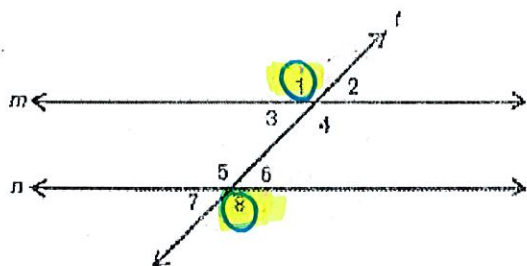## Day 3 – Lines and Transversals

- Two lines are __*parallel*__ if they are coplanar and do not intersect.
- Lines that do not intersect and are not coplanar are called __*skew*__.
- __*perpendicular*__ lines are two lines that intersect at a right angle.
- A __*transversal*__ is a line that intersects two or more coplanar lines at different points.

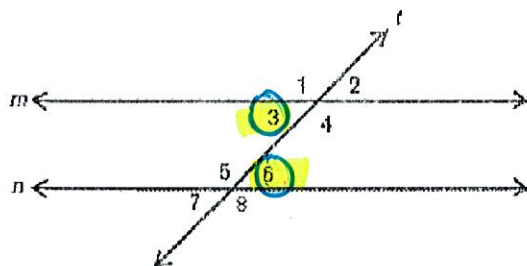### Alternate Exterior Angles

Definition:

Two angles in the __*exterior*__ of the parallel lines and on __*opposite*__ sides.

Alternate Exterior Angles Theorem:

If 2 __*parallel lines*__ are cut by a transversal, then the pairs of alternate exterior angles are __*congruent*__

Other Alternate Exterior Angles: __∠2 & ∠7__

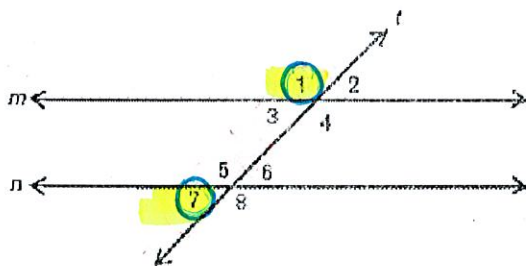### Alternate Interior Angles

Definition:

Two angles in the __*interior*__ of the parallel lines and on __*opposite*__ sides.

Alternate Interior Angles Theorem:

If 2 parallel lines are cut by a transversal, then the pairs of alternate interior angles are __*congruent*__

Other Alternate Interior Angles: __∠4 & ∠5__

Consecutive (Same Side) Exterior Angles
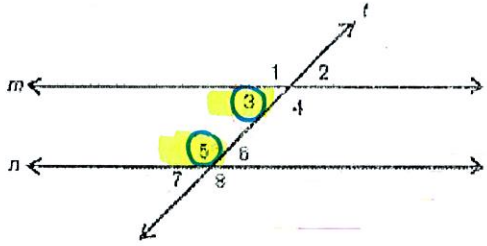
Definition:

Two angles in the __*exterior*__ of the parallel lines and on __*same*__ sides.

Consecutive (Same Side) Exterior Angles Theorem:

If 2 parallel lines are cut by a transversal, then the pairs of consecutive exterior angles are __*supplementary*__

Other Same Side Exterior Angles:

__∠2 & ∠8__

Consecutive (Same Side) Interior Angles

Definition:

Two angles in the __interior__ of the parallel lines and on __same__ sides.

Consecutive (Same Side) Interior Angles Theorem:

If 2 parallel lines are cut by a transversal, then the pairs of consecutive interior angles are __supplementary__

Other Same Side Interior Angles: __∠4 & ∠6__

Corresponding Angles
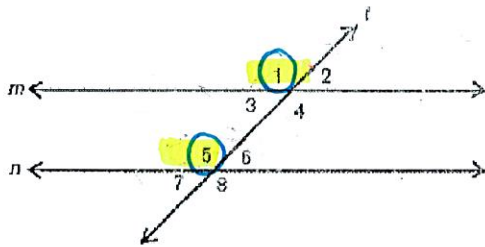
Definition:

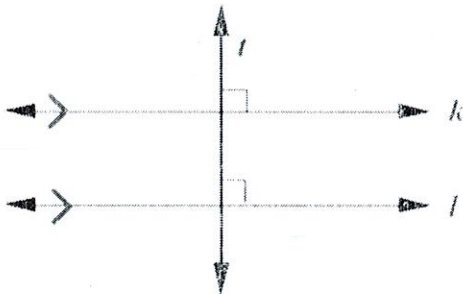Two angles that lie in the __same relative location__.

Corresponding Angles Postulate:

If 2 parallel lines are cut by a transversal, then the pairs of corresponding angles are __congruent__

Other Corresponding Angles: __∠3 & ∠7 , ∠2 & ∠6, ∠4 & ∠8__

Perpendicular Transversal Theorem:

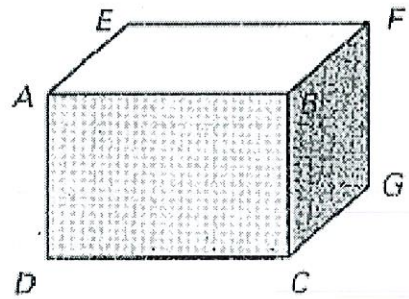If a transversal is perpendicular to one of the two parallel lines, then it is __perpendicular__ to the other.

Legend:	
⊥	Perpendicular (90 degrees)
‖	Parallel

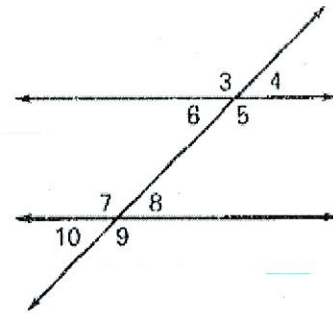If $k \parallel l$ and $t \perp k$, then $t \perp l$.

Think of each segment in the diagram as part of a line.
Identify the segments as parallel, skew, or perpendicular.

1. AB and DC   parallel ||
2. AB and BC   perpendicular ⊥
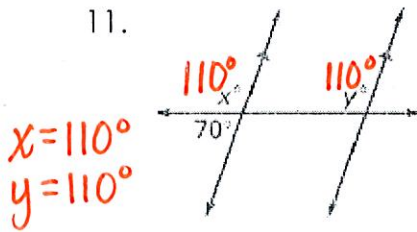3. BF and FG   perpendicular ⊥
4. AB and FG   skew

Identify the angles as corresponding, alternate interior,
alternate exterior, or consecutive interior.

5. ∠3 and ∠7
   corresponding
6. ∠4 and ∠10
   alt. exterior
7. ∠5 and ∠8
   consecutive interior

8. ∠8 and ∠6
   alt. interior
9. ∠9 and ∠5
   corresponding
10. ∠5 and ∠7
   alt. interior

11.
$110°$
$70°$
$x = 110°$
$y = 110°$

12.
$60°$
$x = 60°$
$y = 60°$
$120°$ $120°$
$60°$

13.
$90°$
$x = 90°$
$y = 90°$
$90°$

14.
$(2x - 10)° = 80$
$80°$
$2x - 10 = 80$
$+10 \quad +10$
$\dfrac{2x}{2} = \dfrac{90}{2}$
$\boxed{x = 45}$
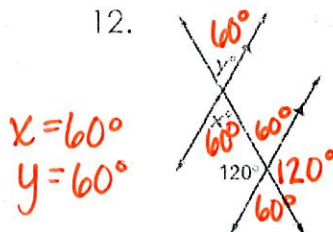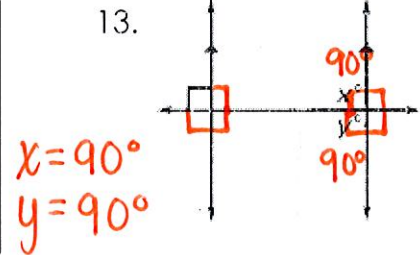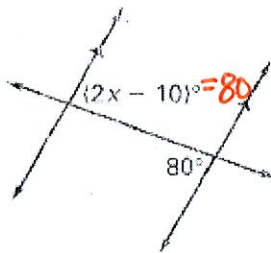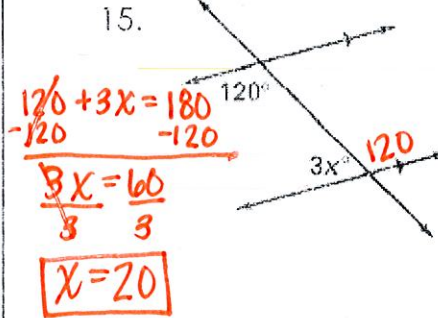
15.
$120°$
$120 + 3x = 180$
$-120 \qquad -120$
$\dfrac{3x}{3} = \dfrac{60}{3}$
$3x°$ 120
$\boxed{x = 20}$
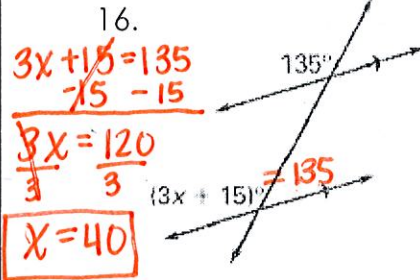
16.
$3x + 15 = 135$
$-15 \quad -15$
$\dfrac{3x}{3} = \dfrac{120}{3}$
$(3x + 15)° = 135$ $135°$
$\boxed{x = 40}$

17. Given: ℓ ‖ m
Prove: ∠1 ≅ ∠2
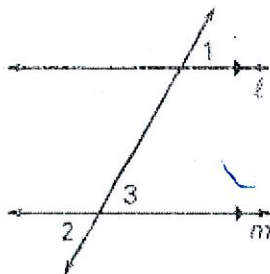
STATEMENT	REASON
1) ℓ ‖ m	1) given
2) ∠1 ≅ ∠3	2) corresponding ∠'s postulate
3) ∠2 ≅ ∠3	3) vertical ∠s are congruent
4) ∠1 ≅ ∠2	4) substitution