Answer on Question#38255 - Physics - Other

$$y = 0.1 \sin \pi(0.1x - 2t)$$

First let's choose a fixed $x = x_0$ and find the period T for t of the wave. Since the sine function has a period of 2π so:

$$\pi(0.1x_0 - 2t) - \pi(0.1x_0 - 2t_0) = 2\pi$$

$$2\pi T = 2\pi$$

$$T = 1 \; second$$

So the period is 1 second; 30 seconds needed to make 30 vibrations.

Now let's discuss how the peek ($y_{max} = 0.1$) moves along the x-axis.

When $t = 0$ the peek is at $x = 5$ because $y_{max} = 0.1 = y(5,0) = 0.1 \sin \pi(0.1 \cdot 5)$.

When $t = 30$ we have:

$$\pi(0.1x - 2 \cdot 30) = \frac{\pi}{2}$$

$$0.1x - 60 = 0.5$$

$$x - 600 = 5$$

$$x = 605$$

So at $t = 30$ the peek is at $x = 605$ and we get that the wave covers $605 - 5 = 600$ meters.

ANSWER: **A**