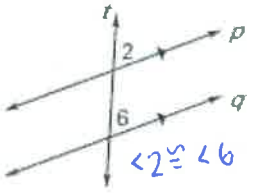
Geometry – H
Section 3.2 Notes Parallel Lines and Transversals

Name: Key
Date: _____ Period: _____

- I can identify angle pairs formed by a transversal.
- I can use the angles formed by parallel lines and transversals to solve algebraic problems.

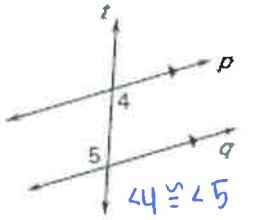
Corresponding Angles Postulate

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



Alternate Interior Angles Theorem

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



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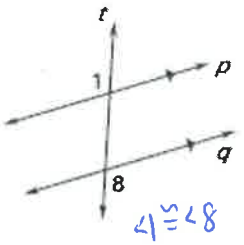
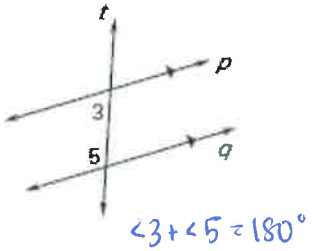


Consecutive Interior Angles Theorem

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

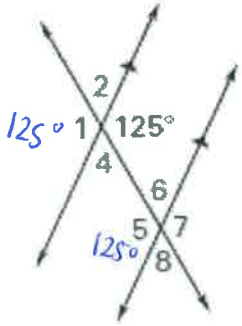


Example 1: The measure of 3 of the numbered angles is 125°. Identify which of the angles are 125°. Give a reason for each.

$m\angle 1 = 125°$ (vertical angles)

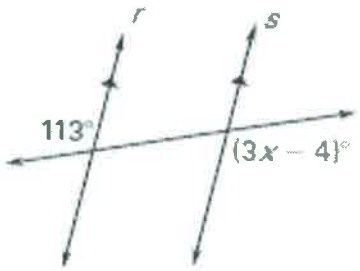
$m\angle 5 = 125°$ (alternate interior angles)

$m\angle 7 = 125°$ (vertical angles with $\angle 5$)



Example 2:

a) Find the value of x. Give a reason for each step when solving.

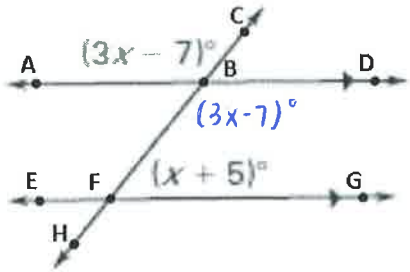


$113 = 3x - 4$ (alt. exterior angles)

$117 = 3x$ addition property

$x = 39$ division property

b) Find the value of x. Give a reason for each step when solving.



$m\angle FBD = (3x-7)^\circ$ vertical angles theorem

$m\angle FBD + m\angle BFG = 180^\circ$ consecutive interior angles theorem

$3x-7 + x+5 = 180$ substitution property

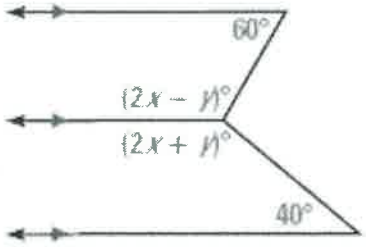
$4x - 2 = 180$ combine like terms

$4x = 182$ addition property

$\boxed{x = 45.5}$ division property

Example 3: Find the values of x and y.

a)



$60 + 2x - y = 180$ (consec. interior)

$\rightarrow 2x - y = 120$

$2x + y + 40 = 180$ (consec interior)

$\rightarrow 2x + y = 140$

$\begin{cases} 2x - y = 120 \\ 2x + y = 140 \end{cases}$

$4x = 260$

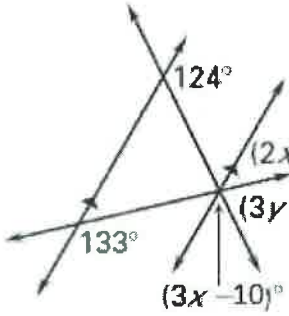
$\boxed{x = 65}$

$2(65) - y = 120$

$130 - y = 120$

$-y = -10 \Rightarrow \boxed{y = 10}$

b)



$124 = 2x + 3 + 3y + 5$

$124 = 2x + 3y + 8$

$\rightarrow 116 = 2x + 3y$

$133 = 3x - 10 + 3y + 5$

$133 = 3x + 3y - 5$

$\rightarrow 138 = 3x + 3y$

$\begin{cases} (2x + 3y = 116) \cdot (-1) \\ 3x + 3y = 138 \end{cases}$

$-2x - 3y = -116$

$3x + 3y = 138$

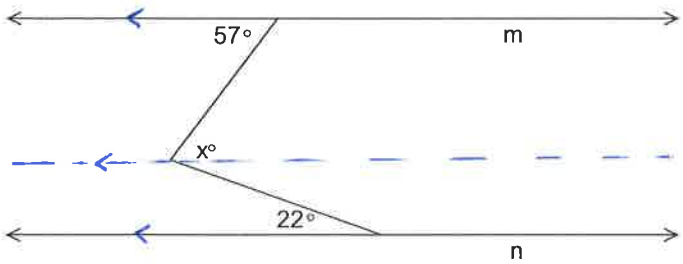
$\boxed{x = 22}$

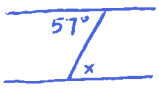
$2(22) + 3y = 116$

$44 + 3y = 116$

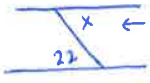
$3y = 72 \Rightarrow \boxed{y = 24}$

Example 4: In the diagram, $m \parallel n$. Find the value of x. Explain how you obtained your answer.





← $x = 57^\circ$ (alt. interior angles)



← $x = 22$ (alt. interior angles)

Total $x = 57 + 22 = \boxed{77^\circ}$