

- (1) Page 54, number 10
 (2) Recall that we defined in class operations of multiplication and addition on the set $\{0, 1\}$:

$$\begin{array}{c|cc} + & 0 & 1 \\ \hline 0 & 0 & 1 \\ 1 & 1 & 0 \end{array}$$

and

$$\begin{array}{c|cc} \cdot & 0 & 1 \\ \hline 0 & 0 & 0 \\ 1 & 0 & 1 \end{array}$$

- (a) Verify the distributive law. (Since a, b, c can each take 2 possible values, there are 8 cases in all). (You should also check that the other field axioms hold – but do not hand that in).
 (b) Is there an order on this field satisfying axioms 8-11? Justify your answer.
 (3) We define $|a| = a$ if $a > 0$ and $-a$ if $a < 0$. Prove that $|a + b| \leq |a| + |b|$ for all a and b . [Hint: You might want to consider 4 cases depending on whether each of a and b is negative or nonnegative. Also we write $a \leq b$ for “ $a < b$ or $a = b$ ”.]