

U13 TOPIC 4: Parallel Lines Cut by a Transversal

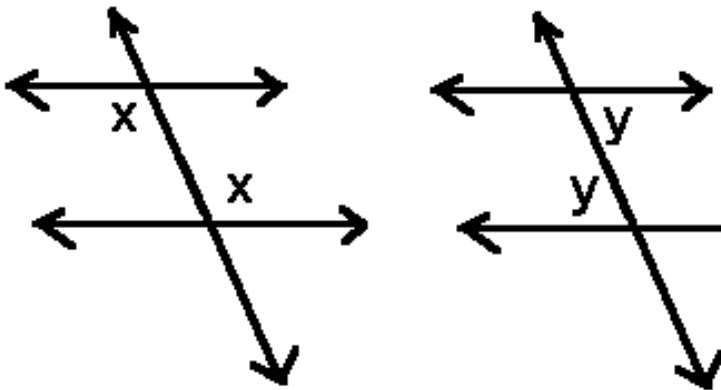
Aim: What is the relationship between the angles formed when **parallel lines** are intersected?

Important Vocabulary

- **Parallel lines** are two lines that are in the same plane that never intersect. They are always equidistant from each other. **Symbol:** \parallel
- **Perpendicular lines** are two lines that intersect to form right angles. **Symbol:** \perp
- A **transversal** is a line that intersects two or more parallel lines that lie in the same plane.

Congruent Angles Formed By a Transversal

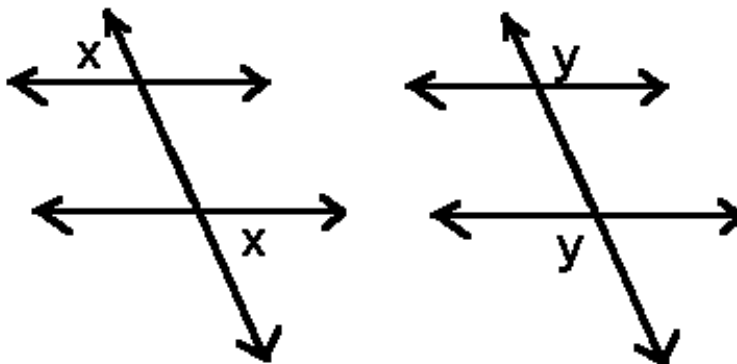
ALTERNATE INTERIOR ANGLES



Alternate Interior Angles are

_____.

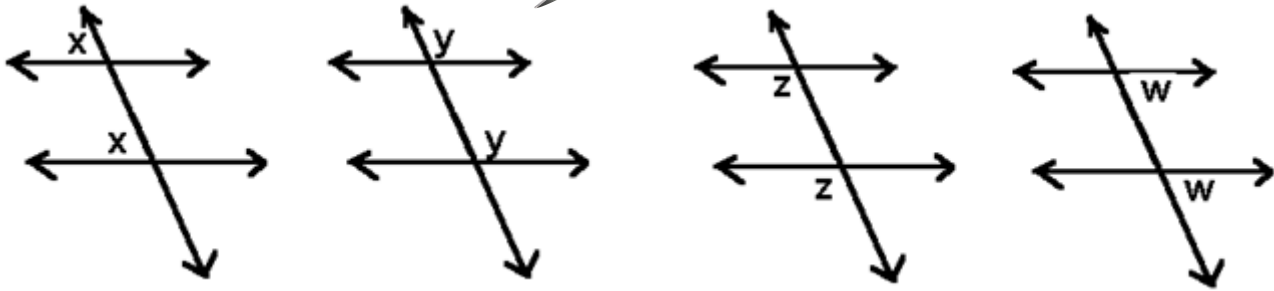
ALTERNATE EXTERIOR ANGLES



Alternate Exterior Angles are

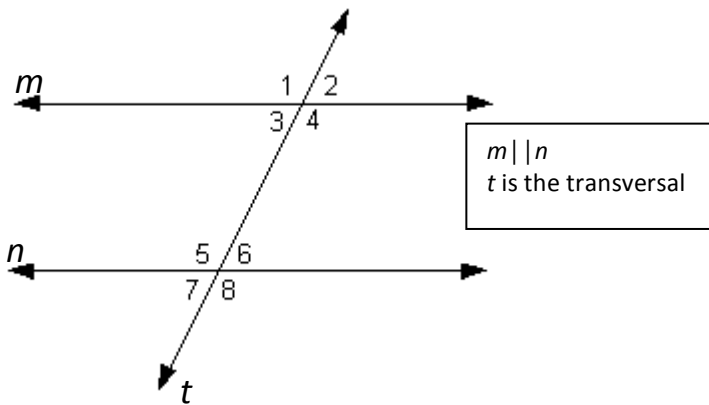
_____.

CORRESPONDING ANGLES

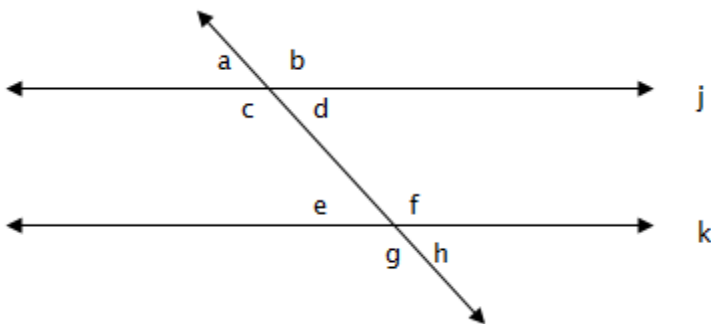


Corresponding Angles are _____.

Example 1: If $m \angle 1$ is 120° , find the measure of each of the missing angles in the diagram below.



Example 2: In the figure below $j \parallel k$. If the measure of angle h is 46° , find the measure of each of the missing angle.



SUMMARY → 3 NEW ANGLE RELATIONSHIPS

- Alternate Interior
- Alternate exterior
- Corresponding

4 PREVIOUS ANGLE RELATIONSHIPS

- Vertical
- Supplementary
- Complimentary
- Angles at a point

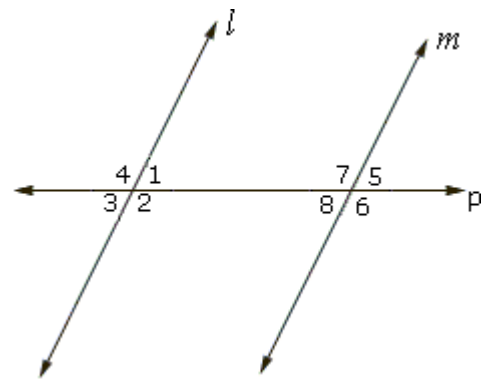
Example 3: If angle t measures 40° and its corresponding angle w measures $(2x + 10)^\circ$, find the measure of x .

Try It!

#1-2 In the diagram below $l \parallel m$ and p is the transversal. If the $m\angle 2$ is 110° ;

1.) Name the **angle relationship** of:

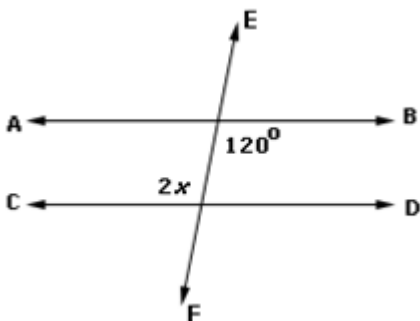
- a) $\angle 2$ and $\angle 6$ _____
- b) $\angle 2$ and $\angle 1$ _____
- c) $\angle 3$ and $\angle 5$ _____
- d) $\angle 1$ and $\angle 8$ _____
- e) $\angle 8$ and $\angle 5$ _____



2) Find the measure of **all** the missing angles.

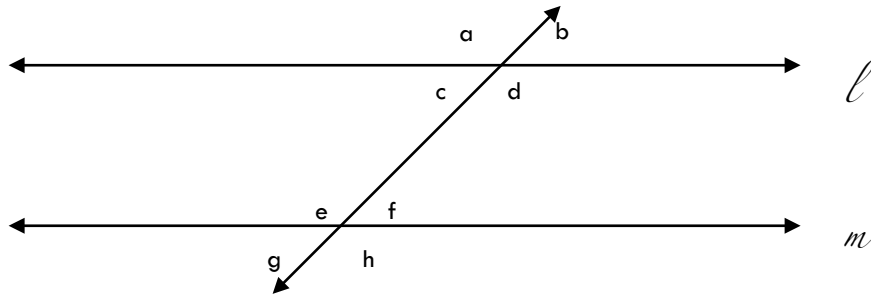
3) AB and CD are two parallel lines and EF is the transversal. Write and solve an equation to find the value of x . Be certain to justify your work. State their relationship.

Relationship: _____



$x =$ _____

#4-6 In the diagram below $l \parallel m$ and is cut by a transversal. If $m\angle a = 123^\circ$, find the measures of $\angle b$, $\angle e$, and $\angle h$ and state the relationship of each angle to $\angle a$.



4) a) $m\angle b =$ _____

b) What is the angle relationship to $\angle a$?

5) a) $m\angle e =$ _____

b) What is the angle relationship to $\angle a$?

6) a) $m\angle h =$ _____

b) What is the angle relationship to $\angle a$?

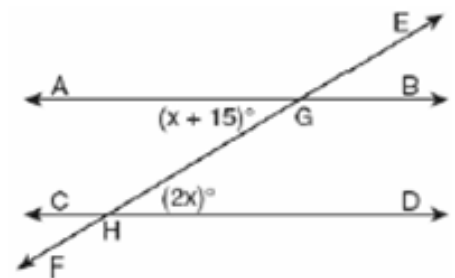
7) In the accompanying diagram, parallel lines AB and CD are intersected by transversal EF at points G and H, respectively, $m\angle AGH = x + 15$, and $m\angle GHD = 2x$. Which equation can be used to find the value of x ?

A $2x = x + 15$

B $2x + x + 15 = 90$

C $2x + x + 15 = 180$

D $2x(x + 15) = 0$



8) Angles x and y are alternate exterior angles formed by two parallel lines and a transversal. If $m\angle x = 167^\circ$, what is $m\angle y$?

A 13°

B 77°

C 167°

D 180°

