Name **ANSWER KEY**

5.1 Congruence and Triangles

Goal: Classify triangles by their sides and by their measures.

Corresponding Parts: the sides and angles that are the same when two triangles have exactly the same
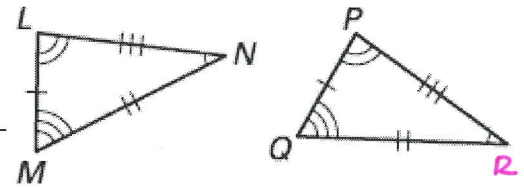
__size__ and __shape__

Congruent Figures: figures are congruent if all pairs of corresponding __sides__ and corresponding

__angles__ are congruent

The two triangles are congruent. Identify all congruent parts and write a congruence statement.

Corresponding Angles:

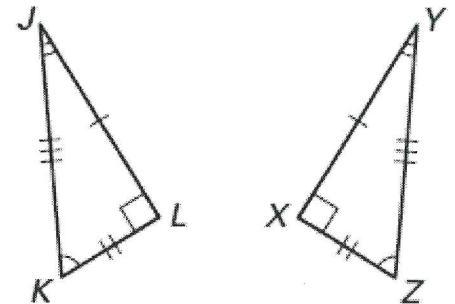∠N and ∠R   ∠L and ∠P   ∠M and ∠Q

Corresponding Sides:

$\overline{LM}$ and $\overline{PQ}$ $\overline{MN}$ and $\overline{QR}$ $\overline{LN}$ and $\overline{PR}$

Congruence Statement: Δ NLM ≅ Δ RPQ

Corresponding Angles:

∠K and ∠Z   ∠L and ∠X   ∠J and ∠Y

Corresponding Sides:

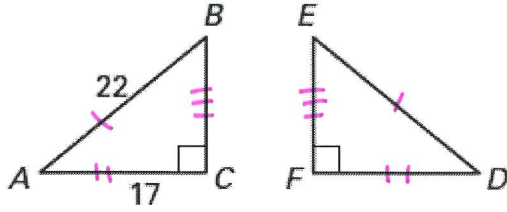$\overline{JL}$ and $\overline{YX}$ $\overline{LK}$ and $\overline{XZ}$ $\overline{JK}$ and $\overline{YZ}$

Congruence Statement: Δ JLK ≅ Δ YXZ
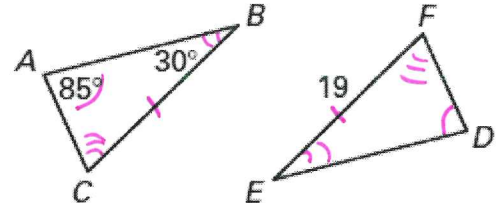
Emphasize that the order matters!

In the triangles below, $\triangle ABC \cong \triangle DEF$. Find the indicated measures.

DE = __22__   DF = __17__

BC = __19__ $m\angle D$ = __85°__ $m\angle E$ = __30°__

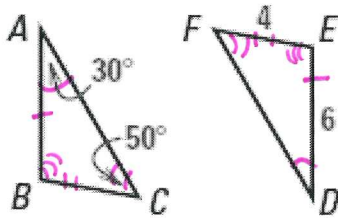$m\angle C$ = __65°__ $m\angle F$ = __65°__

$\begin{array}{r} 180 \\ -85 \\ \underline{30} \\ 65 \end{array}$

In the triangles below, $\triangle ABC \cong \triangle DEF$. Find the indicated measures.

AB = __6__   BC = __4__ $m\angle D$ = __30°__

$m\angle F$ = __50°__ $m\angle B$ = __100°__ $m\angle E$ = __100°__

BC = __5__ $m\angle D$ = __27°__ $m\angle F$ = __86°__

AB = __11__ $m\angle B$ = __67°__ $m\angle E$ = __67°__

$\begin{array}{r} 180 \\ -50 \\ \underline{30} \\ 100 \end{array}$
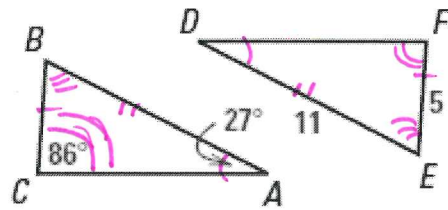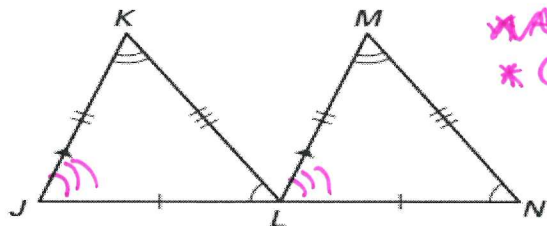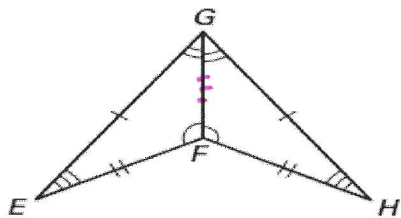
$\begin{array}{r} 180 \\ -86 \\ \underline{27} \\ 67 \end{array}$

Determine whether the triangles are congruent. If so, write a congruence statement.

a) Congruent? __Yes__

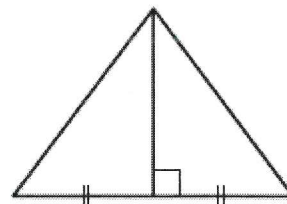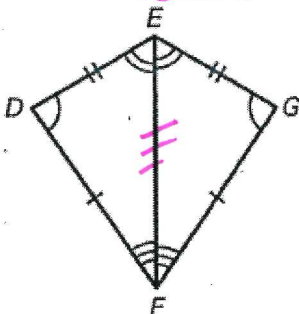Statement: $\triangle$__EGF__ $\cong \triangle$__HGF__

b) Congruent? __Yes__

Statement: $\triangle$__JKL__ $\cong \triangle$__LMN__

*AA+... turn
* corresponding
Angles*

c) Congruent? __yes__
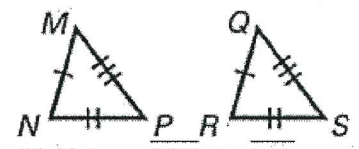
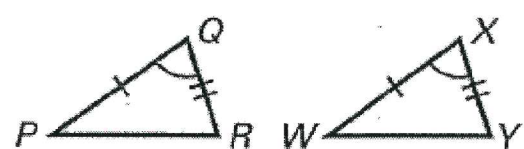Statement: $\triangle$__DEF__ $\cong \triangle$__GEF__

d) Congruent? __NO__

Statement: $\triangle$_____ $\cong \triangle$_____

* Every side & angle must be able to be marked $\cong$ *

2

5.2 SSS and SAS

Goal: Show triangles are congruent using SSS and SAS.

|	
Side-Side-Side (SSS) Congruent Postulate: If three <u>sides</u> of one triangles are congruent to three <u>sides</u> of a second triangle, then the two triangles are <u>congruent</u>	M, Q diagrams If Side $\overline{MN} \cong \overline{QR}$, and Side $\overline{NP} \cong \overline{RS}$, and Side $\overline{PM} \cong \overline{SQ}$, then $\triangle MNP \cong \triangle \underline{QRS}$
Side-Angle-Side (SAS) Congruent Postulate: If two sides and the included angle of one triangle are congruent to two sides and the <u>included</u> angle of a second triangle, then the triangles are <u>congruent</u>	Q, X diagrams If Side $\overline{PQ} \cong \overline{WX}$, and Angle $\angle Q \cong \angle X$, and Side $\overline{QR} \cong \overline{XY}$, then $\triangle PQR \cong \triangle \underline{WXY}$.

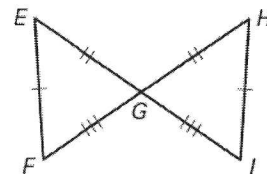**Does the diagram give enough information to use the SSS congruence postulate?**
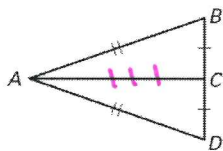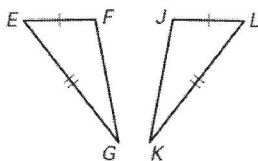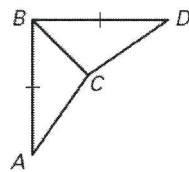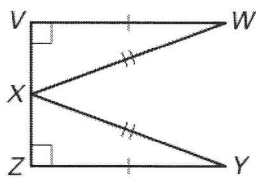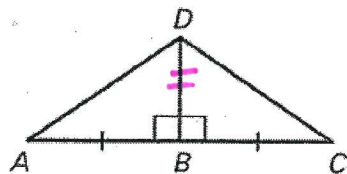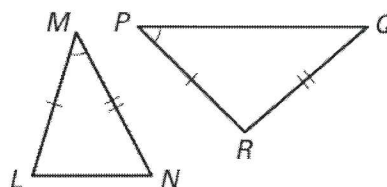
Yes   NO   NO   yes

Does the diagram give enough information to use the SAS congruence postulate?
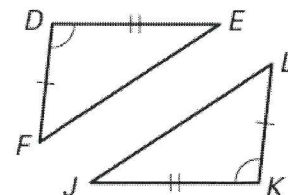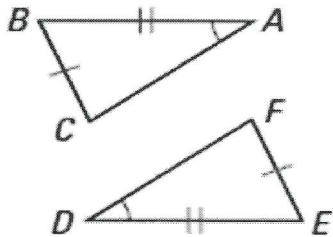
No   Yes   No   Yes

3

Decide if there is enough information is given to show that the triangles are congruent. If so, tell which congruence postulate you would use and write a congruence statement.
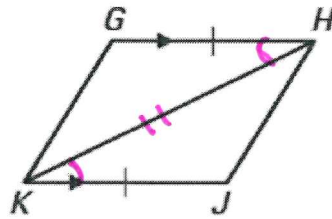
a. Congruent? ___No___

Postulate: _____

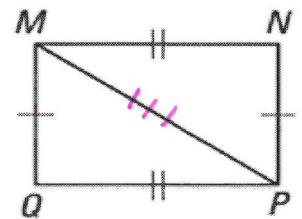Δ_____ ≅ Δ_____

b. Congruent? ___Yes___

Postulate: ___SAS___

Δ___KGH___ ≅ Δ___HJK___

Alt. Int. ∠'s

c. Congruent? ___Yes___

Postulate: ___SSS___

Δ___MQP___ ≅ Δ___PNM___

d. Congruent? ___Yes___

Postulate: ___SAS___

Δ___WXZ___ ≅ Δ___YXZ___
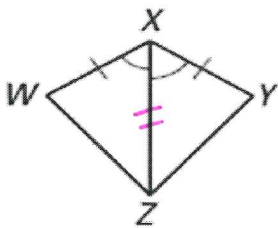
e. Congruent? ___Yes___

Postulate: ___SSS___

Δ___RSU___ ≅ Δ___TSU___

f. Congruent? ___NO___

Postulate: _____

Δ_____ ≅ Δ_____

4
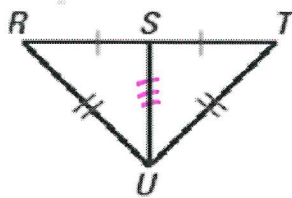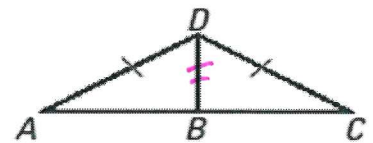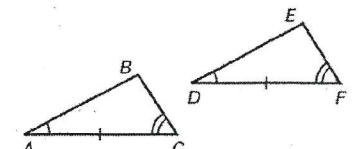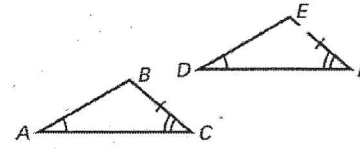
5.3 ASA and AAS

Goal: Show triangles are congruent using ASA and AAS.

|	
Angle-Side-Angle (ASA) Congruent Postulate: If two angles and the included <u>*side*</u> of one triangle are congruent to two <u>*angles*</u> the included side of a second triangle, then the two triangles are <u>*congruent*</u>	If Angle $\angle A \cong \angle D$, and Side $\overline{AC} \cong \overline{DF}$, and Angle $\angle C \cong \angle F$, then $\triangle ABC \cong \triangle \underline{DEF}$.
Angle-Angle-Side (AAS) Congruent Postulate: If two <u>*angles*</u> and the <u>non-included</u> side of one triangle are congruent to two angles and the corresponding non-included <u>*side*</u> of a second triangle, then the two triangles are <u>*congruent*</u>	If Angle $\angle A \cong \angle D$, and Angle $\angle C \cong \angle F$, and Side $\overline{BC} \cong \overline{EF}$, then $\triangle ABC \cong \triangle \underline{DEF}$.

Use △TGL shown. Complete the table.

Angles	Included Side
$\angle T$ and $\angle G$	*TG*
$\angle G$ and $\angle L$	*GL*
$\angle T$ and $\angle L$	*TL*
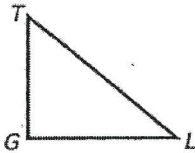
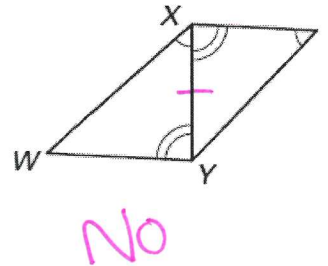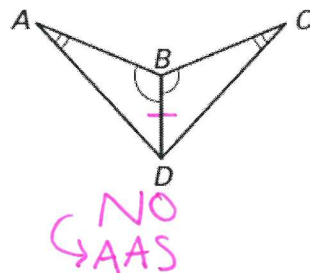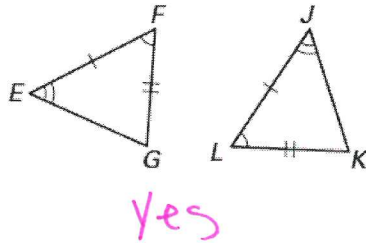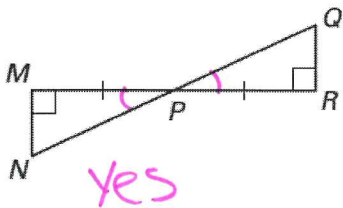**Draw any △ABC in the space below. Complete the table.**

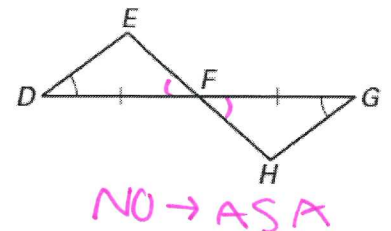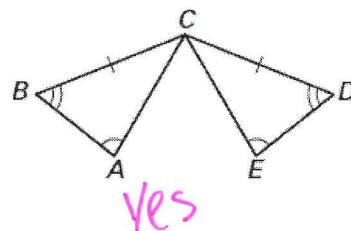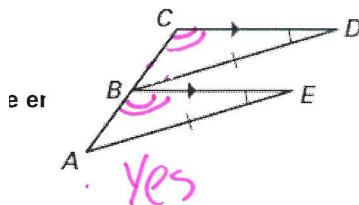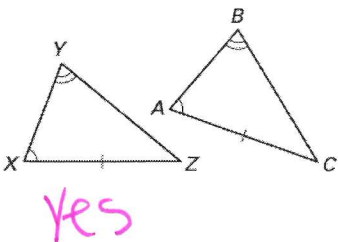| Angles	Non-Included Sides
$\angle A$ and $\angle B$	*AC* and *BC*
$\angle B$ and $\angle C$	*AC* and *AB*
$\angle A$ and $\angle C$	*AB* and *CB*
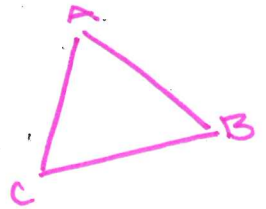
Does the diagram give enough information to use the ASA congruence postulate?

yes   *yes*   *NO →AAS*   *No*

Does the diagram give enough information to use the AAS congruence postulate?

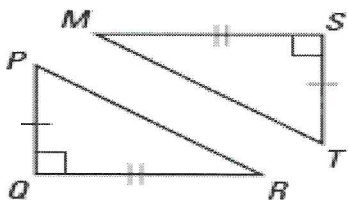*yes*   *yes*   *yes*   *NO → ASA*

Decide if there is enough information is given to show that the triangles are congruent. If so, tell which congruence postulate you would use and write a congruence statement.
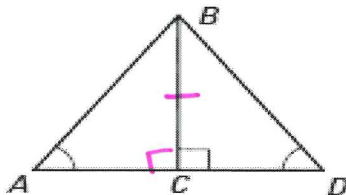
a. Congruent? _Yes_

Postulate: _SAS_

Δ_PQR_ ≅ Δ_TSM_
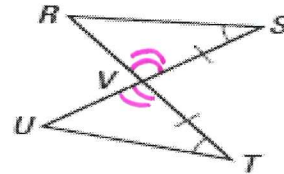
b. Congruent? _Yes_

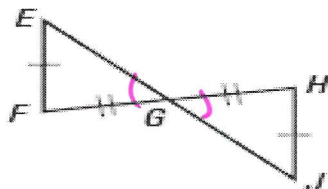Postulate: _AAS_

Δ_ABC_ ≅ Δ_DBC_

c. Congruent? _Yes_

Postulate: _ASA_

Δ_RSV_ ≅ Δ_UTV_

d. Congruent? _No_

Postulate: _____

Δ_____ ≅ Δ_____

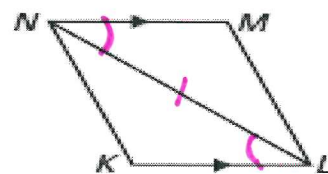e. Congruent? _Yes_

Postulate: _SSS_

Δ_WXV_ ≅ Δ_ZXY_

f. Congruent? _No_

Postulate: _____

Δ_____ ≅ Δ_____

6
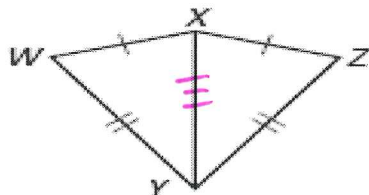
# 5.4 Hypotenuse Leg Congruence Theorem: HL

Goal: Use the HL Congruence Theorem to prove triangles congruent.

Hypotenuse-Leg Theorem: If the hypotenuse and a leg of a ___right___ triangle are congruent to the hypotenuse and a leg of a second ___right___ triangle, then the two triangles are ___congruent___.
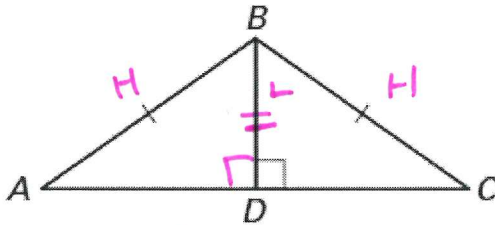
H $\overline{AC} \cong \overline{DF}$, and
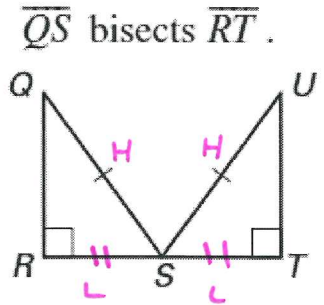L $\overline{BC} \cong \overline{EF}$,
then $\triangle ABC \cong \triangle$ ___DEF___.

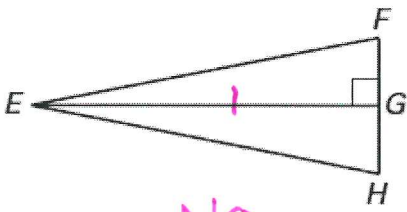Does the diagram give enough information to use the HL congruence theorem?
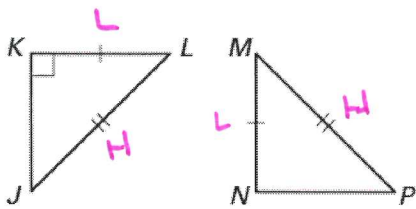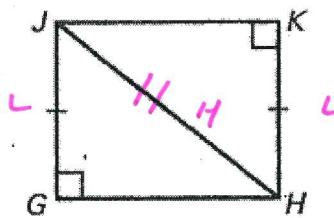
NO
∠N is not marked as a right ∠

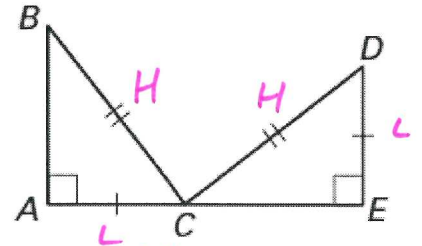Yes

$\overline{QS}$ bisects $\overline{RT}$.
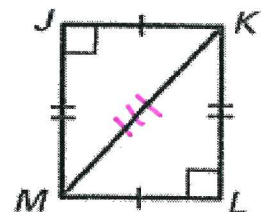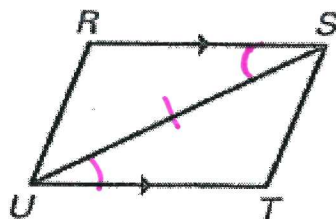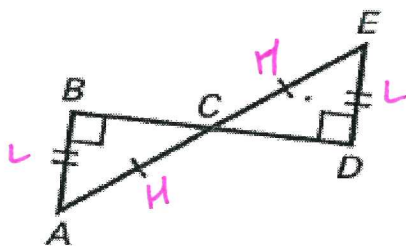Yes

NO

Yes

Yes

Decide if there is enough information is given to show that the triangles are congruent. If so, tell which congruence postulate you would use.

a. Congruent? ___Yes___

Postulate: ___HL___

$\triangle$ ___ABC___ $\cong \triangle$ ___EDC___

b. Congruent? ___No___

Postulate: _____

$\triangle$ _____ $\cong \triangle$ _____

c. Congruent? ___Yes___

Postulate: ___SSS or HL or SAS___

$\triangle$ ___MJK___ $\cong \triangle$ ___KLM___

d. Congruent? Yes

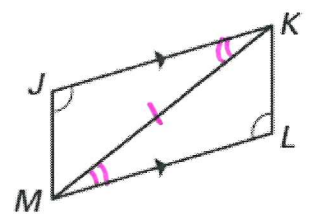Postulate: HL

Δ ABC ≅ Δ DGF
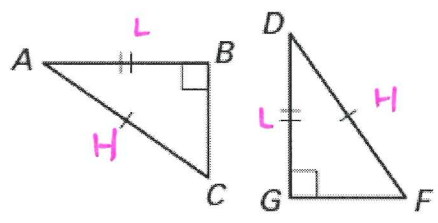
e. Congruent? Yes

Postulate: ASA

Δ VWX ≅ Δ ZVX
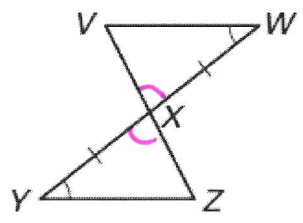
f. Congruent? Yes

Postulate: AAS

Δ JKM ≅ Δ LMK

g. Congruent? Yes

Postulate: SSS

Δ WXY ≅ Δ ZXY
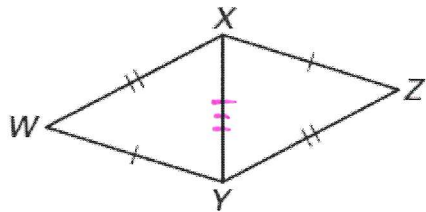
h. Congruent? Yes

Postulate: SAS

Δ FGE ≅ Δ IGH
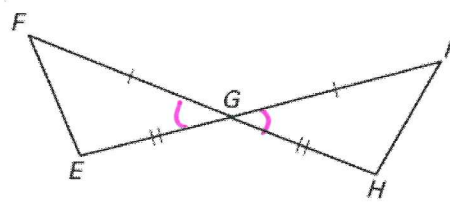
i. Congruent? Yes

Postulate: HL

Δ SPR ≅ Δ QPR
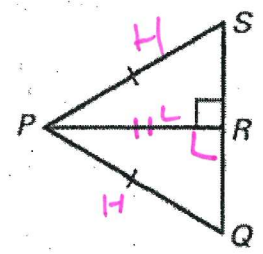
5.7 Reflections and Symmetry

Goal: Identify and use reflections and lines of symmetry

Reflection: a transformation that creates a ___mirror___ image. The original figure is reflected in a line that is called the line of reflection.

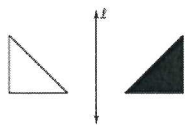| Properties of Reflections |
|---|
| 1. The reflected image is ___congruent___ to the original figure. |
| 2. The orientation of the reflected image is ___flipped___. |
| 3. The line of reflection is the ___perpendicular bisector___ of the segments joining the corresponding points. |

Draw the reflection of the letter E in the line k.
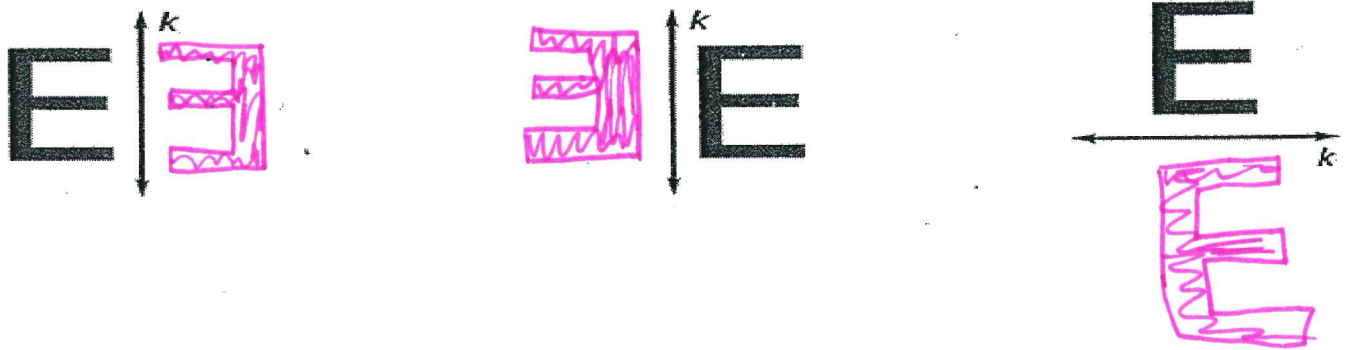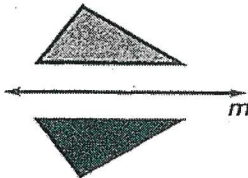

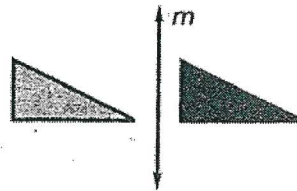**Tell whether the figures are reflections.**
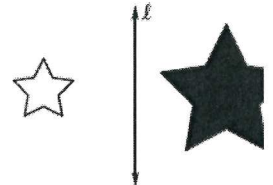

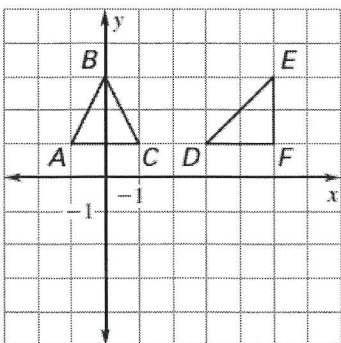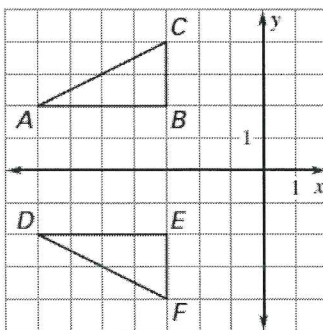NO   Yes   Yes   NO   NO

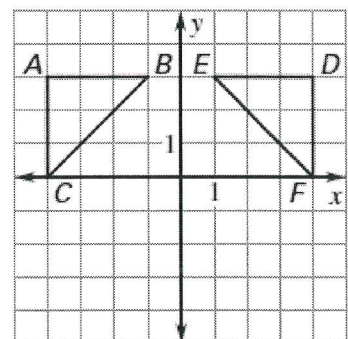**Tell whether the ligures are reflections. If they are reflections, name the line of reflection.**
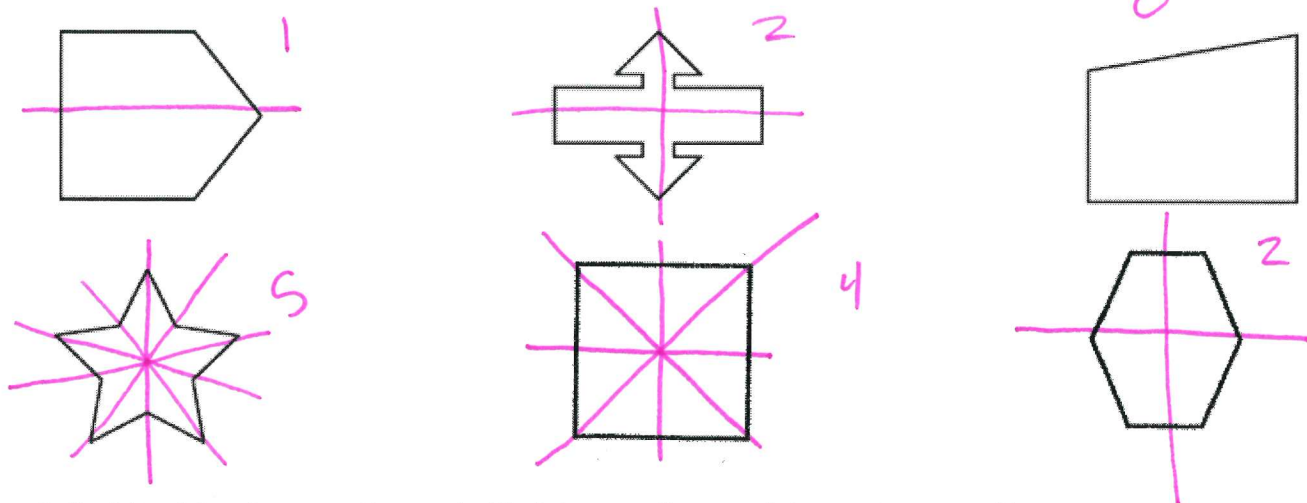

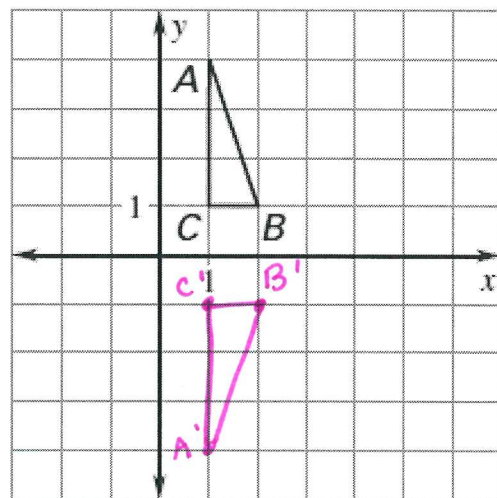Not a reflection   Yes → x-axis   Yes → y-axis

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]**Line of symmetry**: a line that allows a figure to be reflected onto itself by a reflection in the line.

Determine the number of lines of symmetry of each figure.

1

2

0

5

4

2

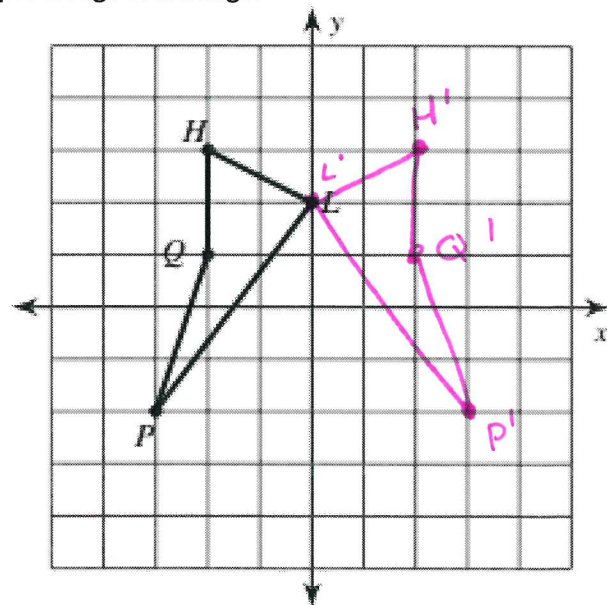**Reflect the triangle across the x-axis. Find the coordinates of the pre-image and image.**

A __(1, 4)__   A' __(1, -4)__

B __(2, 1)__   B' __(2, -1)__

C __(1, 1)__   C' __(1, -1)__

✳ **y-coordinates switch signs** ✳

Reflect the figure across the y-axis. Find the coordinates of the pre-image and image.

H __(-2, 3)__   H' __(2, 3)__

Q __(-2, 1)__   Q' __(2, 1)__

P __(-3, -2)__   P' __(3, -2)__

L __(0, 2)__   L' __(0, 2)__

✳ **x-coordinates switch signs** ✳