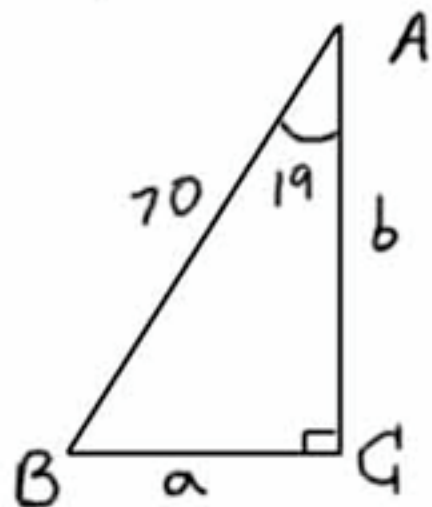Finding the measures of all sides and all angles in a triangle is called **solving the triangle**.

Ex 1) Solve the triangle below if $\angle A = 19°$ and side $c = 70$.

① $\cos 19° = \dfrac{b}{70}$

$b = 70 \cdot \cos 19°$

$b \approx 70 (0.9455)$

$b \doteq 66.185$

$b \doteq 66.2$

② $\sin 19° = \dfrac{a}{70}$

$a = 70 \cdot \sin 19°$

$a = 70 (0.3256)$

$a = 22.792$

$a \doteq 22.8$

III $\angle A + \angle B + \angle C = 180°$

$19° + \angle B + 90° = 180°$

$\angle B + 109° = 180°$

$\angle B = 71°$

An **angle of elevation** is found by the *line of sight* looking horizontally out to the horizon and then looking **up** at an object. An **angle of depression** is found by the *line of sight* looking horizontally out to the horizon and then looking **down** at an object.
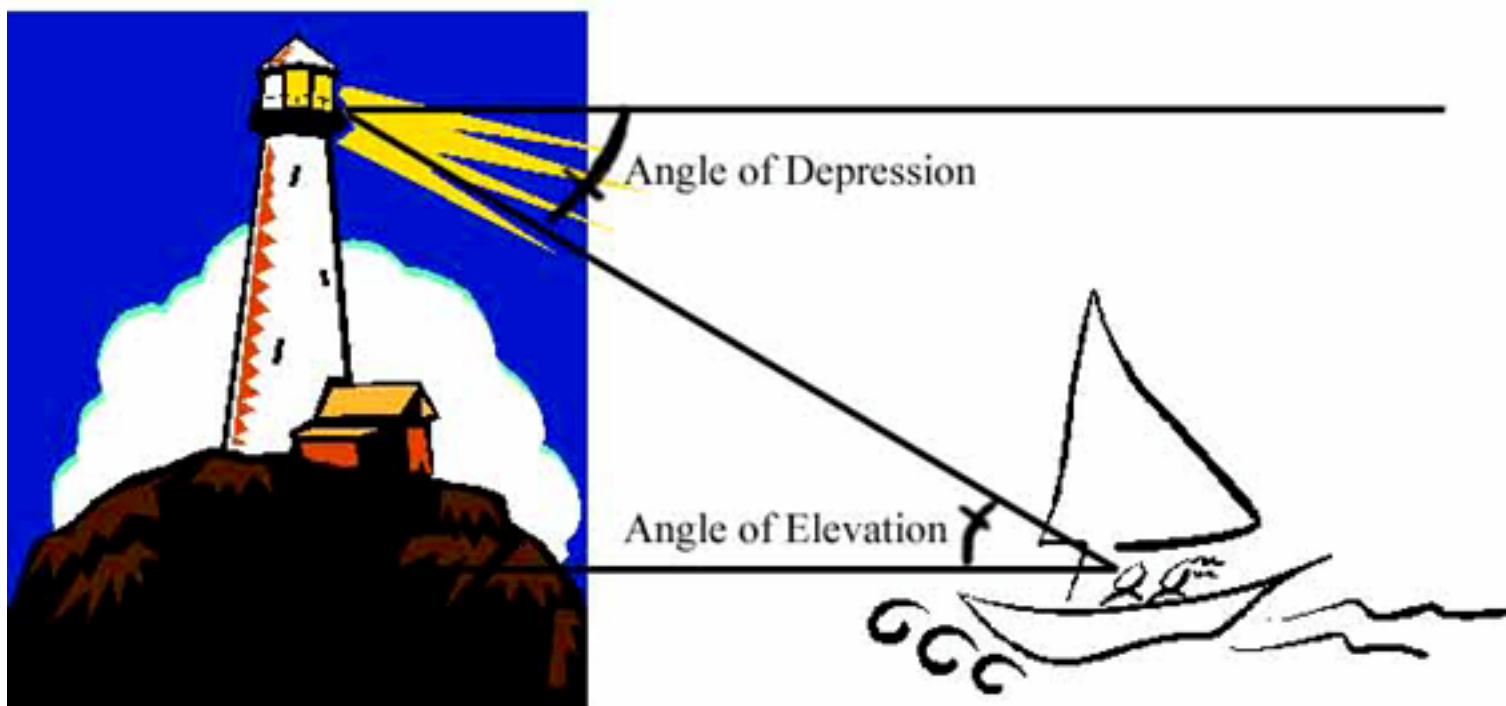
Geometry Reminder: When two parallel lines are cut by a transversal, the alternate interior angles (or "Z" angles as some people call them) are congruent.
In this case, the two horizon lines are parallel and the line of sight between the people in the boat and the person in the light house is the transversal. Therefore, this angle of depression is congruent to this angle of elevation.

Ex 2) An observer stands on ground level, 200 meters from the base of a tower. The angle of elevation to the top of the tower is 26.5°. How high is the tower above the observer's eye level?
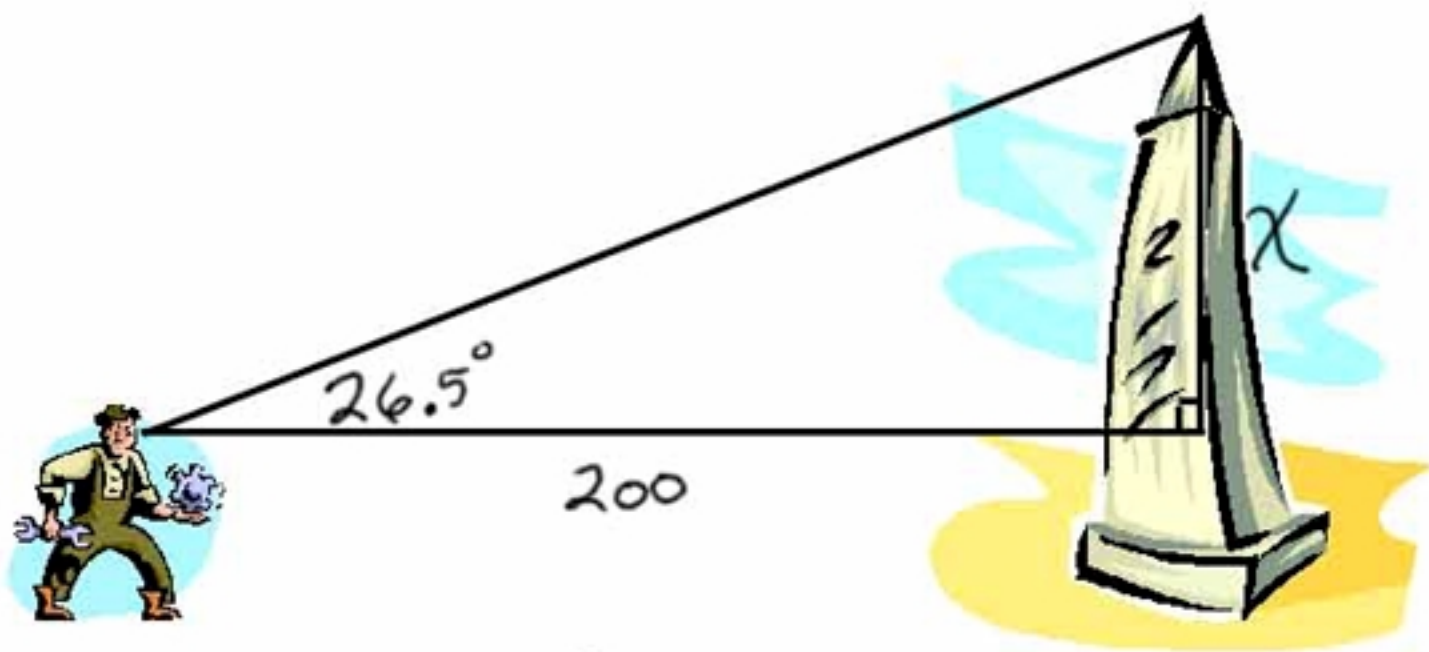
$$\tan 26.5° = \frac{x}{200}$$
$$x = 200 \left(\tan 26.5° \right)$$
$$x = 200 \left(0.4986 \right)$$
$$x = 99.72$$