by-step solution

Step 1 of 2

Objective:-

The objective is to prove $if\ a \mid b,\ then\ ac \mid bc.$

Comment

Step 2 of 2

Proof:-

Let suppose $a \mid b.$

Then there exist number *k* such that:-

$$b = ka \qquad \ldots\ldots(1)$$

Let us multiply both sides by *c.*

$$bc = kac$$
$$bc = k(ac)$$

Thus, *a* is a factor of $k(ac)$ that is a factor of bc. Hence, *a* divides bc, mathematically $ac \mid bc.$

Proved

Comment