Math 11200/20 worksheet
Friday, October 7, 2016

Problem 1

Definition: Let $a, b \in \mathbb{Z}$. We write $a \mid b$ (and say "a divides b") if there exists a $k \in \mathbb{Z}$ such that $a \cdot k = b$.

Which of the following are true? (Use the definition above!)

(a) $4 \mid 12$

(b) $4 \mid 13$

(c) $4 \mid (-12)$

(d) $(-4) \mid 12$

(e) $(-4) \mid (-12)$

(f) $1234 \mid 1$

(g) $1 \mid 1234$

(h) $1 \mid 0$

(i) $0 \mid 1$

(j) $0 \mid 0$

Problem 2

What are all the divisors of 24? What are all the divisors of 37? What are all the divisors of 0?

Problem 3

Let $a, b, c \in \mathbb{Z}$. Which of the following are true?

(a) If $a \mid b$, then $a \mid bc$.

(b) If $a \mid bc$, then $a \mid b$.

(c) If $a \mid b$ and $a \mid c$, then $a \mid (b + c)$.

(d) If $a \mid b$ and $a \mid (b + c)$, then $a \mid c$.

(e) If $a \mid b$ and $b \mid c$, then $a \mid c$.

(f) If $a \mid b$ and $a \mid c$, then $b \mid c$.

(g) If $a^2 \mid b^2$, then $a \mid b$.

(h) If $a \mid b$, then $a^2 \mid b^2$.