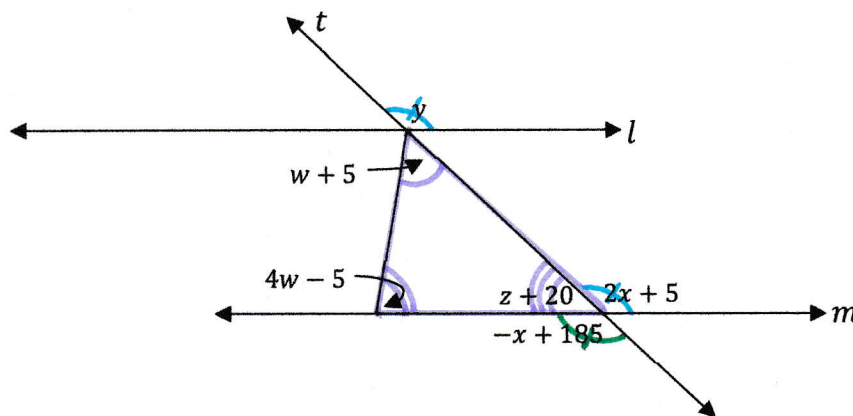


## Using Angle Relationships to Write & Solve Equations

### How to Use Angle Relationships to Write & Solve Equations:

Step 1:	Identify the angle relationships in the diagram.
Step 2:	Use the angle relationships to write equations.
Step 3:	Solve the equations for each variable.

**Example:** Use the following diagram to set up equations (remember to state the theorem used in the set-up of your equations!) and then solve for the variables. Line  $l$  & line  $m$  are parallel.



4 variables  
3  
4 Equations

Triangle  $\angle$  Sum Theorem ( $\Delta \rightarrow 180^\circ$ ):  $(w+5) + (4w-5) + (z+20) = 180^\circ$   
 Corresponding  $\angle$ s ( $\parallel \rightarrow CA =$ ):  $y = 2x + 5$   
 Vertical Angles ( $VA \rightarrow =$ ):  $-x + 185 = 2x + 5$   
 Supplementary Angles:  $z + 20 + 2x + 5 = 180$

$$\begin{array}{r} -x + 185 = 2x + 5 \\ +x \quad \quad +x \\ \hline 185 = 3x + 5 \\ -5 \quad \quad -5 \\ \hline 180 = 3x \\ 3 \quad \quad 3 \\ \hline x = 60 \end{array}$$

$$\begin{array}{l} y = 2x + 5 \\ y = 2(60) + 5 \\ y = 120 + 5 \\ \boxed{y = 125} \end{array}$$

$$\begin{array}{l} z + 20 + 2x + 5 = 180 \\ z + 2x + 25 = 180 \\ \quad \quad -25 \quad -25 \\ \hline z + 2x = 155 \end{array}$$

$$\begin{array}{l} z + 2x = 155 \\ z + 2(60) = 155 \\ z + 120 = 155 \\ \quad \quad -120 \quad -120 \\ \hline z = 35 \end{array}$$

$$\boxed{z = 35}$$

$$\begin{array}{l} (w+5) + (4w-5) + (z+20) = 180^\circ \\ 4w + w + 5 - 5 + z + 20 = 180^\circ \\ 5w + z + 20 = 180 \\ \quad \quad \quad -20 \quad -20 \\ \hline 5w + z = 160 \end{array}$$

$$\begin{array}{l} 5w + z = 160 \\ 5w + 35 = 160 \\ \quad \quad -35 \quad -35 \\ \hline 5w = 125 \\ 5 \quad \quad 5 \\ \hline w = 25 \end{array}$$

$$\boxed{w = 25}$$