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A wave is described by

$$y(x, t) = (2.00 \text{ mm}) \sin \left[(20. \text{ m}^{-1})x - (600.5^{-1})t \right]$$

If the wave is carried by a string with tension 15 N

(1) What is the speed of the wave?

(2) Find the linear density of the string in $\frac{\text{g}}{\text{m}}$.

(1)

$$k = 20. \text{ m}^{-1}$$

$$\omega = 600.5^{-1}$$

$$v = \frac{\omega}{k} = \frac{600.5^{-1}}{20. \text{ m}^{-1}} = \boxed{30. \text{ m/s}}$$

(2)

$$v = \sqrt{\frac{F}{\mu}}$$

$$\mu = \frac{F}{v^2} = \frac{15 \text{ N}}{(30. \text{ m/s})^2} = 0.016667 \frac{\text{kg}}{\text{m}}$$

$$0.017 \frac{\text{kg}}{\text{m}} = \boxed{17 \frac{\text{g}}{\text{m}}}$$