Name _____

Standing waves worksheet

Remember a complete wave is two loops!

1. A piece of string 4 meters long is vibrated so that it holds a two loop standing wave. What is the wavelength of this wave?

1 loop = 2 m (4÷2)

λ = 2 loops = 2(2) = 4m

2. A string is vibrated with a wave that has a wavelength of 6 meters. How long is one loop of the standing wave?

1 loop = ½ λ = ½ (6) = 3 m

3. A string is 12 meters long. If the standing wave set up on this string is three loops, what is the wavelength?

3 loops = 12 m

1 loop = 12/3 = 4m

1λ = 2 loops = 2(4) = 8m

4. The speed that a wave can travel down a slinky is 3 m/s. If a 2 meter long slinky creates a four loop standing wave, what is the frequency of vibration?

4 loops = 2 meters

2 loops = 1 meter = λ

$v = \lambda \cdot f$

$3 = 1 \cdot f$

$f = 3$ Hz

5. Mr. S. is rock climbing and can't help but make waves on the rope. (Physics over safety any day). If he were to (unwisely) make a standing wave on the rope that had four loops and vibrated at a frequency of 3 Hz, how fast do those waves travel down the rope? (Assume the rope is 10 meters long.)

4 loops = 10m

2 loops = λ = 5m

$v = \lambda \cdot f = 5(3) = 15$ m/s