

## Answer on Question #37378

### Physics - Mechanics | Kinematics | Dynamics

#### Question:

Consider the three waves represented by  $y_1=3\sin(kx-wt)$ ,  $y_2=3\sin(kx-wt+2\pi/3)$ ,  $y_3=3\sin(kx-wt+4\pi/3)$

then the amplitude of resultant of waves at  $x=0$

#### Solution:

At  $x = 0$  one has

$$\begin{aligned}y(t) &= 3 \left( \sin(-x) + \sin\left(\frac{2\pi}{3} - x\right) + \sin\left(\frac{4\pi}{3} - x\right) \right) \\&= -3 \left( \sin x + \sin x \cos \frac{2\pi}{3} - \cos x \sin \frac{2\pi}{3} + \sin x \cos \frac{4\pi}{3} - \cos x \sin \frac{4\pi}{3} \right) \\&= -3 \left( \sin x - \frac{1}{2} \sin x - \frac{\sqrt{3}}{2} \cos x - \frac{1}{2} \sin x + \frac{\sqrt{3}}{2} \cos x \right) \\&= -3(\sin x - \sin x) = 0.\end{aligned}$$

#### Answer:

0.