

### ± Harmonics of a Piano Wire

A piano tuner stretches a steel piano wire with a tension of 765 N. The steel wire has a length of 0.700m and a mass of 5.25g .

#### Part A

What is the frequency  $f_1$  of the string's fundamental mode of vibration?

Express your answer numerically in hertz using three significant figures.

$f_1 =$   Hz

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On utilise  $v = \sqrt{\frac{F}{\mu}} = \sqrt{\frac{FL}{m}}$  et on obtient  $f_1 = \frac{v}{2L} = \frac{1}{2} \sqrt{\frac{F}{Lm}} = 228 \text{ Hz}$

#### Part B

What is the number  $n$  of the highest harmonic that could be heard by a person who is capable of hearing frequencies up to  $f = 16 \text{ kHz}$ ?

Express your answer exactly.

$n =$

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$n = 16000/228 = 70$