Math 3040 HW 3 - Due Sept. 30, 2019. IN TEX

1. Prove Proposition 8.41 from TAP
2. Let $(R, +, \cdot)$ be an ordered field. For which nonzero elements x and y in R is
$$\frac{1}{x+y} < \frac{1}{x} + \frac{1}{y}?$$
Be sure to prove your answer!
3. Suppose $(Z, +, \cdot)$ is an ordered integral domain. Let a and b and c be elements of Z such that $c^2 + a \cdot c + b = 0$.
   (a) Prove that if $4b = a^2$, then $x^2 + a \cdot x + b \geq 0$ for all $x \in Z$.
   (b) Prove that if $4b \neq a^2$, then there is exactly one element d in Z such that $d^2 + a \cdot d + b = 0$ and $d \neq c$.
   (c) For which $x \in Z$ is $x^2 + a \cdot x + b > 0$? As usual, provide a proof.