

24. In adding these with the phasor method (as opposed to, say, trig identities), we may set $t = 0$ (see Sample Problem 36-3) and add them as vectors:

$$\begin{aligned}y_h &= 10 \cos 0^\circ + 8.0 \cos 30^\circ = 16.9 \\y_v &= 10 \sin 0^\circ + 8.0 \sin 30^\circ = 4.0\end{aligned}$$

so that

$$\begin{aligned}y_R &= \sqrt{y_h^2 + y_v^2} = 17.4 \\ \beta &= \tan^{-1} \left(\frac{y_v}{y_h} \right) = 13.3^\circ .\end{aligned}$$

Thus, $y = y_1 + y_2 = y_R \sin(\omega t + \beta) = 17.4 \sin(\omega t + 13.3^\circ)$.