8. The portion of the string that is vibrating is half the original length, so after the string is touched the wavelength of the string now will be one half the original wavelength. The tension in the string was not changed, so the velocity of the wave in the string is unchanged. The fundamental relationship between velocity, frequency, and wavelength is $v = f\lambda$, so if the wavelength is cut in half and the velocity is unchanged the frequency must be doubled. Therefore the new frequency of the shorter string is 800 Hz.