Waves Worksheet #4

① At the fundamental frequency, $L = 0.5\lambda$

Thus $\lambda = 2L$.

The fundamental frequency, f_1, is given by:

$$f_1 = \frac{v}{\lambda} = \frac{v}{2L_1}$$

If we double the Length ($L_2 = 2L_1$), we get a new fundamental frequency, given by:

$$f_2 = \frac{v}{\lambda} = \frac{v}{2L_2} = \frac{v}{2(2L_1)} = \frac{1}{2} \cdot \frac{v}{2L_1}$$

$\therefore f_2 = \frac{1}{2} f_1$

The new fundamental is **half** the original.

② a) $\lambda = 2L$

$= 2(1.10)$

$\lambda = \boxed{2.20\ m}$

b) $f_0 = 131\ Hz$

$f_1 = 2(131) = \boxed{262\ Hz}$

$f_2 = 3(131) = \boxed{393\ Hz}$

③ $\lambda = 2L$

$= 2(2.5)$

$\lambda = 5\,m$

$f = \frac{v}{\lambda}$

$= \frac{85}{5}$

$f = \boxed{17\ Hz}$