

56. We orient one phasor along the x axis with length 4.0 mm and angle 0 and the other at $0.8\pi \text{ rad} = 144^\circ$ (in the second quadrant) with length 7.0 mm. Adding the components, we obtain

$$\begin{aligned} 4.0 + 7.0 \cos(144^\circ) &= -1.66 \text{ mm} && \text{along } x \text{ axis} \\ 7.0 \sin(144^\circ) &= 4.11 \text{ mm} && \text{along } y \text{ axis} . \end{aligned}$$

- (a) The amplitude of the resultant wave is consequently

$$\sqrt{(-1.66)^2 + 4.11^2} = 4.4 \text{ mm} .$$

- (b) And the phase constant (an angle, measured counterclockwise from the $+x$ axis) is

$$180^\circ + \tan^{-1} \left(\frac{4.11}{-1.66} \right) = 112^\circ .$$