34. (a) We can use phasor techniques or use trig identities. Here we show the latter approach. Since $\sin a + \sin(a+b) = 2\cos(b/2)\sin(a + b/2)$, we find

$$E_1 + E_2 = 2E_o \cos(\tfrac{\phi}{2}) \sin(\omega t + \tfrac{\phi}{2})$$

where E_o = 2.00 μV/m, ω = 1.26 × 10^{15} rad/s, and ϕ = 39.6 rad. This shows that the electric field amplitude of the resultant wave is

$$E = 2E_o \cos(\phi/2) = 2.33 \ \mu\text{V/m} .$$

(b) Eq. 35-22 leads to

$$I = 4I_o(\cos(\phi/2))^2 = 1.35 \ I_o$$

at point P, and

$$I_{cen} = 4I_o(\cos(0))^2 = 4 \ I_o$$

at the center . Thus, $\frac{I}{I_{cen}} = \frac{1.35}{4} = 0.338$.

(c) The phase difference ϕ (in wavelengths) is gotten from ϕ in radians by dividing by 2π. Thus, $\phi = 39.6/2\pi = 6.3$ wavelengths. Thus, point P is between the sixth side maximum (at which ϕ = 6 wavelengths) and the seventh minimum (at which $\phi = 6\frac{1}{2}$ wavelengths).

(d) The rate is given by ω = 1.26 × 10^{15} rad/s.

(e) The angle between the phasors is ϕ = 39.6 rad = 2270° (which would look like about 110° when drawn in the usual way).