

Quiz 7

Name: Key*You must show your work to get full credit.*

1. State precisely the definition of " m divides n ". This includes stating what type of numbers m and n are (natural numbers, integers, rational number etc.) and if there are any restrictions on m and/or n .

m divides n provided m and n are integers,
 $m \neq 0$ and $n = qm$ for some integer q .

2. If $2 \mid a$ and $3 \mid b$, prove $12 \mid a^2b$.

Assume $2 \mid a$ and $3 \mid b$. Then there are $q_1, q_2 \in \mathbb{Z}$
 such that
 $a = 2q_1, b = 3q_2$.

Thus

$$\begin{aligned} a^2b &= (2q_1)^2 (3q_2) \\ &= 4q_1^2 (3q_2) \\ &= 12q_1^2 q_2 \\ &= 12q \end{aligned}$$

where $q = q_1^2 q_2$ is an integer.
 Thus $12 \mid a^2b$. done.