Name _____

# Lesson 12: Proofs Day 3 –

# Parallel Lines Cut by a Transversal

**LEARNING TARGET**

**I CAN write a proof using geometric facts that I know are true about parallel lines cut by a transversal.**

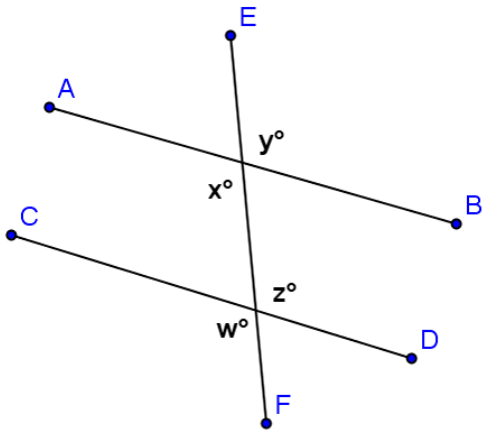
## Warm Up

1. Expressions for the measure of two of the alternate interior angles inside of two parallel lines cut by a transversal are given as *3X + 12* and *4x-20*. Find **x**. (Hint: Draw a picture)

## Mini Lesson

A proof is a written account of the complete thought process that is used to reach a conclusion. Each step of the process is supported by a theorem, postulate, or definition verifying why the step is possible. In a formal proof, no steps can be left out. You will be given a hypothesis and write a proof to show that the conclusion is true.

1. In the diagram below, if you are given that $\overline{AB} \parallel \overline{CD}$ how can you use your knowledge of the congruence of vertical angles and alternate interior angles to prove that $x = w$?



2. Construct a proof designed to demonstrate the following:

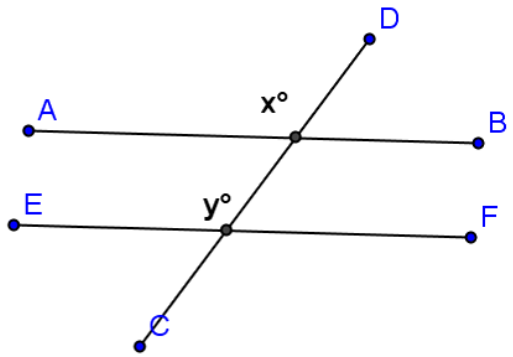
   *If two lines are perpendicular to the same line, they are parallel to each other.*

(a) Draw and label a diagram, (b) state the given facts and the conjecture to be proved (write your plan), and (c) then write out a clear statement of your reasoning to justify each step.

## Work Time

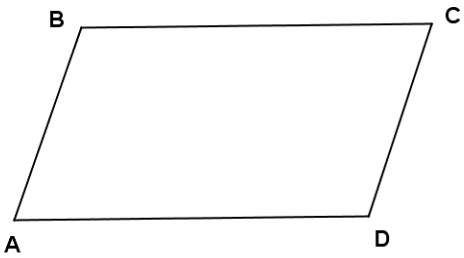
1. In the figure to the right, $x = y$.

   Prove that $\overline{AB} \parallel \overline{EF}$.




2. Given: $\angle C$ and $\angle D$ are supplementary. $m\angle B = m\angle D$.

   Prove: $\overline{AB} \parallel \overline{CD}$



Name _____ Classwork/Homework

## Lesson 12: Proofs Day 3 – Parallel Lines Cut by a Transversal

1. A theorem states that *in a plane, if a line is perpendicular to one of two parallel lines, then it is perpendicular to the other of the two parallel lines.*

   Prove this theorem. (a) Construct and label an appropriate figure, (b) state the given information and the theorem to be proved, then (c) list the necessary steps to demonstrate the proof.