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ALTERNATIVE SOLUTION

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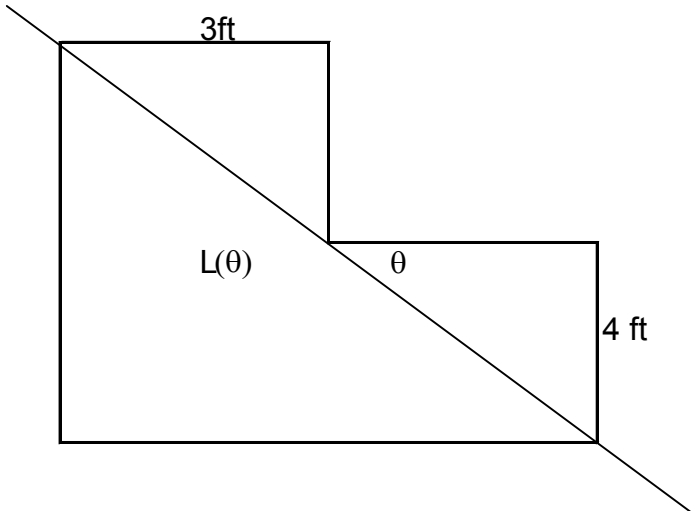
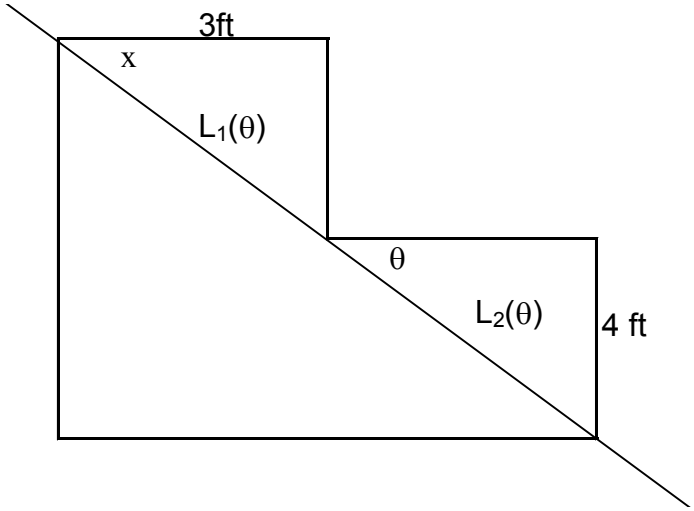
Text: Precalculus, sixth edition
Section: 5.6– Phase Shift; Sinusoidal Curve Fitting
Pg.: 369
Question: 5.6#35a

Show that the length L of the ladder as a function of the angle θ is

$L(\theta) = 3\sec\theta + 4\csc\theta$



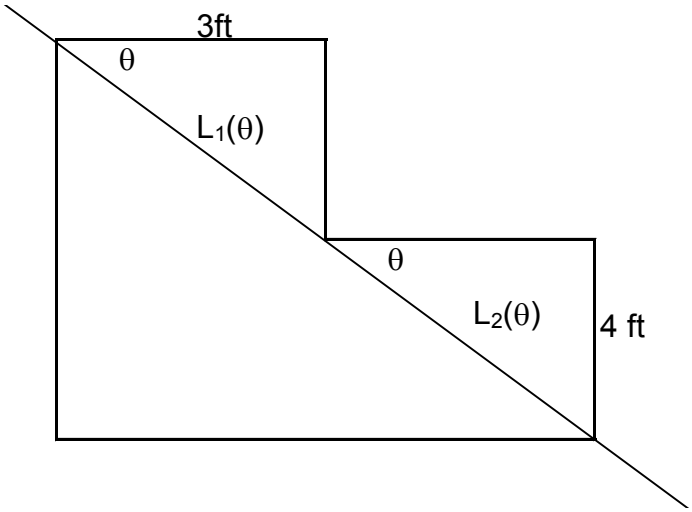
First, split $L(\theta)$ into $L_1(\theta)$ and $L_2(\theta)$



$\sin\theta = 4\text{ft}/ L_2(\theta)$

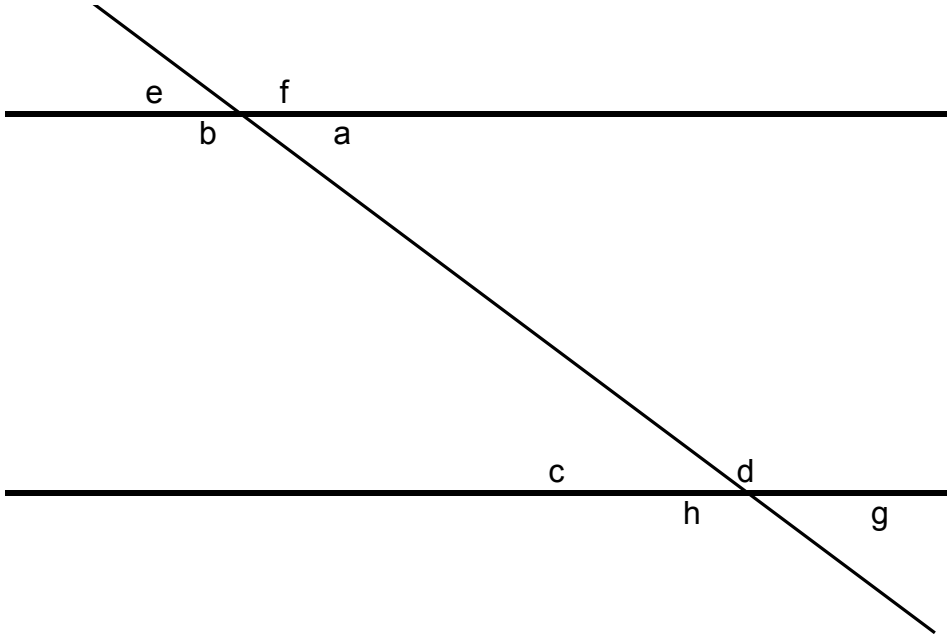
Therefore, $L_2(\theta) = 4\text{ft}/ \sin\theta$

Then, you can automatically say that $x = \theta$



This is because if two parallel lines are cut by a transversal, the corresponding angles are equal, alternate interior angles are equal, and alternate exterior angles are equal. [1]

[1] Michael Serra, *Discovering Geometry: An Inductive Approach,* copyright 1997 Michael Serra, pg. 179



a = e = c = g and f = b = d = h

Now you can determine that

Cos θ = 3ft / $L_1(\theta)$

Therefore, $L_1(\theta)$ = 3ft/Cos θ

$L(\theta) = L_1(\theta) + L_2(\theta)$ = (3ft/Cos θ) + (4ft/ Sinθ) = 3sec θ + 4csc θ