Warmup 2/(2^3)

Created by Katie Wagner

1. Draw a segment and a perpendicular bisector of that segment.

2. What is the slope? What is the y-intercept:
   a. y = -2x +3
   b. 2x + 4y = 10
   c. for the line that goes through (0, 5) and (2, 9)

Quiz Friday

Types of Angles (Monday)

Parallel Lines (Tuesday)

Converse of Theorems (Today)

Perpendicular Bisector Theorem (Today)

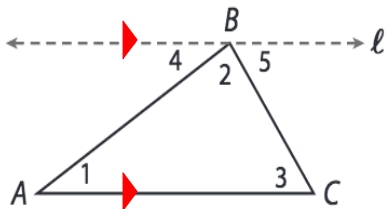Equations of Parallel and Perpendicular Lines (Thursday)

Check Homework

Objective

Some proofs and Converse of Theorems

PROVING the angle sum of a triangle with parallel lines…

This proof will be on the test!

What is the converse of a theorem?

A statement formed by interchanging what is given in a theorem and what is to be proved

Converse
Switch the If and Then Statements!

A statement and its converse

"If two angles are a linear pair, then they are supplementary."

The converse:

"If two angles are supplementary, then they are a linear pair."

Can you come up with another if-then statement that is <u>true</u> but the converse would be <u>false</u>?

Can you come up with one where the converse is also true?

Would the converse be true?

- **If two angles are vertical, then they are congruent.**
- **"If two angles are congruent, then they are vertical"**

- **If an angle is acute, then its supplement is obtuse.**
- **"If an angle's supplement is obtuse, then the angle is acute."**

- **If you add two even numbers, then their sum will be even.**
- **"If the sum of two numbers is even, then the two numbers are even."**

Write the converse of each statement.

1. If $a = b$, then $a + c = b + c$.

    If $a + c = b + c$, then $a = b$.

2. If m$\angle A$ + m$\angle B$ = 90°, then $\angle A$ and $\angle B$ are complementary.

    If $\angle A$ and $\angle B$ are complementary, then m$\angle A$ + m$\angle B$ =90°.

3. If $AB + BC = AC$, then A, B, and C are collinear.

    If A, B, and C are collinear, then $AB + BC = AC$.

Same Side Interior Angles Postulate:

If two parallel lines are cut by a transversal, then the pairs of same-side interior angles are supplementary

Converse of the Same Sides Interior Angles Theorem

If two lines are cut by a transversal so that a pair of same-side interior angles are supplementary, then the lines are parallel

Corresponding Angles Postulate

If two parallel lines are cut by a transversal, then the pairs of corresponding angles have the same measure

### Converse of the Corresponding Angles Postulate

If two lines are cut by a transversal so that any pair of corresponding angles are congruent, then the lines are parallel.

Converse of the Alternate Interior Angles Theorem

If two lines are cut by a transversal so that any pair of alternate interior angles are congruent, then the lines are parallel.

Converse of the Alternate Exterior Angles Theorem

If two lines are cut by a transversal so that any pair of alternate exterior angles are congruent, then the lines are parallel.
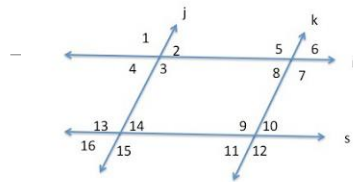
Which lines are parallel if <9 ≅ <13?

Is ℓ || m? Explain using a converse.

m∠3 = (4x – 80)°,
m∠6 = (3x – 50)°, x = 30

m∠3 = 4(30) – 80 = 40
m∠6 = 3(30) – 50 = 40

m∠3 = m∠6

∠3 ≅ ∠6
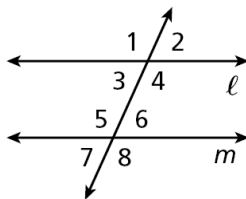
ℓ || m   *Conv. of Alternate Interior Angles Theorem*

Is ℓ || m? Explain using a converse.

m∠4 = 4(13) + 25 = 77
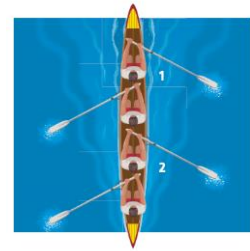m∠5 = 5(13) + 12 = 77

m∠4 = m∠5

∠4 ≅ ∠5
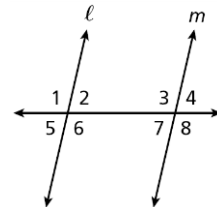
ℓ || m   *Conv. of Alternate Exterior Angles Theorem*

A carpenter is creating a woodwork pattern and wants two long pieces to be parallel.
m∠1= (8x + 2)° and m∠2 = (2x + 10)°.
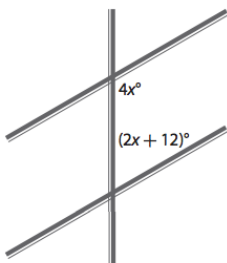**If x = 15, is A parallel to B?**

Piece A   Piece B

1   2
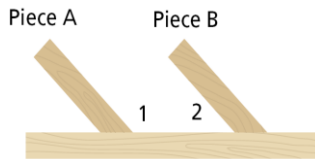
What if…? Suppose the corresponding angles on the opposite side of the boat measure (4y – 2)° and (3y + 6)°, where y = 8. Are the oars parallel?
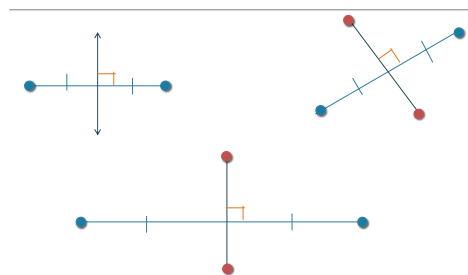
The angles are congruent, so the oars are || by the Conv. of the Corr. ∠s Post.

Find the value of x so that the two lines are parallel.
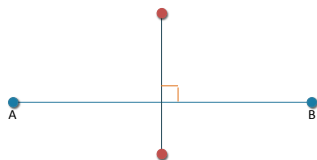
4x°

(2x + 12)°

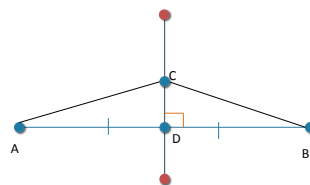What is a perpendicular bisector???

I need a volunteer!

Draw a point that is equidistant (equal distance) from A and B

A   B

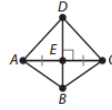How can we prove that $\overline{AC} \cong \overline{BC}$?

Pythagorean Theorem!

C

A   D   B

4

Perpendicular Bisector Theorem

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment

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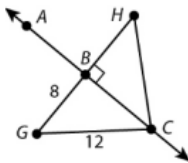Use the diagram shown. $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$.

4. Suppose $ED = 16$ cm and $DA = 20$ cm. Find DC.

Because $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$, then DA = DC and DC = 20 cm

5. Suppose $EC = 15$ cm and $BA = 25$ cm. Find BC.

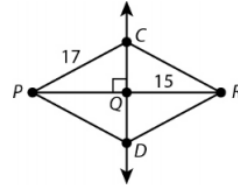**Because $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$, then BA = BC and BC = 25 cm.**

Given: $\overline{AC}$ is the perpendicular bisector of $\overline{GH}$.

$GH =$ _____

$CH =$ _____

Given: $\overline{CD}$ is the perpendicular bisector of $\overline{PR}$.

$CR =$ _____

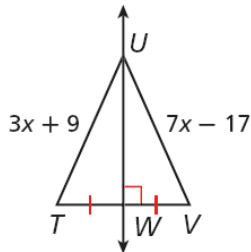$PQ =$ _____

Find each measure.
TU

$TU = UV$
$3x + 9 = 7x - 17$
$9 = 4x - 17$
$26 = 4x$
$6.5 = x$
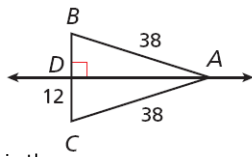So $TU = 3(6.5) + 9 = 28.5$.

$3x + 9$ $7x - 17$

Converse of the Perpendicular Bisector Theorem

If a point is equidistant from the endpoints of a segment, then it lies on the perpendicular bisector of the segment

2/8/2017

Find the measure.

BC

Since $AB = AC$ and $\ell \perp \overline{BC}$, is the perpendicular bisector of $\overline{BC}$ by the Converse of the Perpendicular Bisector Theorem.

$BC = 2CD$

$BC = 2(12) = 24$

Homework

Graphing Parallel and Perpendicular Lines "Preview"