

# 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  $a|b$ , then  $ac|bc$ .*

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## Step 2 of 2

Proof:-

Let suppose  $a|b$ .

Then there exist number  $k$  such that:-

$$b = ka \quad \text{.....(1)}$$

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  $ac|bc$ .

Proved

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