In Griffiths 9.3.2, he obtains this result: $$\tilde{E}_{0_R} = \left(\frac{1-\beta}{1+\beta}\right)\tilde{E}_{0_I},$$ *(equation 9.82) with $\beta = v_1/v_2 = n_2/n_1$ Notations and coordinates are defined at the begining of section 9.3.2.*

In the case when $n_1 < n_2$, if $\tilde{E}_{0I}$ (the "complex incident amplitude") is real and positive, and the incident E field is defined as Griffiths does in section 9.3.2: *1) In which physical direction does the incoming E field vector at z=0, and t=0 point?*
+x? -x? +z? -z? Or, none of these. (Briefly, explain)

In which physical direction does the reflected E field vector at z=0, and t=0 point?
+x? -x? +z? -z? Or, none of these. (Briefly, explain)

Let's keep practicing with Griffiths' "complex notation" for travelling EM waves. Take a look at Griffiths' Eq 9.49 (right after Example 9.2 in section 9.2.2) and make the following assumptions - let nhat = +y-hat (NOTE! That's different from what Griffiths assumed in Example 9.2)
- let the k vector be (0,0,k) (i.e. k points in the +z direction)
- let E0(tilde) be the complex number A*exp[i pi/2], with A some real positive constant. (NOTE! That's also different from Griffiths' example, this E0 is now intrinsically complex with a phase of pi/2)

Using the above assumptions, please answer the following three questions. (There is space below them to explain any reasoning, especially important if you feel the answer is ambiguous or "other"!)

In what direction does the physical E field point? (Don't worry about sign - it's oscillating, right?)
x, y, z, it's ambiguous, or Not ambiguous - it's something different!

Which way does the physical B field vector point? (Again, it oscillates)
x y z , it's ambiguous , Not ambiguous - it's something else!

Is B "in phase" with E?
Yes, exactly
No, out of phase by Pi/2
No, out of phase by Pi
it's ambiguous
Not ambiguous - it's something else!

Optional: Use the space below if you want to elaborate on your answers above.

Griffiths Section 9.3 is, at its heart, about "light traveling from air into glass" (or something similar), it's the section where we deduce key properties of light and optics (like Snell's law...) The math is all about applying Equations 9.74 (very end of 9.3.1) to some geometry you choose. Briefly, where do Equations 9.74 *come from*? And, what key assumptions/approximations are we making?