

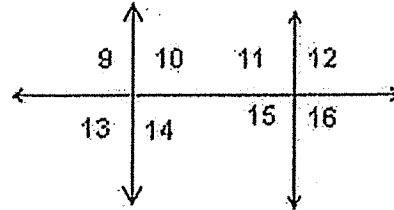
Worksheet #3 (Parallel Lines Cut by a Transversal)

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

Use the figure at the right to answer problems 1- 8.

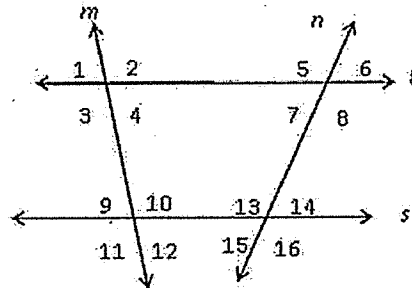
Classify each pair of angles as one of the following:

- (a) alternate interior angles      (b) corresponding angles  
 (c) alternate exterior angles      (d) vertical angles  
 (e) supplementary angles      (f) none



1. \_\_\_\_\_  $\angle 9$  &  $\angle 16$       5. \_\_\_\_\_  $\angle 9$  &  $\angle 11$   
 2. \_\_\_\_\_  $\angle 15$  &  $\angle 11$       6. \_\_\_\_\_  $\angle 9$  &  $\angle 15$   
 3. \_\_\_\_\_  $\angle 10$  &  $\angle 15$       7. \_\_\_\_\_  $\angle 13$  &  $\angle 14$   
 4. \_\_\_\_\_  $\angle 12$  &  $\angle 15$       8. \_\_\_\_\_  $\angle 14$  &  $\angle 11$

9.  $m\angle 2 = 97^\circ$        $m\angle 6 = 83^\circ$   
 $m\angle 3 =$  \_\_\_\_\_       $m\angle 5 =$  \_\_\_\_\_  
 $m\angle 10 =$  \_\_\_\_\_       $m\angle 7 =$  \_\_\_\_\_  
 $m\angle 9 =$  \_\_\_\_\_       $m\angle 16 =$  \_\_\_\_\_

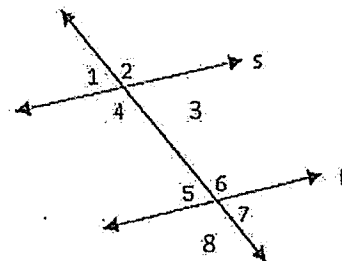


Find the value of x given that  $s \parallel t$

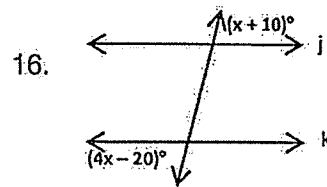
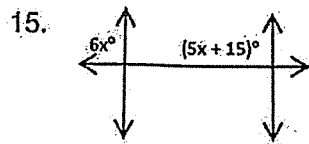
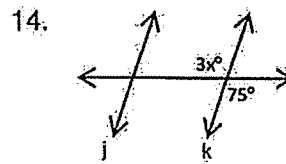
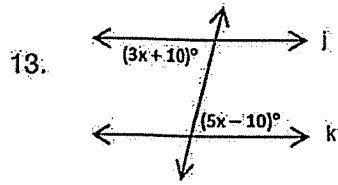
10.  $m\angle 4 = 77^\circ$ ,  $m\angle 8 = 4x + 57$

11.  $m\angle 3 = 5x + 13$ ,  $m\angle 5 = 53^\circ$

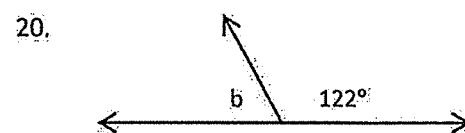
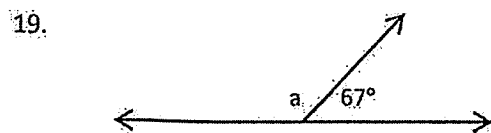
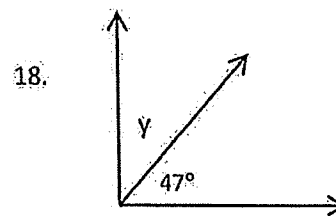
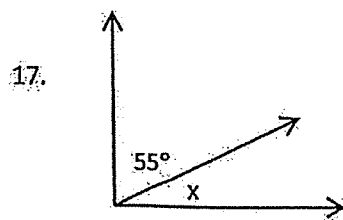
12.  $m\angle 1 = 6x - 5$ ,  $m\angle 7 = 115^\circ$



Find the value of  $x$  that makes  $j \parallel k$ .



Determine the missing angles.

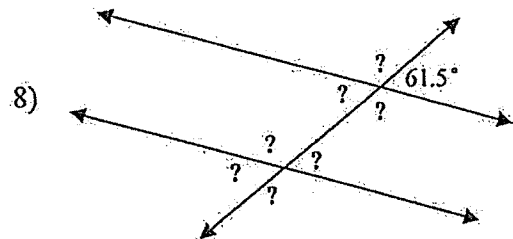
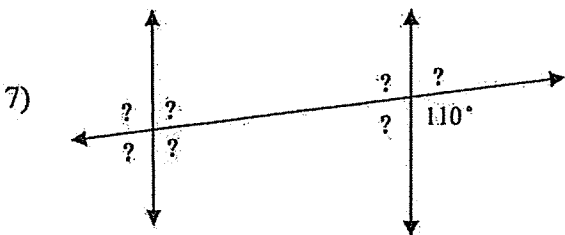
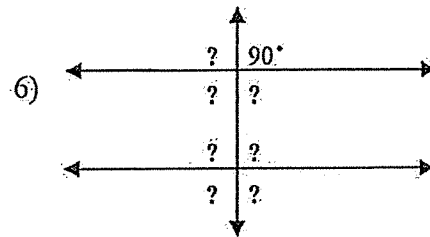
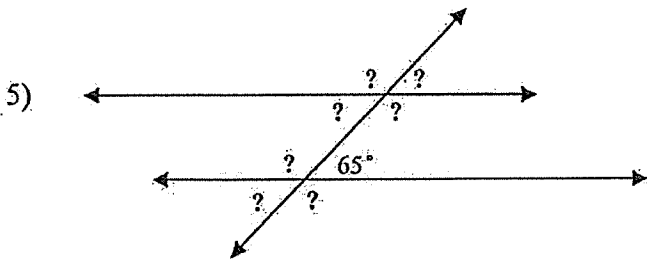
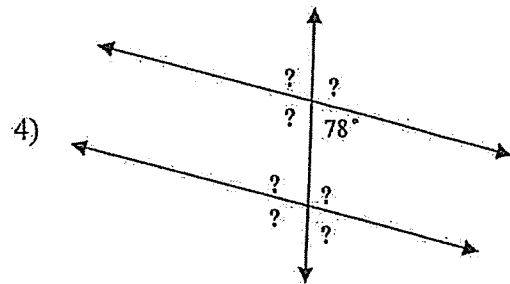
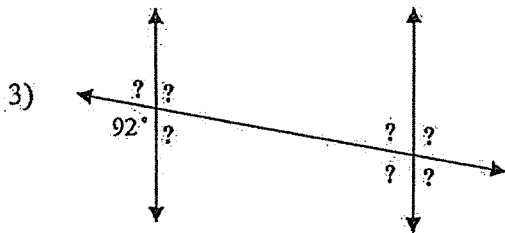
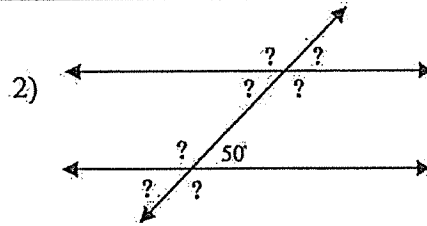
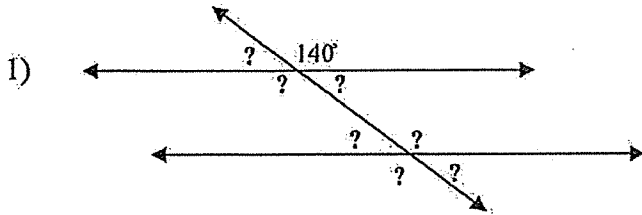
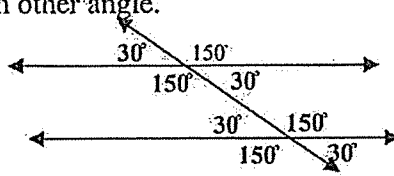


Name \_\_\_\_\_

**FINDING UNKNOWN ANGLE MEASURES #2**

**Directions:** For each set of parallel lines, you are given the measure of one angle. Use your knowledge of parallel lines and transversals to find the measures of each other angle.

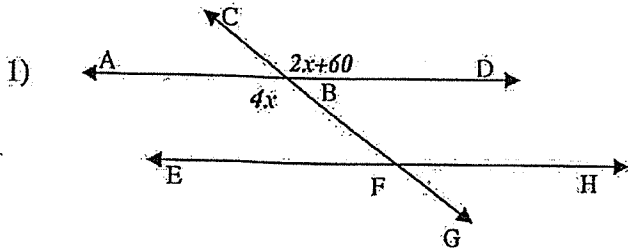
Example: Given an angle of  $150^\circ$



Name \_\_\_\_\_

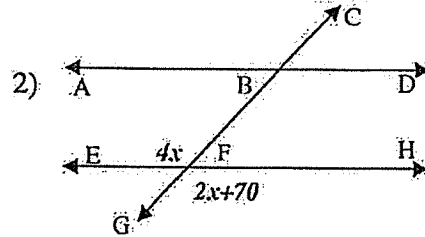
**FINDING UNKNOWN ANGLE MEASURES—CONGRUENT ANGLES-#3**

**Directions:** Find the measure of each missing angle in the parallel lines and transversals below. Each pair of angles are either *vertical angles*, *alternate angles*, or *corresponding angles*; so they are congruent. All you have to do is set up and solve an equation where the expressions are congruent. Once you've solved for  $x$ , plug that value back into each expression to find the measure of each angle.



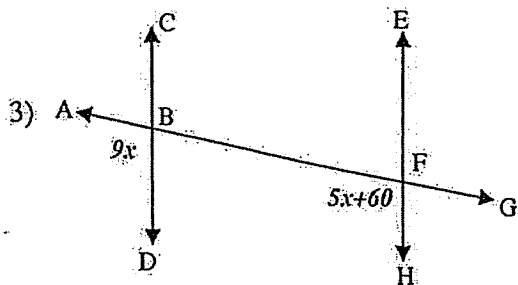
Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle ABG =$  \_\_\_\_\_  $\angle CBD =$  \_\_\_\_\_



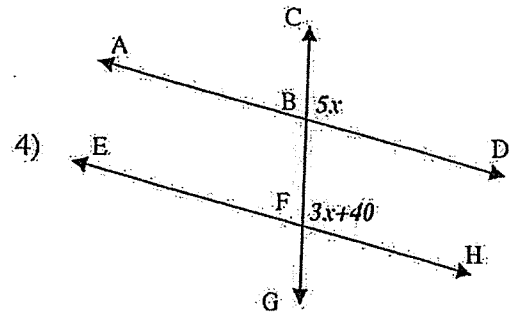
Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle EFB =$  \_\_\_\_\_  $\angle GFH =$  \_\_\_\_\_



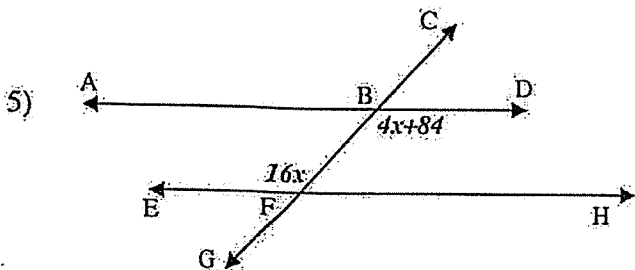
Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle ABD =$  \_\_\_\_\_  $\angle HFA =$  \_\_\_\_\_



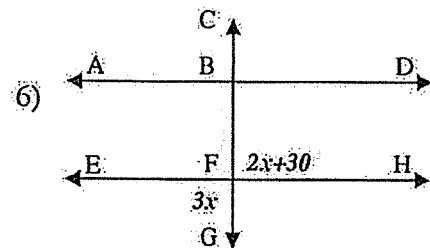
Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle CBD =$  \_\_\_\_\_  $\angle HFC =$  \_\_\_\_\_



Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle GBD =$  \_\_\_\_\_  $\angle EFC =$  \_\_\_\_\_



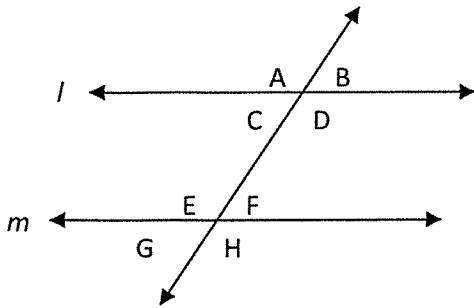
Equation: \_\_\_\_\_

$x =$  \_\_\_\_\_  $\angle EFG =$  \_\_\_\_\_  $\angle HFC =$  \_\_\_\_\_

## Parallel Lines With Algebra

Remember – drawings are not necessarily drawn accurately!

1 – 3: Find the value of  $x$  in each question given that lines  $l$  and  $m$  are parallel. Check your answers by finding the measure of each angle.

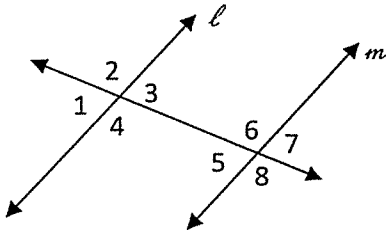


1)  $m\angle C = 3x - 10$ ;  
 $m\angle F = x + 70$

2)  $m\angle D = x + 27$ ;  
 $m\angle F = 2x - 39$

3)  $m\angle B = 2(x + 40)$ ;  
 $m\angle G = 5x + 44$

4 – 6: Find the value of  $x$  in each question given that lines  $l$  and  $m$  are parallel. Check your answers by finding the measure of each angle.



4)  $m\angle 3 = 2x + 16$ ;  
 $m\angle 5 = 7x - 4$

5)  $m\angle 4 = 8x - 80$ ;  
 $m\angle 5 = -2x + 116$

6)  $m\angle 2 = 3x + 19$ ;  
 $m\angle 6 = 2(x + 10)$

7) Given  $l \parallel m \parallel n$  and  $s \parallel t$ , and  $m\angle 1 = 143^\circ$ , find

$m\angle 2 = \underline{\hspace{2cm}}$      $m\angle 11 = \underline{\hspace{2cm}}$      $m\angle 20 = \underline{\hspace{2cm}}$

$m\angle 3 = \underline{\hspace{2cm}}$      $m\angle 12 = \underline{\hspace{2cm}}$      $m\angle 21 = \underline{\hspace{2cm}}$

$m\angle 4 = \underline{\hspace{2cm}}$      $m\angle 13 = \underline{\hspace{2cm}}$      $m\angle 22 = \underline{\hspace{2cm}}$

$m\angle 5 = \underline{\hspace{2cm}}$      $m\angle 14 = \underline{\hspace{2cm}}$      $m\angle 23 = \underline{\hspace{2cm}}$

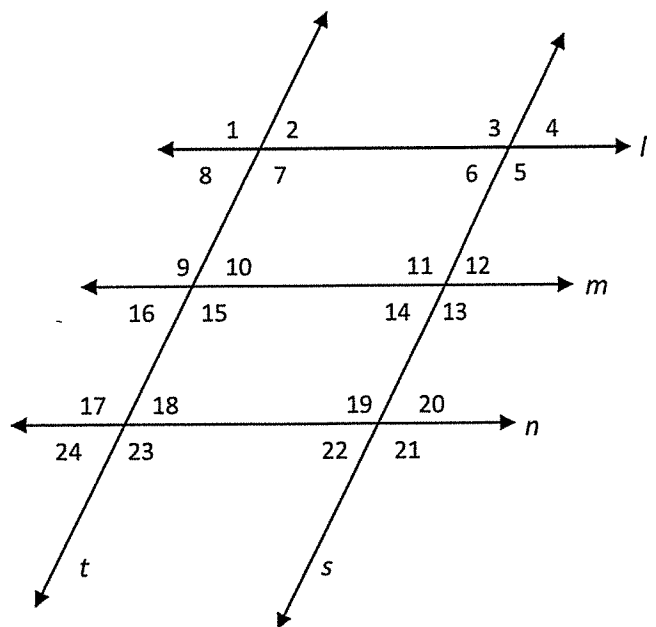
$m\angle 6 = \underline{\hspace{2cm}}$      $m\angle 15 = \underline{\hspace{2cm}}$      $m\angle 24 = \underline{\hspace{2cm}}$

$m\angle 7 = \underline{\hspace{2cm}}$      $m\angle 16 = \underline{\hspace{2cm}}$

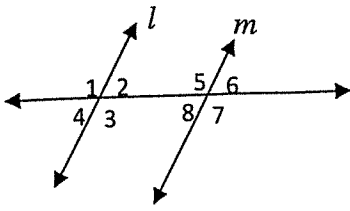
$m\angle 8 = \underline{\hspace{2cm}}$      $m\angle 17 = \underline{\hspace{2cm}}$

$m\angle 9 = \underline{\hspace{2cm}}$      $m\angle 18 = \underline{\hspace{2cm}}$

$m\angle 10 = \underline{\hspace{2cm}}$      $m\angle 19 = \underline{\hspace{2cm}}$



8–10: Given  $l \parallel m$ , find the value(s) of  $x$  and each angle. Be sure to check for extraneous solutions.

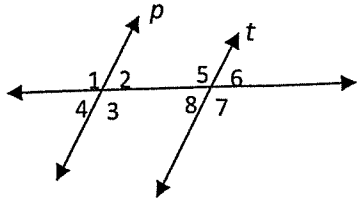


8)  $m\angle 3 = x^2 + 112$ ;  
 $m\angle 8 = 16x + 131$

9)  $m\angle 3 = x^2 - 2x$ ;  
 $m\angle 6 = 3x + 108$

10)  $m\angle 1 = x^2 - 7x$ ;  
 $m\angle 7 = -x + 7$

11–13: Given  $p \parallel t$ , find the value(s) of each variable and each angle.

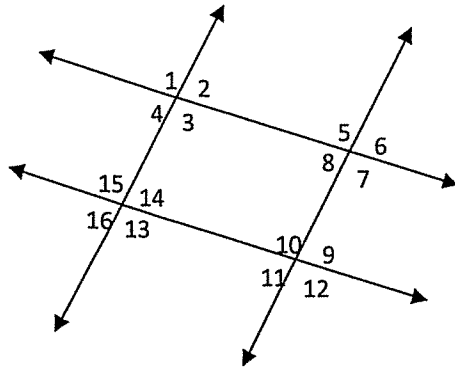


11)  $m\angle 1 = 12x - 4y$   
 $m\angle 8 = x - 4y$   
 $m\angle 5 = 15x + 8y$

12)  $m\angle 2 = 8b + a$   
 $m\angle 5 = 7a + 25b$   
 $m\angle 4 = 3a + 5b$

13)  $m\angle 3 = 14s - 3t$   
 $m\angle 7 = 9s + 12t$   
 $m\angle 4 = 5s + 6t$

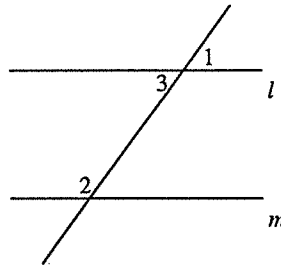
14) Given that  $m\angle 4 = 3x + 10$  and  $m\angle 12 = 2x + 30$ , find the value of  $x$ ,  $m\angle 4$ ,  $m\angle 10$ .



Write a two-column proof.

15) Given:  $l \parallel m$

Prove:  $\angle 1$  and  $\angle 2$  are supplementary



16) Given:  $l \parallel m$  and  $a \parallel b$

Prove:  $\angle 1 \cong \angle 12$

