

## WELCOME

 Math 2Chapter 5/6: Triangle Congruency Theorems Last Night's HW: 5.1 Worksheet
Tonight's HW: 5.2-6a Worksheet

## Warm Up

Solve for x :


## Chapter 5 Section 2-6 Learning Targets

|  | A | I can state postulates or theorems that can be used to prove <br> two triangles are congruent. |
| :--- | :--- | :---: |
| B | I can prove that two triangles are congruent using the Side- <br> Side-Side congruence theorem. | 5.2 |
| C | I can prove that two triangles are congruent using the Side- <br> Angle-Side congruence theorem. | 5.4 |
| D | I can prove that two triangles are congruent using the Angle- <br> Side-Angle congruence theorem. | 5.5 |
| E | I can prove that two triangles are congruent using the Angle- <br> Angle-Side congruence theorem. | 5.6 |

## Congruent Triangles

If all three sets of angles and sides are congruent

| Angles | Sides |
| :---: | :---: |
| $\angle \mathrm{A} \cong \angle \mathrm{P}$ | $\overline{\mathrm{AB}} \cong \overline{\mathrm{PQ}}$ |
| $\angle \mathrm{B} \cong \angle \mathrm{Q}$ | $\overline{\mathrm{BC}} \cong \overline{\mathrm{QR}}$ |
| $\angle \mathrm{C} \cong \angle \mathrm{R}$ | $\overline{\mathrm{CA}} \cong \overline{\mathrm{RP}}$ |

Then...

## $\triangle A B C \cong \triangle P Q R$



But there are easier ways!

Decide whether the triangles are congruent. Justify your reasoning.


## Side, Side, Side (SSS)

If three sides of a triangle are $\cong$ to three sides of another triangle, then $\Delta^{\prime} \mathrm{s} \cong$.

| $\overline{\text { Required }}$ |  |
| :--- | :--- |
| $\overline{\mathrm{AC}} \cong \overline{\mathrm{PR}}$ | S |
| $\overline{\mathrm{CB}} \cong \overline{\mathrm{RQ}}$ | S |
| $\overline{\mathrm{BA}} \cong \overline{\mathrm{QP}}$ | S |



So since we have SSS...
$\triangle A B C \cong \triangle P Q R$

## Side, Angle, Side (SAS)

If two sides and the angle between them are $\cong$ to a set of two other sides and angle between, then $\Delta$ 's $\cong$.
Required

$$
\begin{array}{ll}
\overline{\mathrm{AC}} \cong \overline{\mathrm{PR}} & \mathrm{~S} \\
\angle \mathrm{CC} \cong \mathrm{R} & \mathrm{~A} \\
\overline{\mathrm{CB}} \cong \overline{\mathrm{RQ}} & \mathrm{~S}
\end{array}
$$



So since we have SAS...

$$
\triangle A B C \cong \triangle P Q R
$$

## Angle, Side, Angle (ASA)

If two angles and the side between them are $\cong$ to a set of two other angles and side between, then $\Delta \cong$.

|  | Required |
| ---: | :--- |
| $\angle \mathrm{A} \cong \angle \mathrm{P}$ | A |
| $\overline{\mathrm{AC}} \cong \overline{\mathrm{PR}}$ | S |
| $\angle \mathrm{C} \cong \angle \mathrm{R}$ | A |



So since we have ASA...
$\triangle A B C \cong \triangle P Q R$

## Angle, Angle, Side (AAS)

If two angles and a side that is not between them are $\cong$ to a set of two other angles and a side, then $\Delta^{\prime} s \cong$. Required

$\angle A \cong \angle P$<br>A<br>$\angle \mathrm{C} \cong \angle \mathrm{R}$ $\mathrm{CB} \cong \overline{\mathrm{RQ}}$<br>A<br>$\mathrm{CB} \cong \mathrm{RQ} \quad \mathrm{S}$



So since we have AAS...
$\triangle A B C \cong \triangle P Q R$

## SSS

Three congruent sides

## SAS

Two sides and angle between


ASA
Two angles and Side Between.
AAS
Two angles and a opposite side


Is it possible to prove that the triangles are congruent? If so, state the postulate or theorem you would use. Explain your reasoning.
2. $\triangle R S T$ and $\triangle T Q R$

3. $\triangle J K L$ and $\triangle N M L$

5. $\triangle P Q R, \triangle S R Q$



## WELCOME

 Math 2Chapter 5/6: Triangle Congruency Theorems Last Night's HW: 5.2-6a Worksheet
Tonight's HW: 5.2-6b Worksheet

## Warm Up

1. Decide if the triangles are congruent. If they are provide the congruence type and congruence statement.

2. Solve for $x$ :


## Chapter 5 Section 2-6 Learning Targets

|  | A | I can state postulates or theorems that can be used to prove <br> two triangles are congruent. |
| :--- | :--- | :---: |
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## SSS

Three congruent sides

## SAS

Two sides and angle between


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Two angles and Side Between.
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## Proof Guide Lines

1) Read and understand problem.
2) Draw all the given info on the triangle.
3) See what other things you can deduce.
(Vertical, Linear Pair, Reflexive, Alternate Interior...)
4) Decide Congruence Type \& write at bottom of proof. (SSS, SAS, ASA, AAS)
5) Start with Given and Prove Each Congruency.
6) Reread proof and make sure it makes sense.

## GIVEN $>\overline{E F} \cong \overline{G H}$, $\overline{F G} \cong \overline{H E}$ <br> PROVE $>\triangle E F G \cong \triangle G H E$ <br> 

## Solution

To begin, copy the diagram and label it using the given information. Then write the given information and the statement you need to prove.
GIVEN $\gg \overline{\overline{D R}} \perp \overline{A G}$,
PROVE $>\triangle D R A \cong \triangle D R G$


## Proof Practice 1

1. Given: $\overline{B C} \cong \overline{B A}$
$\overline{C D} \cong \overline{A D}$
Prove: $\triangle A B D \cong \triangle C B D$

2. Write a proof. Justify each statement.


Given: $\overline{A B} \cong \overline{C D}, \overline{A B} \| \overline{C D}$
Prove: $\triangle A B D \cong \triangle C D B$
3. Given: $\overline{A B} \cong \overline{D E}$

$$
\angle B \cong \angle E
$$

Prove: $\triangle A B C \cong \triangle D E C$


1. Given: $\overline{B C} \cong \overline{B A}$

Prove: $\triangle A B D \cong \triangle C B D$

2. Write a proof. Justify each statement.


Given: $\overline{A B} \cong \overline{C D}, \overline{A B} \| \overline{C D}$
Prove: $\triangle A B D \cong \triangle C D B$
3. Given: $\overline{A B} \cong \overline{D E}$

$$
\angle B \cong \angle E
$$

Prove: $\triangle A B C \cong \triangle D E C$


## Transformations Practice

