

Step by step method for solution to Week 1 - Ex 6b):

- 1) Take the partial derivative of pressure with respect to  $x$  and  $t$ .
- 2) Make use Eq. 3.15 for 1-D sound field (in the book) which a derivative of pressure with respect to  $x$ . We can equate the results obtained from step 1) for partial derivative of pressure with respect to  $x$  to the one obtained in this step.
- 3) Rearranging, we get an equation for partial derivative of velocity with respect to time. We keep this aside and will make use of it later (label it as equation (a) or something)
- 4) The question states that it is assumed that  $v_x(x,t)$  has same time dependence as  $p(x,t)$ . We make use of this claim, and write equation where partial derivative of velocity with respect to time is equal to partial derivative of pressure with respect to time (obtained in step 1).
- 5) We get an equation for partial derivative of velocity with respect to time. Label it as equation (b) or something.
- 6) Eq. (a) and eq. (b) can be equated. Then finally solve for  $v_x$ .