



4-4

Congruent Figures

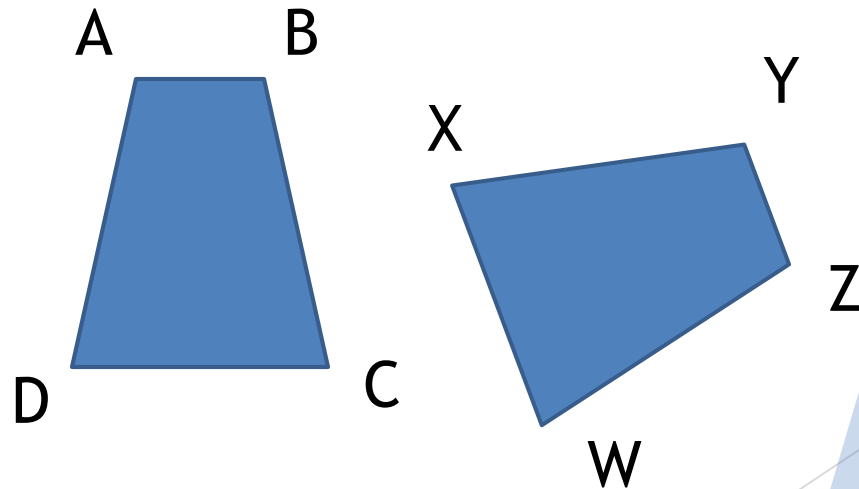
OBJECTIVE

- To use the properties of congruent polygons
- To prove polygons congruent using the definition of congruence

VOCABULARY

Congruent polygons - polygons that have the same size and shape.

They may be rotated flipped or moved, but if they were cut out, they would fit on top of each other exactly.



VOCABULARY

The congruence statement is written by matching up the congruent parts.

$$ABCD \cong YZWX$$

$$\angle A \cong \angle Y$$

$$\overline{AB} \cong \overline{YZ}$$

$$\angle B \cong \angle Z$$

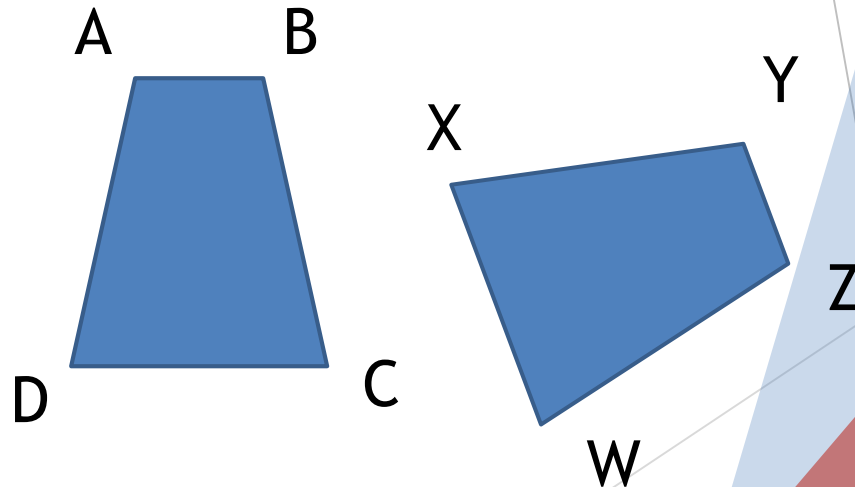
$$\overline{BC} \cong \overline{ZW}$$

$$\angle C \cong \angle W$$

$$\overline{CD} \cong \overline{WX}$$

$$\angle D \cong \angle X$$

$$\overline{AD} \cong \overline{YX}$$

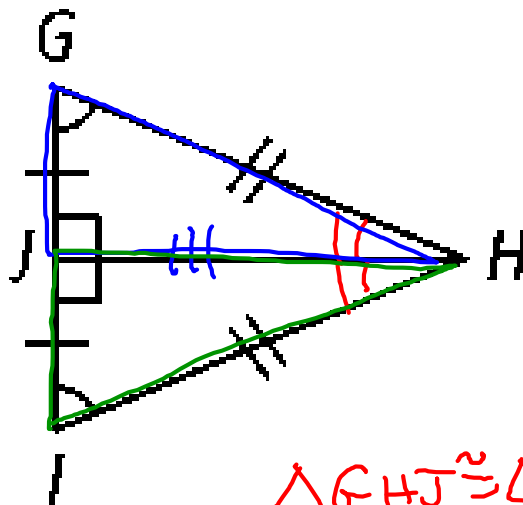


Is $WXYZ \cong CDAB$?

CLASS WORK

Can you conclude that the triangles are congruent? Justify your answers.

1. $\triangle GHJ$ and $\triangle IHJ$



$$\begin{aligned} \angle G &\cong \angle I &> \text{Given} \\ \angle GJH &\cong \angle IJH &3^{\text{rd}} \angle s \text{ Thm} \end{aligned}$$

$$\overline{GJ} \cong \overline{IJ}; \overline{GH} \cong \overline{IH} \text{ Given}$$

$$\overline{JH} \cong \overline{JH} \text{ Reflexive prop of } \cong$$

$$\triangle GHJ \cong \triangle IHJ$$

Def of \cong polygons (Δ)

CLASS WORK

Find the
value of x .

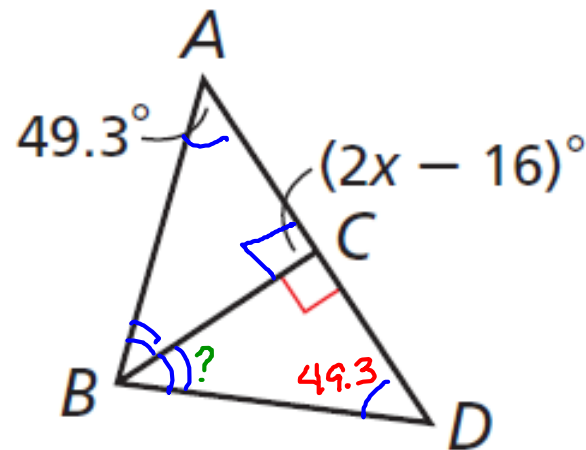
Find $m\angle DBC$.

$$2x - 16 = 90$$

$$2x = 106$$

$$x = 53$$

2 Given: $\triangle ABC \cong \triangle DBC$



$$m\angle DBC = 90 - 49.3 = 40.7^\circ$$

CLASS WORK

3.

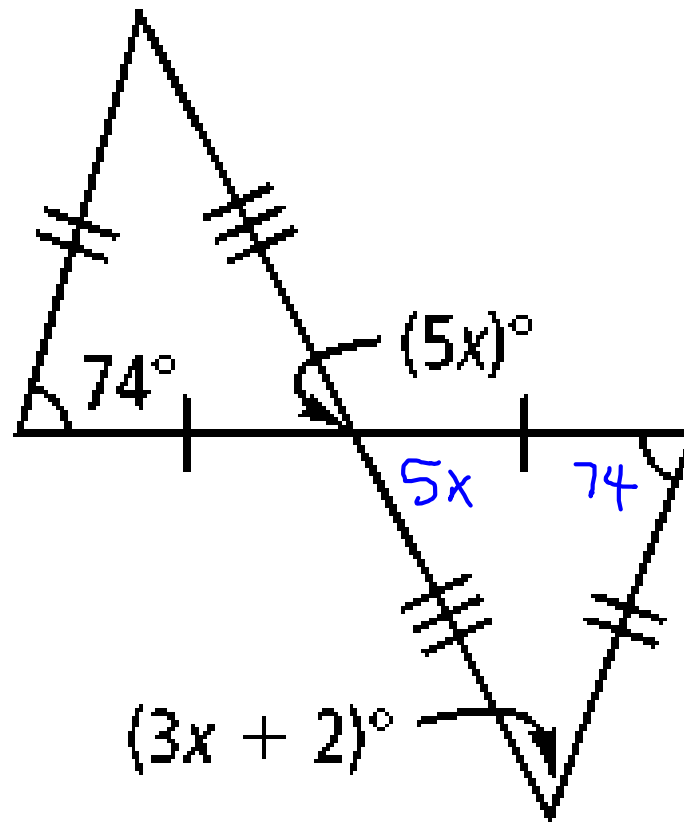
Find x .

$$5x + 74 + 3x + 2 = 180$$

$$8x + 76 = 180$$

$$8x = 104$$

$$x = 13$$



CLASS WORK

$$ABCD \cong FGHJ.$$

Find the
measures of the
given angles.

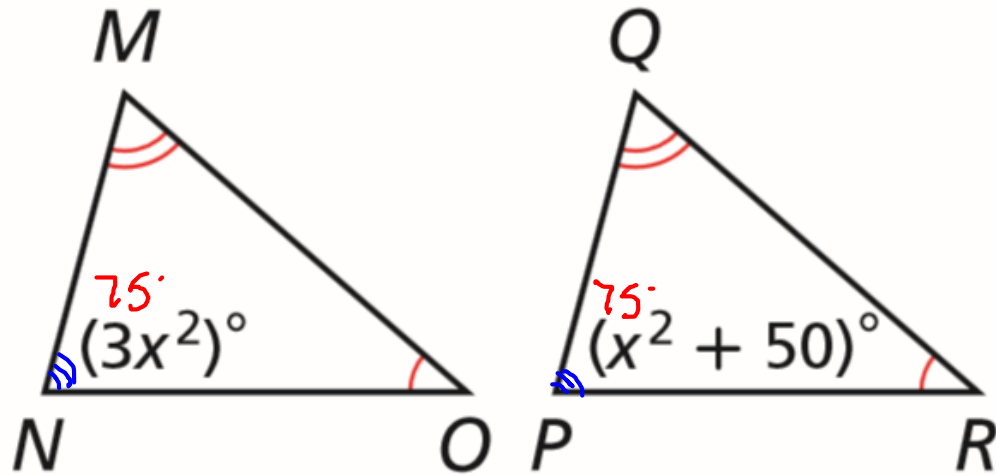
$$4. m\angle B = 3y, m\angle G = y + 50$$

$$\begin{array}{r} 3y = y + 50 \\ -y \quad -y \\ \hline 2y = 50 \\ \hline y = 25 \end{array}$$

$$\begin{aligned} 3(25) &= 75 \\ m\angle B &= 75 \\ 25 + 50 &= 75 \\ m\angle G &= 75 \end{aligned}$$

CLASS WORK

5. Find
 $m\angle N$ and
 $m\angle P$



$$3x^2 = x^2 + 50$$

$$2x^2 = 50$$

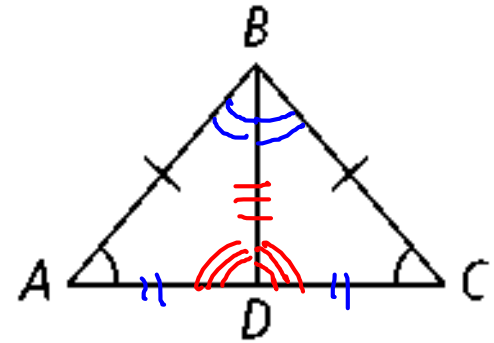
$$x^2 = 25$$

$$x = \pm 5$$

CLASS WORK

5. Given: $\overline{AB} \cong \overline{BC}$; $\angle A \cong \angle C$;
 \overline{BD} is the angle bisector of $\angle ABC$;
 D is the midpoint of \overline{AC} .

Prove: $\triangle ABD \cong \triangle CBD$



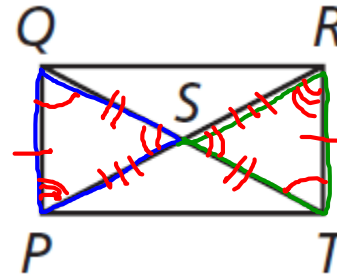
Statements

Reasons

<p>① 1) $\overline{AB} \cong \overline{BC}$; $\angle A \cong \angle C$ \overline{BD} is the angle bisector of $\angle ABC$ D is the midpoint of \overline{AC}</p> <p>② 2) $\angle ABD \cong \angle CBD$</p> <p>③ 3) $\angle ADB \cong \angle CDB$</p> <p>④ 4) $\overline{AD} \cong \overline{CD}$</p> <p>⑤ 5) $\overline{BD} \cong \overline{BD}$</p> <p>⑥ 6) $\triangle ABD \cong \triangle CBD$</p>	<p>1) Given</p> <p>2) Definition of angle bisector</p> <p>3) Third angles theorem</p> <p>4) Definition of midpoint</p> <p>5) Reflexive property of \cong</p> <p>6) Definition of congruent polygons</p>
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CLASS WORK

6. **Given:** \overline{PR} and \overline{QT} bisect each other. $\angle PQS \cong \angle RTS$, $\overline{QP} \cong \overline{RT}$
Prove: $\triangle QPS \cong \triangle TRS$



Statements	Reasons
1) $\overline{QP} \cong \overline{RT}$; $\angle PQS \cong \angle RTS$ \overline{PR} and \overline{QT} bisect each other	1) Given
2) $\overline{PS} \cong \overline{RS}$; $\overline{QS} \cong \overline{TS}$	2) Definition of segment bisector
3) $\angle QSP \cong \angle TSR$	3) Vertical angles theorem
4) $\angle QPS \cong \angle TRS$	4) Third angles theorem
5) $\triangle ABD \cong \triangle CBD$	5) Definition of congruent polygons

LEARNING RUBRIC

- ▶ Got It: Applies concepts to prove congruent polygons in complex/real world situations
- ▶ Almost There: Represents and applies concepts to solve for angle measures in simple/complex problems
- ▶ Moving Forward: Solves for congruent angle measures in more complex represented problems
- ▶ Getting Started: Solves for congruent angle measures in simple represented problems

SUMMARY

- ❖ Congruent polygons are the same size and shape.
- ❖ They have congruent corresponding parts.

HOMEWORK

Pages 243 - 245:

13 - 19 all;

24, 32, 34, 36