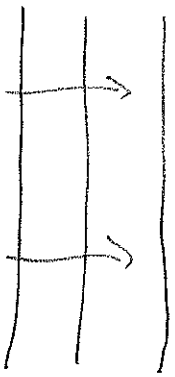
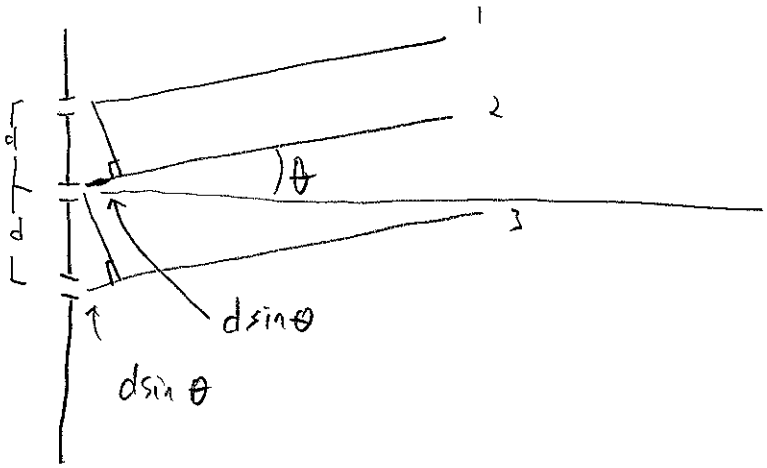
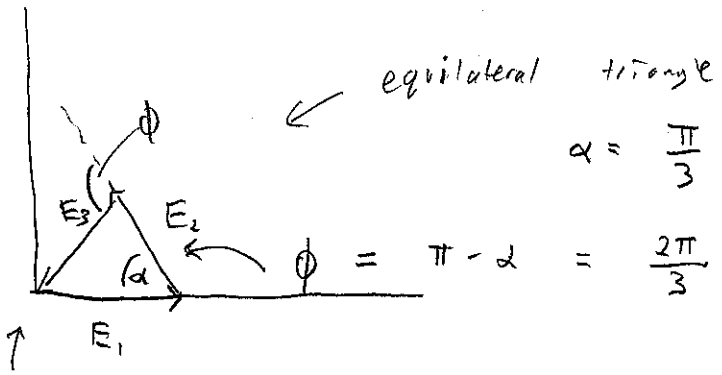
Physics 267 Problem 5 Solution



plane wave



phasor approach



resulting vector has zero magnitude - this is a dark fringe

$$\frac{2\pi}{\lambda} d\sin\theta = \frac{2\pi}{3}$$

$$\boxed{\sin\theta = \pm\frac{\lambda}{3d}}$$

± because θ can be positive or negative

for two slit interference

$$\sin\theta = \left(m + \frac{1}{2}\right)\frac{\lambda}{d} \qquad m = 0, \pm 1, \ldots$$

take $m = 0, -1$ for smallest angle

$$\sin\theta = \pm\frac{\lambda}{2d}$$