

3.2 Properties of Parallel Lines

Learning Targets for today

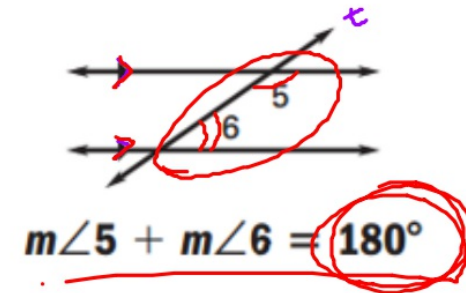
- ① To be able to recognize the different angle relationships when a transversal cuts through two parallel lines.
- ① To be able to find and justify angle measurements using theorems about parallel lines (AIA, AEA, CIA & Corresponding angles).
- ① To be able to use properties of parallel lines to solve real-life problems.



KEY CONCEPTS!

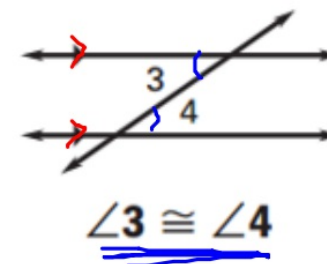
Same-Side Interior Angles Postulate

If two parallel lines are cut by a transversal, then the pairs of consecutive interior angles are Supplementary.



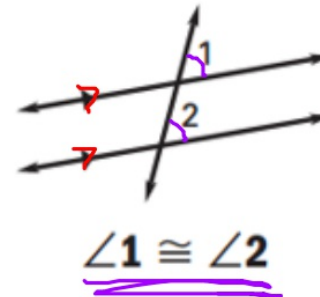
Alternate Interior Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are Congruent.



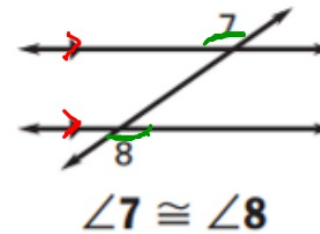
Corresponding Angles Theorem

If two parallel lines are cut by a transversal, then the pairs of corresponding angles are Congruent.



Alternate Exterior Angle Theorem

If two parallel lines are cut by a transversal, then the pairs of alternate exterior angles are Congruent.



Using Properties of Parallel Lines

Example for you...

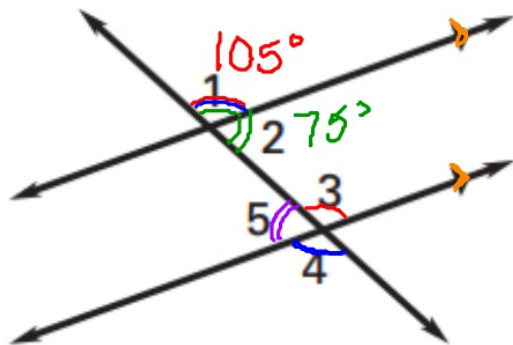
Given the $m\angle 1 = 105^\circ$, find the measure of each angle and justify your answer with a theorem or postulate.

1. $m\angle 3 = 105^\circ$. Corresponding \angle 's

2. $m\angle 4 = 105^\circ$. Alt. Exterior \angle 's

3. $m\angle 2 = 75^\circ$. Linear Pair

4. $m\angle 5 = 75^\circ$. No Relationship w/ $\angle 1$
Alt. Interior w/ $\angle 2$



Your turn to try...

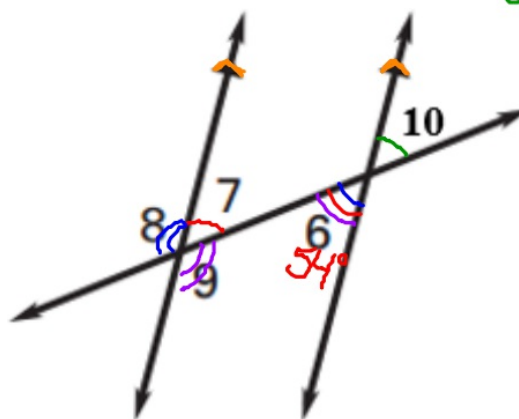
Given the $m\angle 6 = 54^\circ$, find the measure of each angle and justify your answer with a theorem or postulate.

1. $m\angle 7 = 54^\circ$. Alt. Interior \angle 's

2. $m\angle 8 = 126^\circ$. No Relationship w/ $\angle 6$
Linear Pair w/ $\angle 7$

3. $m\angle 9 = 126^\circ$. Same-Side Interior

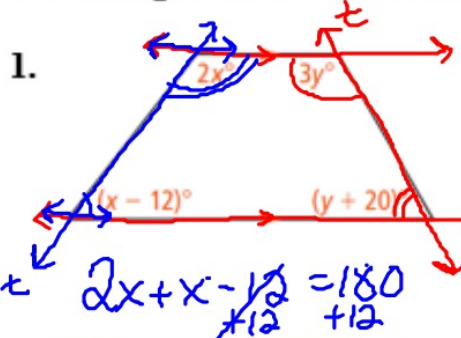
4. $m\angle 10 = 54^\circ$. Vertical Angles



Using Algebra to Find an Angle Measure

Example for you...

Use the figure to find the values of x and y.

1. 

$$3y + y + 20 = 180$$

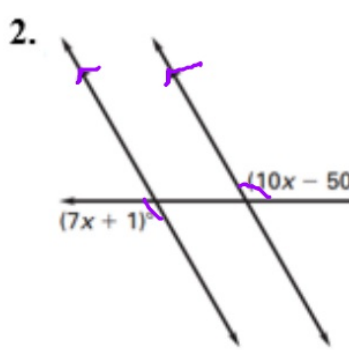
$$4y + 20 = 180$$

$$\begin{array}{r} 4y + 20 = 180 \\ -20 \quad -20 \\ \hline 4y = 160 \\ \frac{4}{4} \quad \frac{4}{4} \\ \hline y = 40 \end{array}$$

$$2x + x - 12 = 180$$

$$\begin{array}{r} 2x + x - 12 = 180 \\ +12 \quad +12 \\ \hline 3x = 192 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = 64 \end{array}$$

$x = 64$ and $y = 40$

2. 

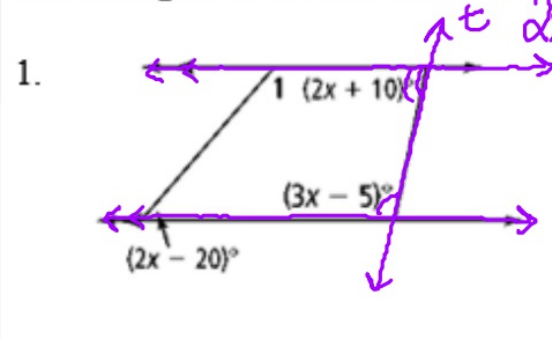
$$10x - 50 = 7x + 1$$

$$\begin{array}{r} 10x - 50 = 7x + 1 \\ -7x \quad -7x \\ \hline 3x - 50 = 1 \\ +50 \quad +50 \\ \hline 3x = 51 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = 17 \end{array}$$

$x = 17$

Your turn to try...

Use the figure to find the values of x.

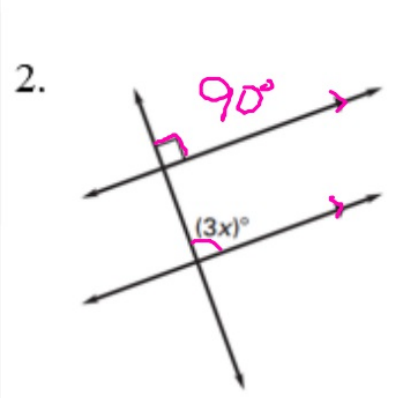
1. 

$$2x + 10 + 3x - 5 = 180$$

$$5x + 5 = 180$$

$$\begin{array}{r} 5x + 5 = 180 \\ -5 \quad -5 \\ \hline 5x = 175 \\ \frac{5}{5} \quad \frac{5}{5} \\ \hline x = 35 \end{array}$$

$x = 35$

2. 

$$3x = 90$$

$$\begin{array}{r} 3x = 90 \\ \frac{3}{3} \quad \frac{3}{3} \\ \hline x = 30 \end{array}$$

$x = 30$