Name: _____ Key _____

Parallel Lines & Transversals

Line *m* is parallel to line *n*. Tell if the angles are *corresponding, alternate interior, alternate exterior, consecutive interior,* or *none of these.*
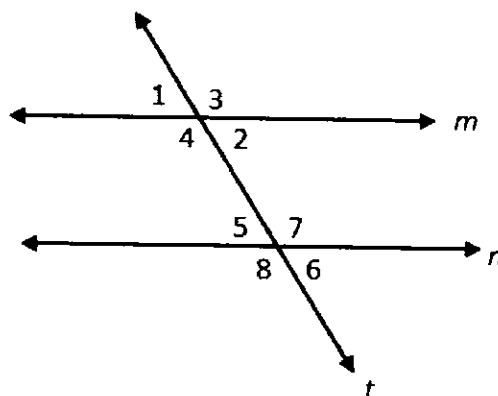
∠1 and ∠5 ___corresponding___

∠2 and ∠7 ___consecutive interior___

∠3 and ∠5 ___none of these___

∠3 and ∠8 ___alternate exterior___

∠4 and ∠7 ___alternate interior___

∠4 and ∠8 ___corresponding___

Line *a* is parallel to line *b*. Line *c* is parallel to line *d*. Name the transversal for each angle pair. Then tell if the angles are *corresponding, alternate interior, alternate exterior, consecutive interior,* or *none of these.*

∠12 and ∠18 ___line *a*; alternate exterior___

∠20 and ∠21 ___line *c*; consecutive interior___

∠10 and ∠16 ___line *d*; alternate exterior___

∠13 and ∠21 ___line *b*; corresponding___

∠20 and ∠22 ___line *c*; alternate interior___
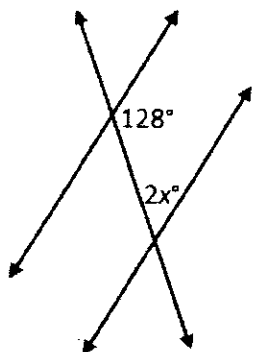
∠11 and ∠17 ___line *a*; alternate interior___
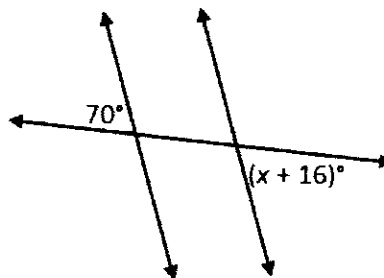
∠15 and ∠24 ___line *b*; consecutive interior___
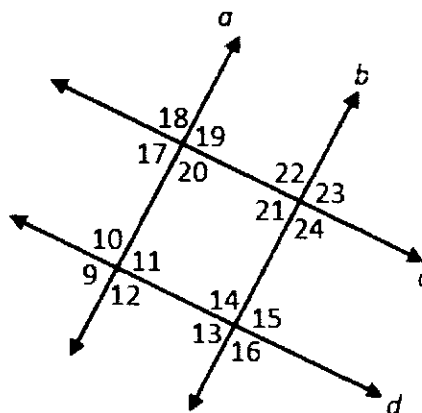
Equations and Transversals

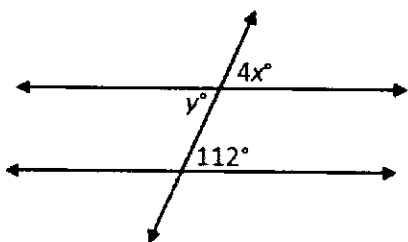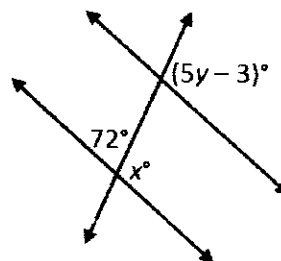**Each figure consists of two parallel lines and a transversal. Find the values of *x* and *y*.**

1. *x* = ___26___

128°

2*x*°

2. *x* = ___54___

70°

(*x* + 16)°

3. *x* = ___28___

    y = ___112___

4*x*°

y°

112°

4. *x* = ___108___

    y = ___22.2___

(5*y* − 3)°

72°

x°

5. *x* = ___12.5___

    y = ___220___

110°

(4*x* + 20)°

$\frac{1}{2}y$°

6. *x* = ___18___

    y = ___106___

(6*x* + 7)°

65°

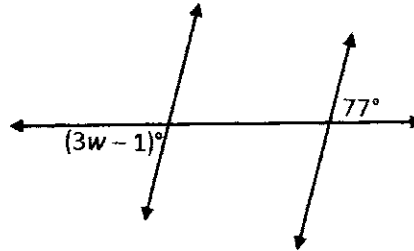(*y* + 9)°
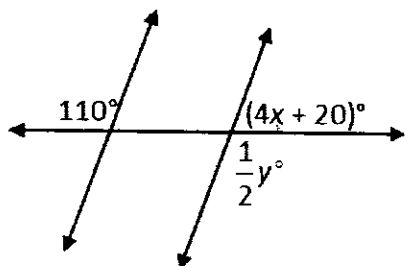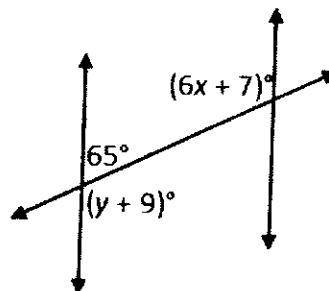
Parallel Lines: Finding the Unknown

Each diagram is formed by two parallel lines and a transversal. Write the equation you can use to find the value of the variable. Then find the value of the variable.
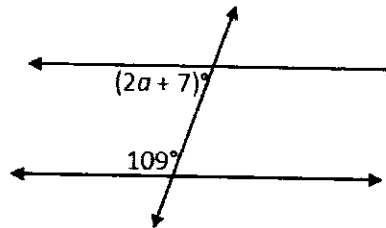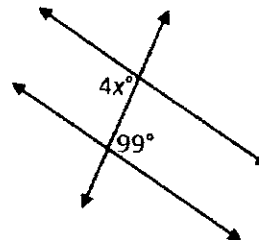
Equation ___ $3w - 1 = 77$ ___
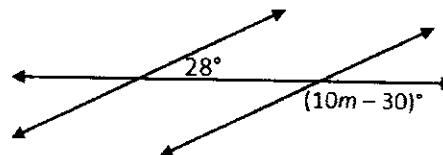
$w =$ ___ 26 ___

Equation ___ $2a + 7 + 109 = 180$ ___

$a =$ ___ 32 ___

Equation ___ $4x = 99$ ___

$x =$ ___ 24.75 ___

Equation ___ $28 + 10m - 30 = 180$ ___
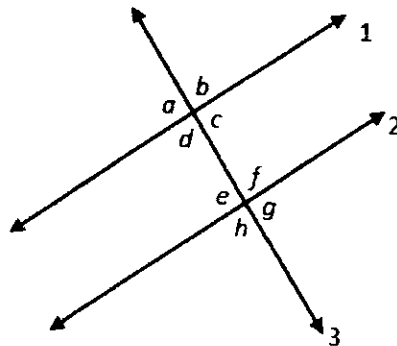
$m =$ ___ 18.2 ___

Equation ___ $125 + 0.5t = 180$ ___

$t =$ ___ 110 ___
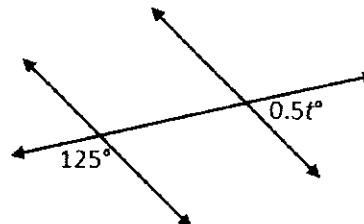
Special Angle Pairs with Parallel Lines

Line 1 is parallel to line 2. List all the angle pairs that fall into each category.

∠a and ∠e ∠b and ∠f ∠d and ∠h ∠c and ∠g	∠d and ∠f ∠c and ∠e
∠a and ∠g ∠b and ∠h	∠d and ∠e ∠c and ∠f

Line *a* is parallel to line *b*. Tell if each statement is true (T) or false (F).

∠1 and ∠10 are alternate exterior angles. ___F___ .

∠8 and ∠11 are alternate interior angles. ___T___

∠2 and ∠10 are corresponding angles. ___T___

∠2 and ∠7 are alternate interior angles. ___F___

∠7 and ∠15 are corresponding angles. ___T___

∠5 and ∠10 are alternate interior angles. ___T___

∠7 and ∠11 are consecutive interior angles. ___T___

∠10 and ∠14 are consecutive interior angles. ___F___

∠1 and ∠3 are corresponding angles. ___F___

∠4 and ∠15 are alternate exterior angles. ___T___

10
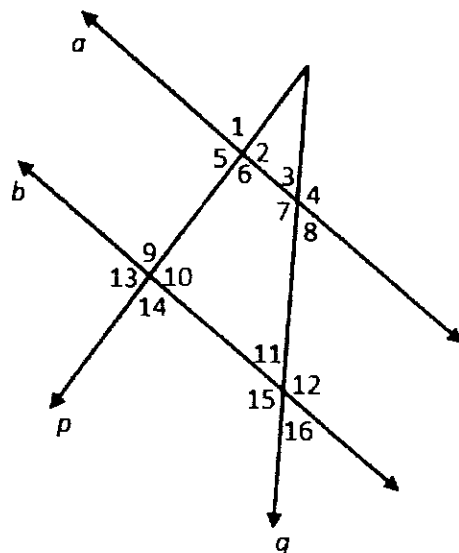
Using Properties of Parallel Lines

Line *a* is parallel to line *b*. Line *c* is parallel to line *d*. Find the angle measures.
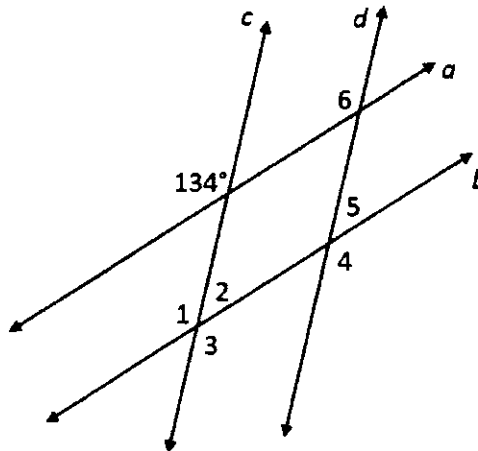
$m\angle 1 =$ ___**134°**___

$m\angle 2 =$ ___**46°**___

$m\angle 3 =$ ___**134°**___

$m\angle 4 =$ ___**134°**___

$m\angle 5 =$ ___**46°**___

$m\angle 6 =$ ___**134°**___

Line *e* is parallel to line *f*. Find the angle measures.

$m\angle 1 =$ ___**117°**___ $m\angle 8 =$ ___**98°**___

$m\angle 2 =$ ___**117°**___ $m\angle 9 =$ ___**98°**___

$m\angle 3 =$ ___**63°**___ $m\angle 10 =$ ___**69°**___

$m\angle 4 =$ ___**117°**___ $m\angle 11 =$ ___**111°**___

$m\angle 5 =$ ___**63°**___ $m\angle 12 =$ ___**69°**___

$m\angle 6 =$ ___**82°**___ $m\angle 13 =$ ___**111°**___

$m\angle 7 =$ ___**82°**___ $m\angle 14 =$ ___**69°**___

☀ Special angles created by parallel lines & a transversal   <u>Answer Key</u> is very bright!
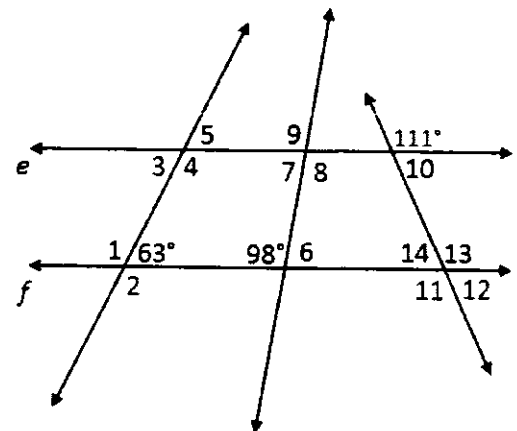
Multiple Choice – Use the diagram at the right to choose the best answer(s) to the questions below. Some questions may have more than one correct answer.

1. Which of the following is a set of Corresponding angles?

A. ∡2 & ∡7   (B. ∡4 & ∡8)   C. ∡4 & ∡6   (D. ∡2 & ∡6)

2. Which of the following is a set of Alternate Exterior angles?

(A. ∡1 & ∡7)   B. ∡4 & ∡6   C. ∡2 & ∡7   D. ∡2 & ∡6

3. Which of the following is a set of Same-Side Interior angles?

A. ∡4 & ∡6   (B. ∡4 & ∡5)   C. ∡3 & ∡5   (D. ∡3 & ∡6)

4. Which of the following pairs of angles are congruent to each other?

A. ∡4 & ∡5   (B. ∡1 & ∡3)   (C. ∡4 & ∡8)   (D. ∡3 & ∡5)

5. Which of the following pairs of angles are supplementary?

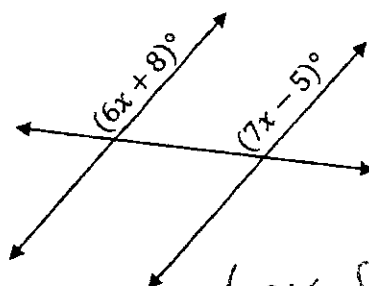A. ∡1 & ∡5   (B. ∡1 & ∡4)   (C. ∡1 & ∡6)   D. ∡6 & ∡8
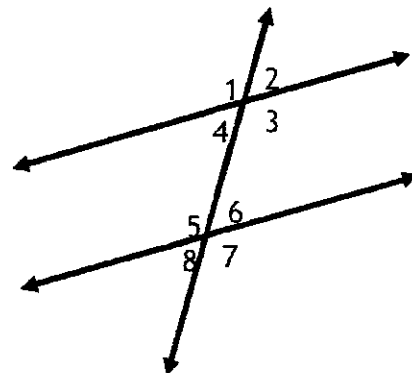
Lines in problems #6 – 13 are parallel and cut by a transversal. Set up an equation and solve for x in each problem. Note: diagrams are not drawn to scale!
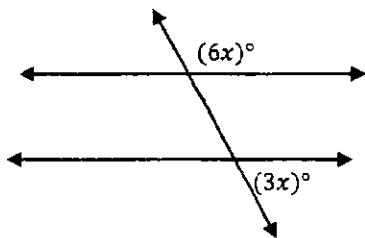
6. $x = \underline{\quad 30 \quad}$

$(4x + 8)°$
$(2x - 8)°$
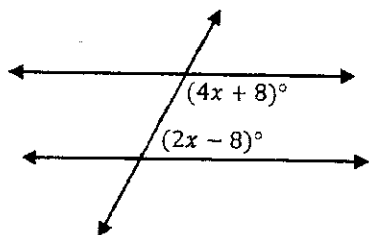
$4x + 8 + 2x - 8 = 180$
$6x = 180$
$x = 30$

7. $x = \underline{\quad 13 \quad}$

$(6x + 8)°$ $(7x - 5)°$

$6x + 8 = 7x - 5$
$13 = x$

3

8. $x =$ __20__

(6x)°

(3x)°

$6x + 3x = 180$

$9x = 180$

$x = 20$

9. $x =$ __5__

(7x + 10)° (26x + 5)°

$7x + 10 + 26x + 5 = 180$

$33x + 15 = 180$

$x = 5$

10. $x =$ __1/3, 2__

(3x²)°

(7x − 2)°

$3x^2 = 7x - 2$

$3x^2 - 7x + 2 = 0$

$(3x - 1)(x - 2) = 0$

11. $x =$ __24__

$(\frac{1}{2}x + 30)°$

$(\frac{7}{4}x)°$

$\frac{1}{2}x + 30 = \frac{7}{4}x$

$30 = \frac{5}{4}x$

$24 = x$
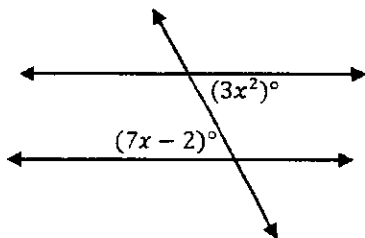
12. $x =$ __8__ $y =$ __3__
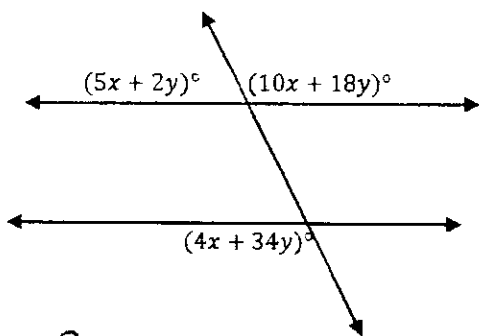
(5x + 2y)°   (10x + 18y)°

(4x + 34y)°

$5x + 2y + 10x + 18y = 180$

$15x + 20y = 180$

$5x + 2y + 4x + 34y = 180$

$9x + 36y = 180$

13. $m\angle 1 =$ __35°__

$m\angle 2 =$ __70°__

$m\angle 3 =$ __75°__

1   2

3

110°   145°

4