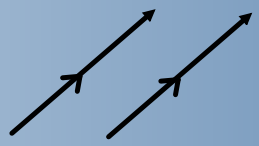
PROPERTIES OF
Angles and Triangles

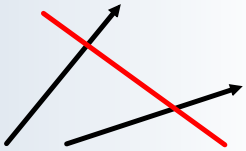
EXPLORING *Parallel Lines...*

Let's remember:

Parallel Lines - lines that never intersect

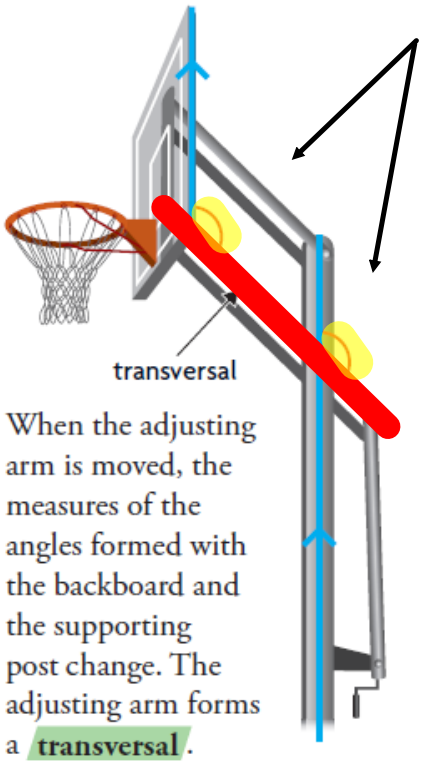


Transversal - line that intersects two or more other lines at distinct points

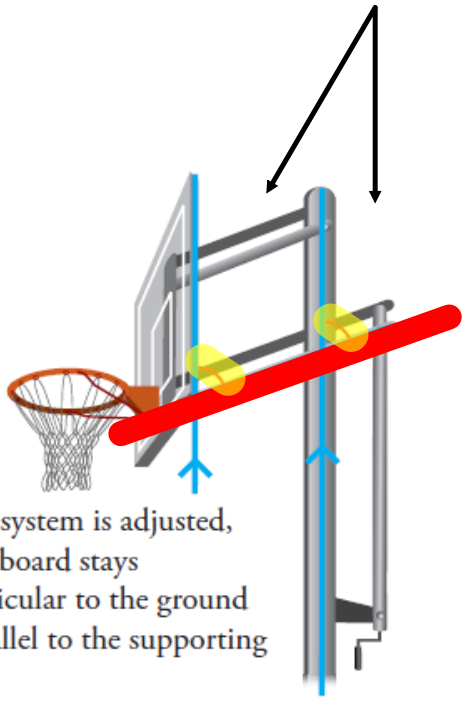


EXPLORING

A sports equipment manufacturer builds portable basketball systems, like those shown here. These systems can be adjusted to different heights.



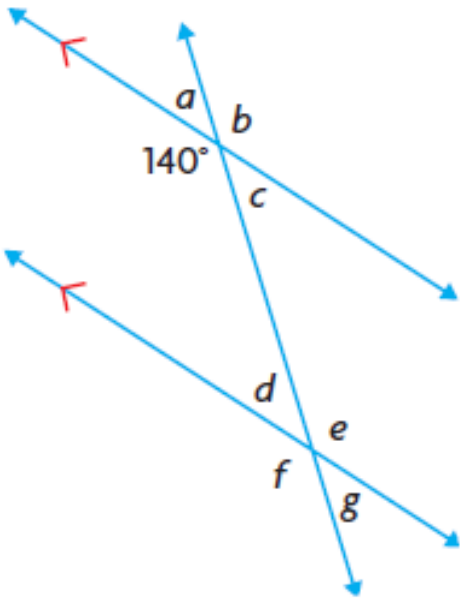
When the adjusting arm is moved, the measures of the angles formed with the backboard and the supporting post change. The adjusting arm forms a **transversal**.



When a system is adjusted, the backboard stays perpendicular to the ground and parallel to the supporting post.

When a transversal intersects two parallel lines, how are the angles measured related?

Use the relationships you observed to predict the measures of as many of the angles *a* to *g* in this diagram as you can. Explain each of your predictions.

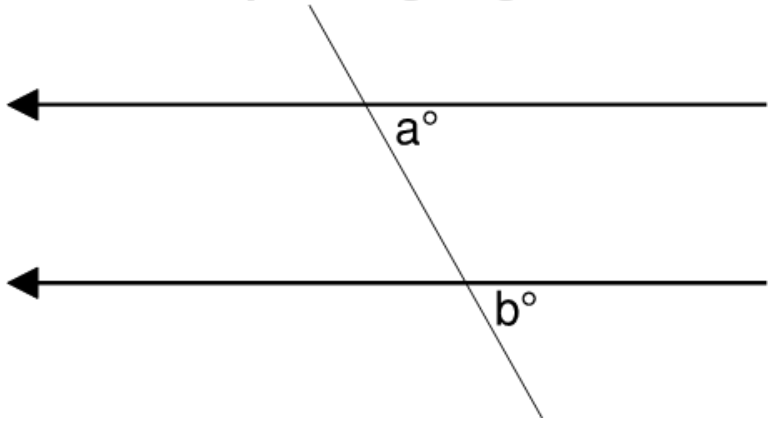


a =
b =
c =
d =
e =
f =
g =

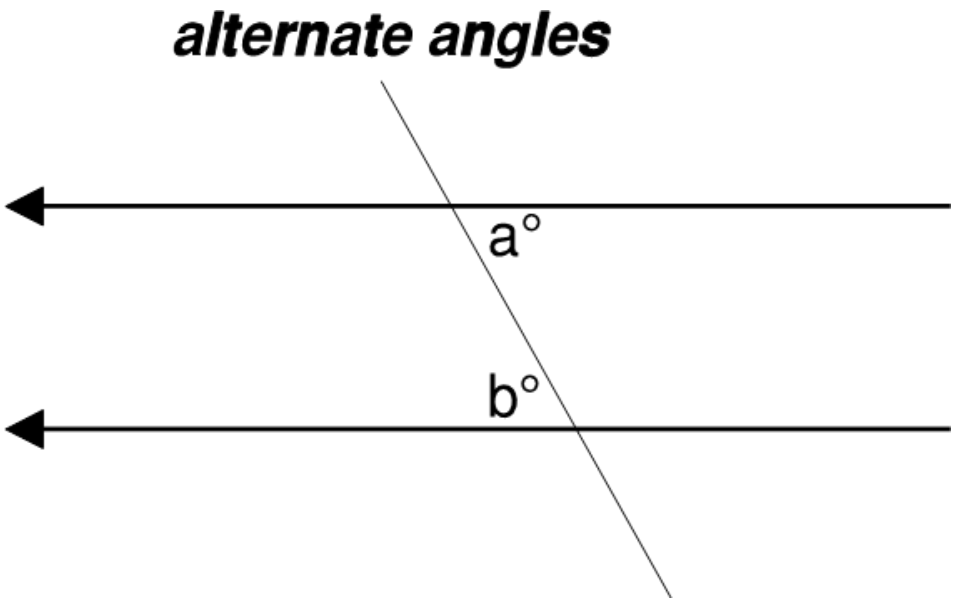
ANGLE PROPERTIES

Parallel Lines

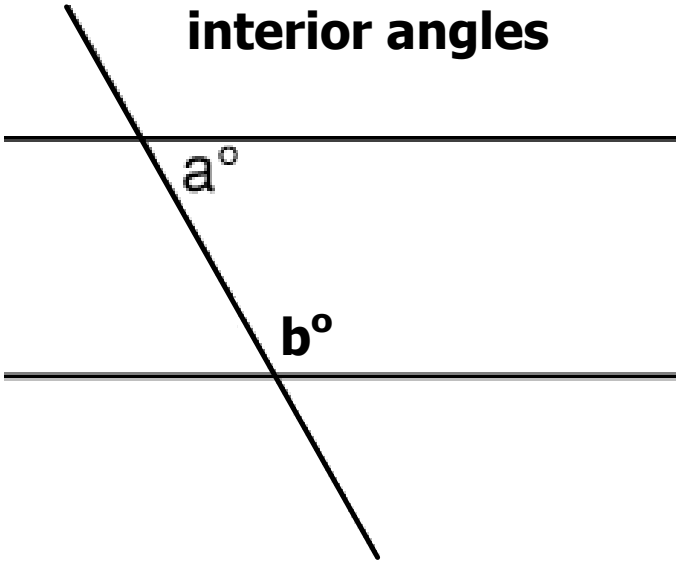
corresponding angles



Corresponding angles are equal. (a = b)



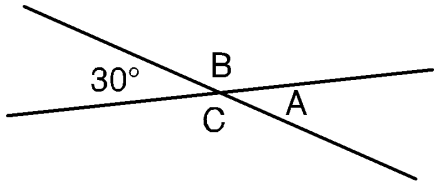
Alternate angles are equal. (a = b)

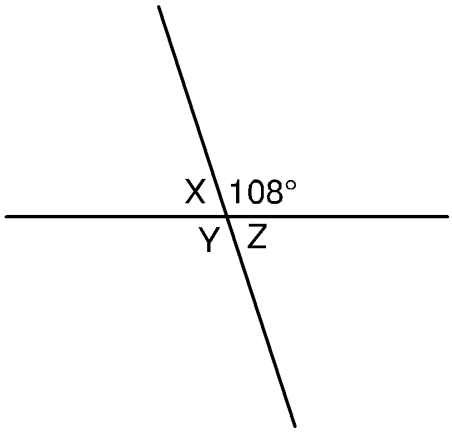


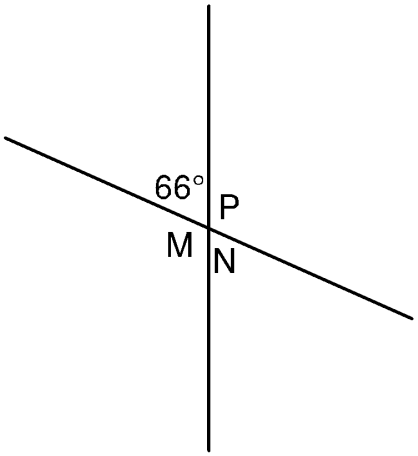
Interior angles are supplementary. ($a + b = 180^o$)

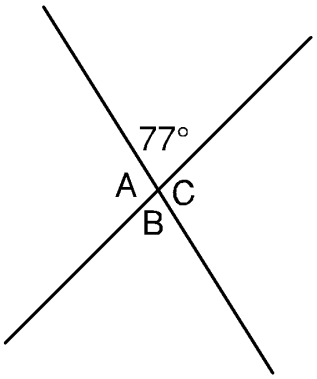
Angles and lines

Calculate the missing angles.
Hint - there are 180° in a straight angle and 360° in a full turn





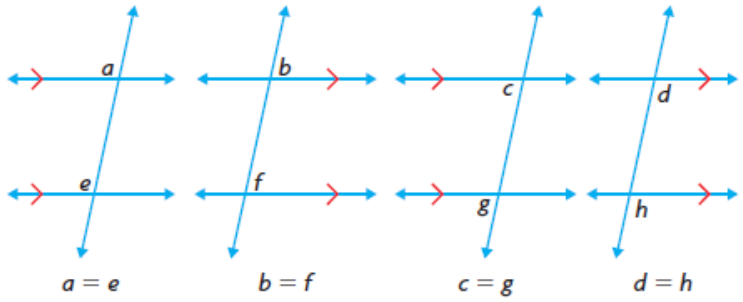




In Summary

Key Ideas

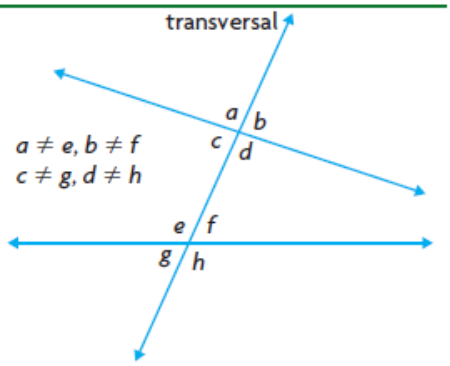
- When a transversal intersects a pair of parallel lines, the corresponding angles that are formed by each parallel line and the transversal are equal.



- When a transversal intersects a pair of lines creating equal corresponding angles, the pair of lines is parallel.

Need to Know

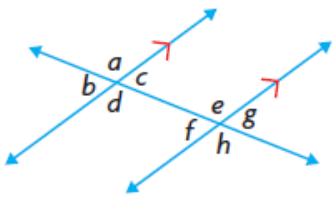
- When a transversal intersects a pair of non-parallel lines, the corresponding angles are not equal.
- There are also other relationships among the measures of the eight angles formed when a transversal intersects two parallel lines.



In Summary

Key Idea

- When a transversal intersects two parallel lines,
  - i) the corresponding angles are equal.
  - ii) the alternate interior angles are equal.
  - iii) the alternate exterior angles are equal.
  - iv) the interior angles on the same side of the transversal are supplementary.



i) $a = e, b = f$
$c = g, d = h$

ii) $c = f, d = e$

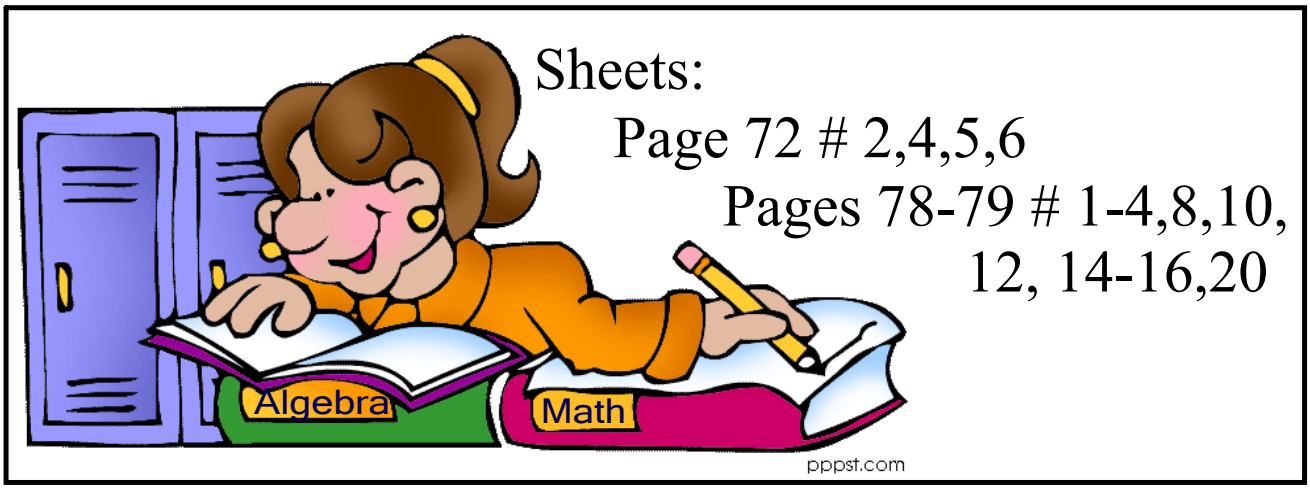
iii) $a = h, b = g$

iv) $c + e = 180°$
$d + f = 180°$

Need to Know

- If a transversal intersects two lines such that
  - i) the corresponding angles are equal, or
  - ii) the alternate interior angles are equal, or
  - iii) the alternate exterior angles are equal, or
  - iv) the interior angles on the same side of the transversal are supplementary,

  then the lines are parallel.



** Review Questions on page 85 #1,5