This print-out should have 7 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Serway CP 13 43

001 10.0 points

A phone cord is 2.71 m long. The cord has a mass of 0.264 kg. A transverse wave pulse is produced by plucking one end of the taut cord. The pulse makes four trips down and back along the cord in 0.918 s.

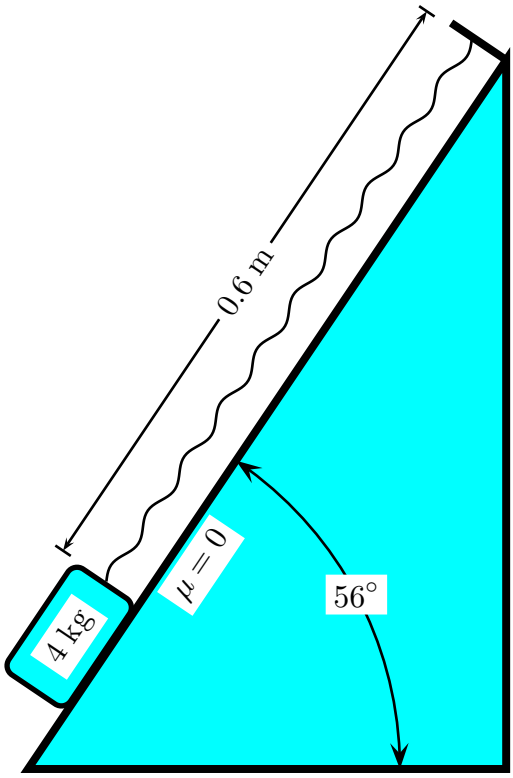
What is the tension in the cord?

Correct answer: 54.3335 N.

Wave Time on a String

002 10.0 points

A 4 kg block supported by a string rests on a frictionless incline. The length of the string is 0.6 m and its mass of 2.5 g $\ll$ 4 kg.



Determine the time it takes a transverse wave to travel from one end of the string to the other. The acceleration of gravity is 9.8 m/s^2 .

Correct answer: 0.00679384 ms.

Power of a Wave 04

003 10.0 points

A sinusoidal wave on a string is described by the equation

$$y = A \sin(k\,x - \omega\,t)\,,$$

where $A = 0.18$ m, $k = 0.73$ m^{-1}, and $\omega = 57$ rad/s.

If the mass per unit length of this string is 12 g/m, what is the power transmitted by the wave?

Correct answer: 49.3172 W.

Fundamental Frequency Change

004 10.0 points

An elastic string of mass 8.8 g is stretched to length 2.6 m by the tension force 34 N . The string is fixed at both ends and has fundamental frequency f_1 . When the tension force increases to 2890 N the string stretches to length 12.74 m and its fundamental frequency becomes f_2.

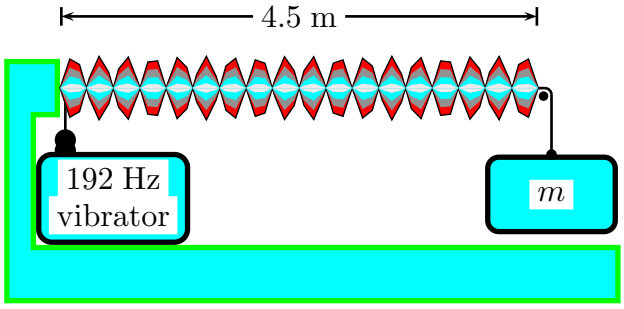
Calculate the ratio $\dfrac{f_2}{f_1}$.

Correct answer: 4.16497.

Serway CP 14 40

005 (part 1 of 3) 10.0 points

In the arrangement shown in the figure below, an object of mass 6.8 kg hangs from a cord around a light pulley. The length of the cord between point P and the pulley is 4.5 m. When the vibrator is set to frequency of 192 Hz, a standing wave with eighteen loops is formed.



What must be the linear mass density of the cord? The acceleration of gravity is 9.8 m/s^2 .

Correct answer: 0.0072309 kg/m.

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006 (part 2 of 3) 10.0 points
How many complete loops (if any) will result if the mass is changed to 61.2 kg? (Answer with −100 if no standing wave forms.)

Correct answer: 6.

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007 (part 3 of 3) 10.0 points
How many complete loops (if any) will result if the mass is changed to 102 kg? (Answer with −100 if no standing wave forms.)

Correct answer: −100.