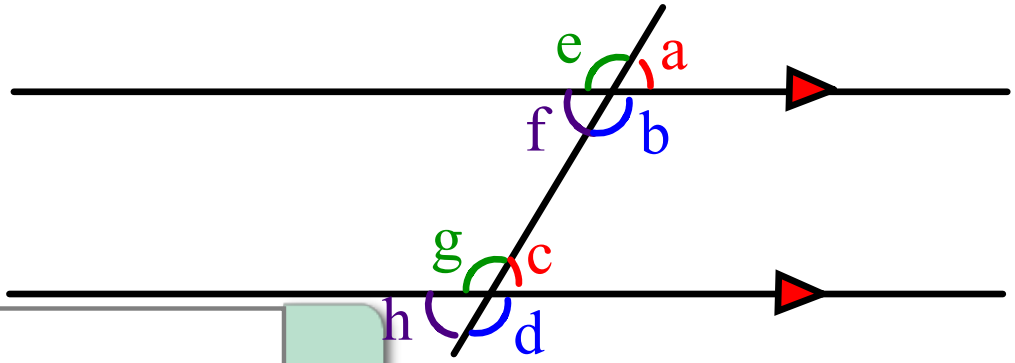
Geometry

Ch. 3 Handout 3.1
Properties of Parallel Lines

Corresponding Angles

Corresponding anglesare pairs of angles that occupy the same position.



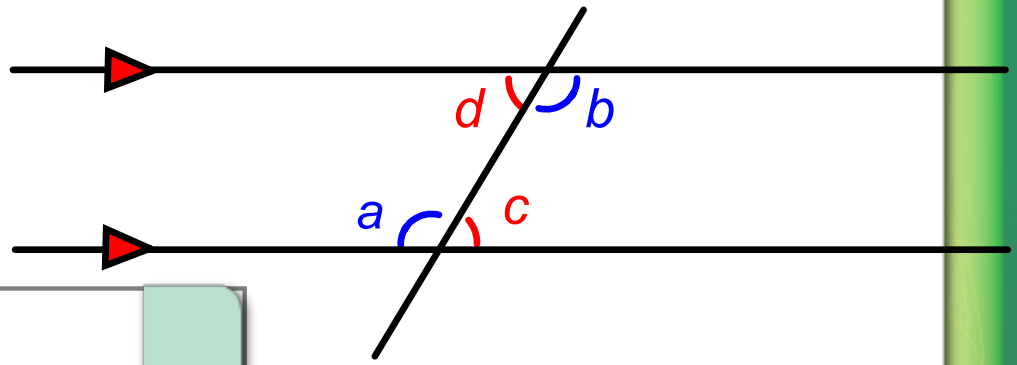
Postulate 3-1 Corresponding Angles Postulate

If a transversal intersects two parallel lines, then corresponding angles are congruent.

Pull

Alternate Interior Angles

Alternate interior angles are nonadjacent interior angles that lie on opposite sides of the transversal.



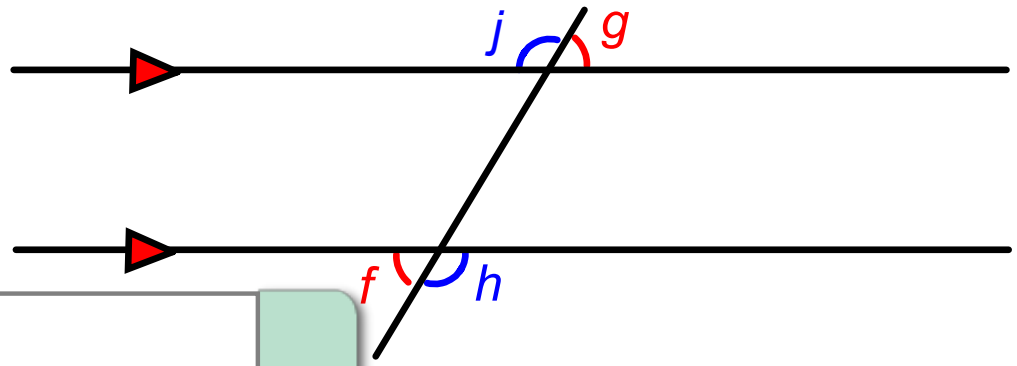
Theorem 3-1: Alternate Interior Angles Theorem

If a transversal intersects two parallel lines, then alternate interior angles are congruent.

Pull

Alternate Exterior Angles

Alternate exterior angles are nonadjacent exterior angles that lie on opposite sides of the transversal.



Theorem 3-3: Alternate Exterior Angles Theorem
If a transversal intersects two parallel lines, then alternate exterior angles are congruent.

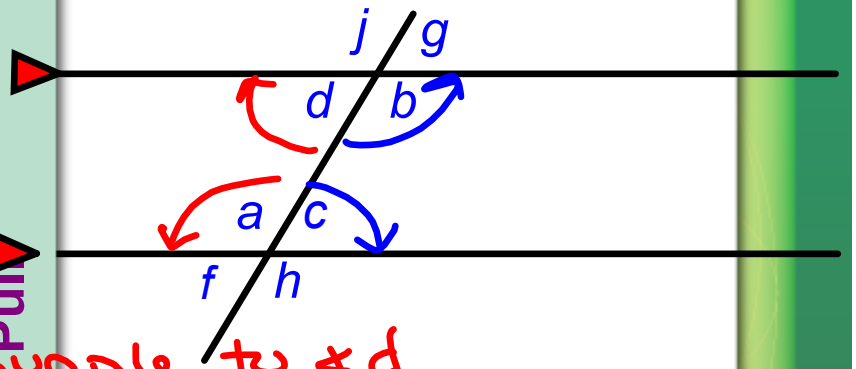
Pull

Same-Side Interior Angles

Same-side interior anglesare interior angles that lie on same-side of the transversal.

Theorem 3-2: Same-Side Interior Angles Theorem
If a transversal intersects two parallel lines, then same-side interior angles are supplementary.

$$m\angle a + m\angle d = 180$$



∠a is supple to ∠d
∠b is supple to ∠b

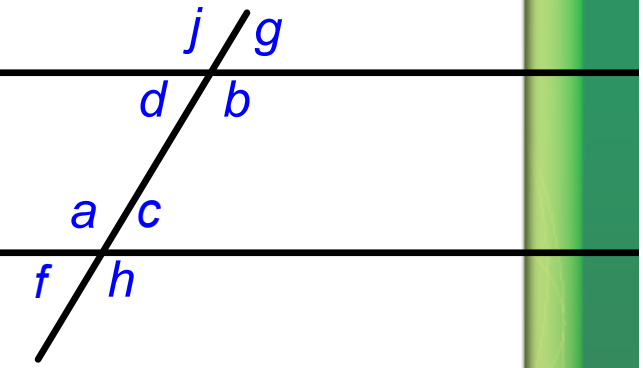
Same-Side Exterior Angles

Same-side exterior angles are exterior angles that lie on same-side of the transversal.

Theorem 3-4: Same-Side Exterior Angles Theorem
If a transversal intersect two parallel lines, then same-side exterior angles are supplementary.

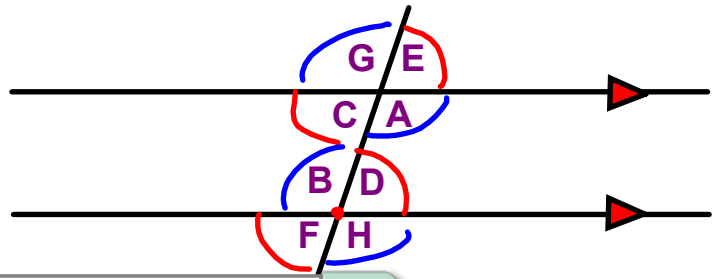
$$m\angle f + m\angle j = 180$$

Pull



Practice

Roll the blue cube below. Then, circle an angle that is **congruent** to the angle shown on the cube.



Pull for Answer

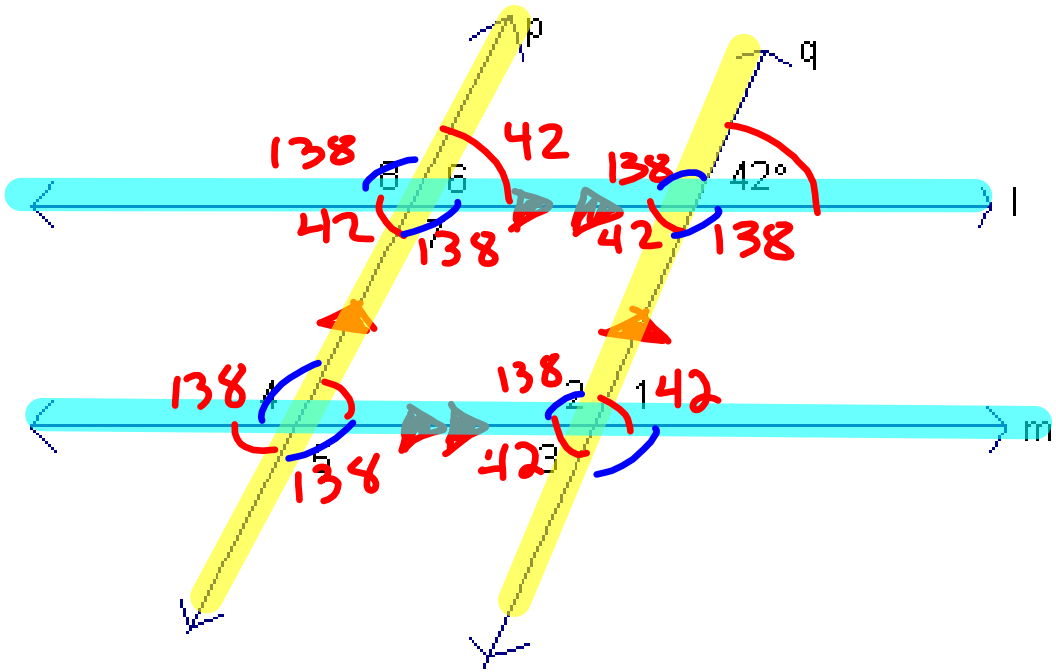
Notice that all angles formed when a transversal intersects parallel lines are either congruent or supplementary to each other.

Remember that congruent angles have the same angle measure.

Pull

3. In the diagram at the right, $l \parallel m$ and $p \parallel q$.

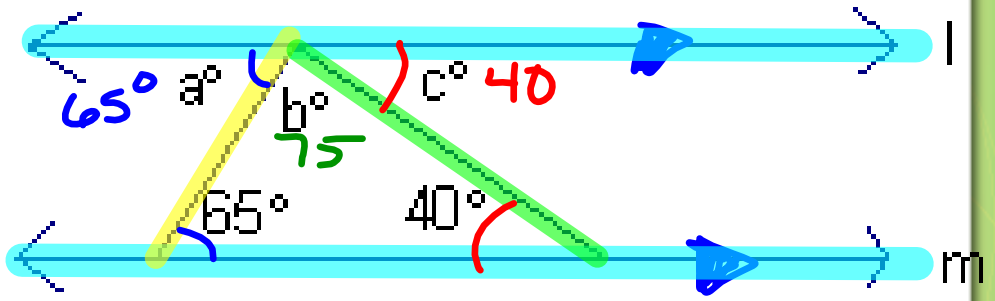
Find the measure of each angle.



4. In the diagram at the right, $l \parallel m$.

Find the values of a, b, and c.

$a = 65°$
$b = 75°$
$c = 40°$



5. $a \parallel b$ and $c \parallel d$.

Using the diagram find the measure of each angle. Justify each answer.

a) $\angle 3$ 47°

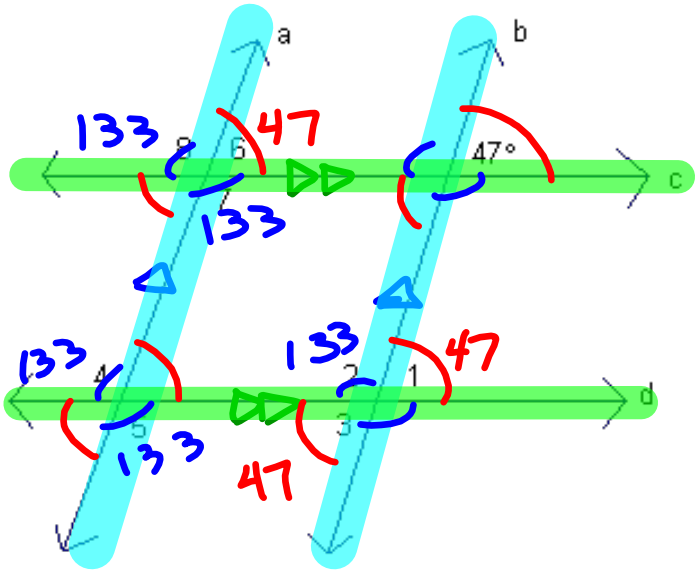
b) $\angle 4$ 133°

c) $\angle 5$ 133°

d) $\angle 6$ 47°

e) $\angle 7$ 133°

f) $\angle 8$ 133°



6. Find the values of x and y. Then find the measures of the four angles in the trapezoid.

$2x + 90 = 180$

$2x = 90$

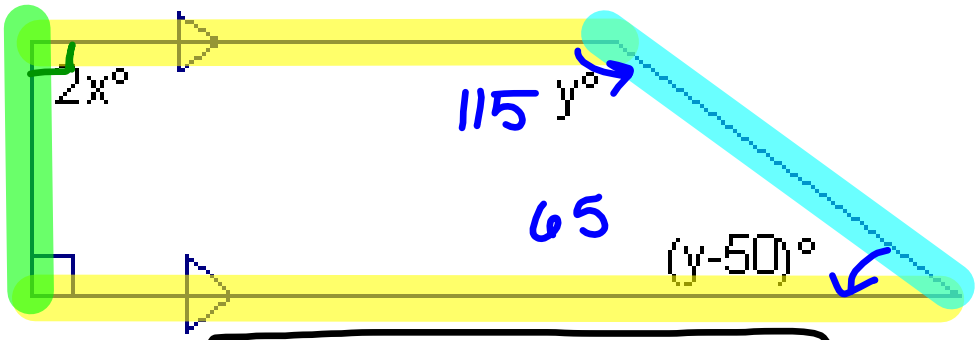
$x = 45$

$y + y - 50 = 180$

$+50 \quad +50$

$2y = 230$

$y = 115$



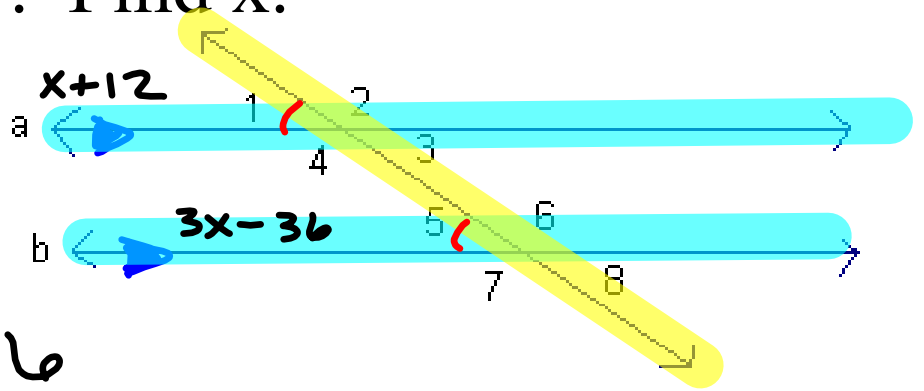
$x = 45$; $y = 115$

$90°, 90°, 115°, 65°$

8. In the diagram, $a \parallel b$. Find x.

$m\angle 1 = x + 12$

$m\angle 5 = 3x - 36$



$x + 12 = 3x - 36$

$-x \qquad -x$

$12 = 2x - 36$

$+36 \qquad +36$

$2x = 48$

$x = 24$

Assignment:

Day 3 pg 131 (11-17 odds, 23, 25, 30, 37-40)