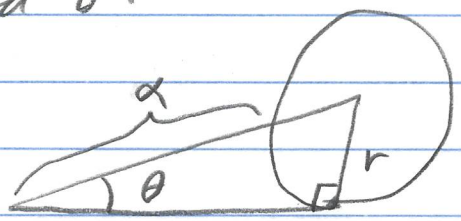
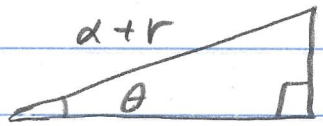
1.3 #65 Write the radius r of the circle in terms of α and θ:



Solution

Well have the right triangle



$$\text{So } \sin\theta = \frac{r}{\alpha + r} \quad \text{or} \quad (\alpha + r)\sin\theta = r$$

$$\text{or} \quad \alpha \sin\theta + r\sin\theta = r$$

$$\text{or} \quad \alpha \sin\theta = r - r\sin\theta = r(1 - \sin\theta)$$

$$\text{or} \quad \boxed{r = \frac{\alpha \sin\theta}{1 - \sin\theta}} \quad \square$$