



Solution to Problem 69

THE NAUTICAL MILE IS AN ARC LENGTH.

ARC LENGTH IS DETERMINED BY $S = R \theta$, WHERE θ IS IN RADIANS.

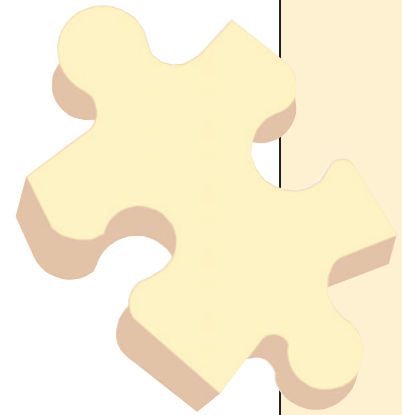
$$S / \theta = R$$

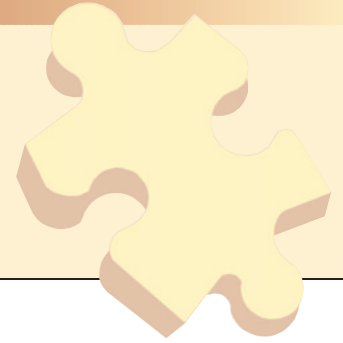
$$R = \frac{1852 \text{ METERS / PER NAUTICAL MILE}}{(1/60)^\circ / \text{NAUTICAL MILE} \times 2 \pi \text{ RADIANS} / 360^\circ}$$

$$R = \frac{1852}{\frac{1}{60} \times \frac{2 \pi}{360}} = \frac{1852}{\frac{2 \pi}{21600}} = \frac{1852 \times 21600}{2 \pi}$$

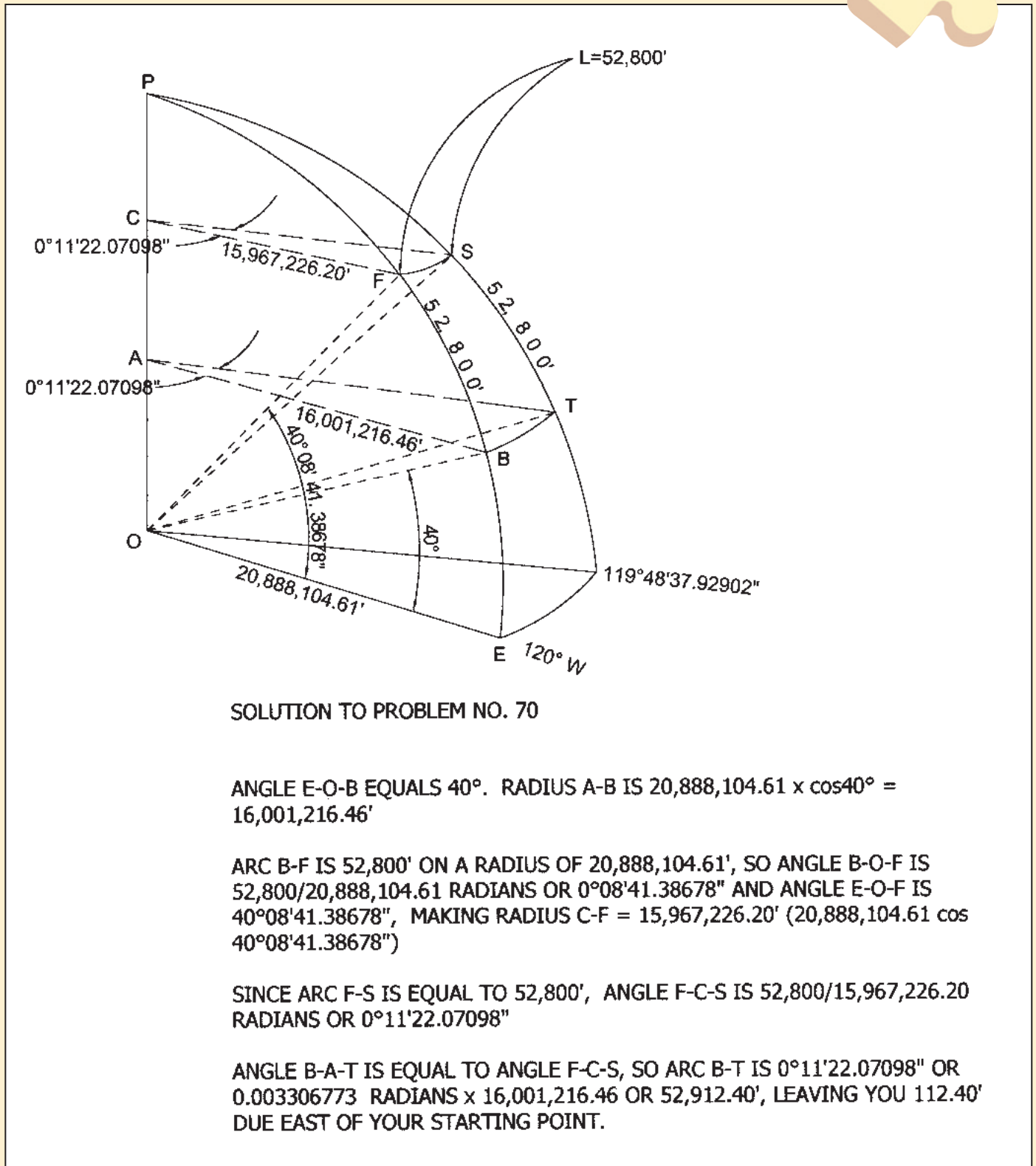
$$R = 6,366,707.019 \text{ METERS}$$

$$R = 6,366,707.02 \text{ METERS} \times 3.28083333333 \text{ FEET/METER} = 20,888,104.61 \text{ FEET}$$





Solution to Problem 70



SOLUTION TO PROBLEM NO. 70

ANGLE E-O-B EQUALS 40°. RADIUS A-B IS $20,888,104.61 \times \cos 40^\circ = 16,001,216.46'$

ARC B-F IS 52,800' ON A RADIUS OF 20,888,104.61', SO ANGLE B-O-F IS $52,800/20,888,104.61$ RADIANS OR $0^\circ 08' 41.38678''$ AND ANGLE E-O-F IS $40^\circ 08' 41.38678''$, MAKING RADIUS C-F = 15,967,226.20' ($20,888,104.61 \cos 40^\circ 08' 41.38678''$)

SINCE ARC F-S IS EQUAL TO 52,800', ANGLE F-C-S IS $52,800/15,967,226.20$ RADIANS OR $0^\circ 11' 22.07098''$

ANGLE B-A-T IS EQUAL TO ANGLE F-C-S, SO ARC B-T IS $0^\circ 11' 22.07098''$ OR 0.003306773 RADIANS $\times 16,001,216.46$ OR 52,912.40', LEAVING YOU 112.40' DUE EAST OF YOUR STARTING POINT.