Your company has been asked to estimate the cost of cladding two existing buildings. Before this can be estimated, the height of both buildings must be calculated.

- The two buildings are 300 feet apart.
- The Shorter Building is 120’ wide by 180’ long.
- The Taller Building is 120’ wide by 210’ long.
- From the top of the Shorter Building, the angle of elevation of the top of the Taller Building is 23°, and the angle of depression of the base of the Taller Building is 36°.

Questions:
How tall is each building? How much total cladding material is need for the project? Do not worry about window or door openings or the area of the roof?

All Things Estimating: Solution - Revised

Solution: A drawing or sketch will be helpful.

Let’s solve for the heights of the buildings first. Remember Sin / Cos / Tan (Oh Hell, Another Hour, Of Algebra)

Sin Cos Tan
The shorter building: \[\text{Tangent} = \frac{\text{Side Opposite}}{\text{Adjacent Side}}\]

\[
\tan 36^\circ = \frac{X}{300}, \quad \text{multiply both sides by 300}
\]

\[
300 \cdot (\tan 36^\circ) = X
\]

\[
(300)(0.7265) = X \quad \text{solve of } X
\]

\[
217.96 = X \quad \text{(height of the shorter building)}
\]

The taller building: \[\text{Tangent} = \frac{\text{Side Opposite}}{\text{Adjacent Side}}\]

\[
\tan 23^\circ = \frac{y}{300} \quad \text{multiply both side by 300}
\]

\[
300 \cdot (\tan 23^\circ) = Y
\]

\[
(300)(0.4245) = Y \quad \text{solve for } Y
\]

\[
127.34' = \text{the } Y \text{ portion of the building.}
\]

\[
\text{Add the } X \text{ height of the shorter building plus the } Y \text{ height of the taller building to get the total height of the taller building.}
\]

\[
217.96 + 127.34' = 345.30
\]

Now that we have the heights of the two buildings, let’s work on determining the area of the cladding.

Shorter building perimeter x Height: \((120'+ 120' + 180' + 180') (217.96) = \text{Area of Cladding of Shorter Building}
\]

\[
(600')(217.96) = 130,776.00 \text{ SF}
\]

Taller building perimeter x Height : \((120' + 120' + 210' + 210') (540.25') = \text{Area of Cladding of Taller Building}
\]

\[
(660')(345.30) = 227,898.00 \text{ SF}
\]

Shorter Building Height: \(217.96'
\]

Taller Building Height: \(345.30'
\]

Total Cladding Needed: \(358,674 \text{ SF}\)