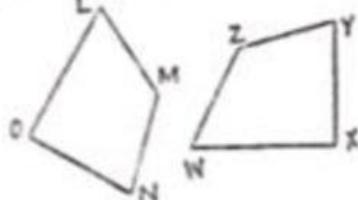


## 2023 MTAP Saturday Program in Mathematics Grade 8 Session 5

A. 1. What are congruent figures?

2. Each pair of figures are congruent. Identify the corresponding vertices, the congruent sides and the congruent angles. Then write a congruence statement for the two figures.

a.



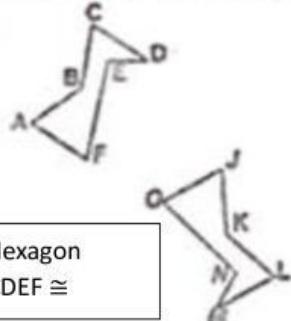
Quadrilateral  
LMNO  $\cong$

L  $\leftrightarrow$   
M  $\leftrightarrow$   
N  $\leftrightarrow$   
O  $\leftrightarrow$

$\overline{LM} \cong$   
 $\overline{MN} \cong$   
 $\overline{NO} \cong$   
 $\overline{LO} \cong$

$\angle L \cong$   
 $\angle M \cong$   
 $\angle N \cong$   
 $\angle O \cong$

b.



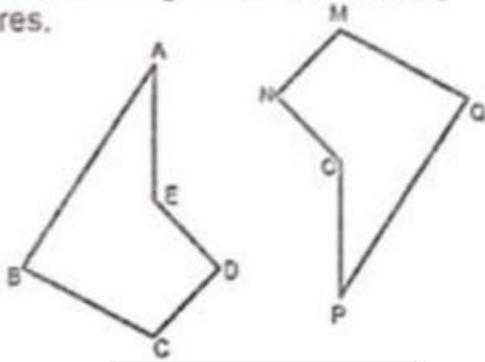
Hexagon  
ABCDEF  $\cong$

A  $\leftrightarrow$   
B  $\leftrightarrow$   
C  $\leftrightarrow$   
D  $\leftrightarrow$   
E  $\leftrightarrow$   
F  $\leftrightarrow$

$\overline{AB} \cong$   
 $\overline{BC} \cong$   
 $\overline{CD} \cong$   
 $\overline{DE} \cong$   
 $\overline{EF} \cong$   
 $\overline{FA} \cong$

$\angle A \cong$   
 $\angle B \cong$   
 $\angle C \cong$   
 $\angle D \cong$   
 $\angle E \cong$   
 $\angle F \cong$

c.



Pentagon  
ABCDE  $\cong$

A  $\leftrightarrow$   
B  $\leftrightarrow$   
C  $\leftrightarrow$   
D  $\leftrightarrow$   
E  $\leftrightarrow$

$\overline{AB} \cong$   
 $\overline{BC} \cong$   
 $\overline{CD} \cong$   
 $\overline{DE} \cong$   
 $\overline{EA} \cong$

$\angle A \cong$   
 $\angle B \cong$   
 $\angle C \cong$   
 $\angle D \cong$   
 $\angle E \cong$

B. 1. Define congruent triangles.

2. List the six pairs of corresponding, congruent parts for each pair of congruent triangles:

a.  $\triangle ABC \cong \triangle DEF$ b.  $\triangle XYZ \cong \triangle PAT$ c.  $\triangle MAT \cong \triangle BIG$ 

$\overline{AB} \cong$   
 $\overline{BC} \cong$   
 $\overline{AC} \cong$

$\angle A \cong$   
 $\angle B \cong$   
 $\angle C \cong$

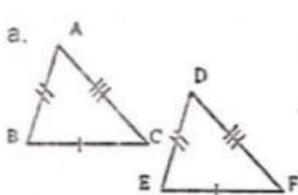
$\overline{XY} \cong$   
 $\overline{YZ} \cong$   
 $\overline{XZ} \cong$

$\angle X \cong$   
 $\angle Y \cong$   
 $\angle Z \cong$

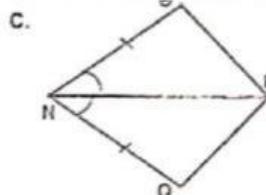
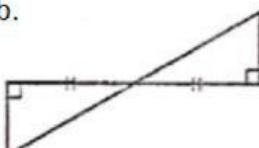
$\overline{MA} \cong$   
 $\overline{AT} \cong$   
 $\overline{MT} \cong$

$\angle M \cong$   
 $\angle A \cong$   
 $\angle T \cong$

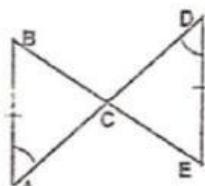
4. Analyze each pair of triangles below and tell if they are congruent or not based on the markings. If they are congruent, state the postulate or theorem that proves their congruence.



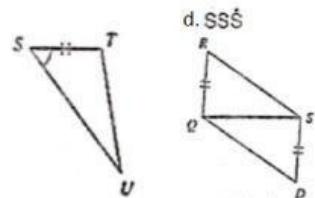
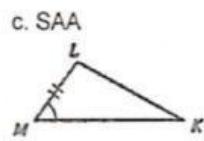
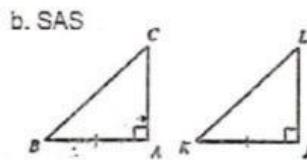
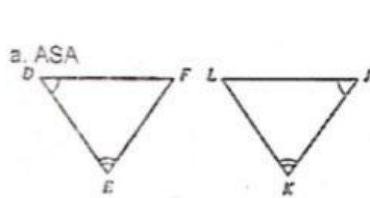
b.



d.



5. Give one pair of corresponding parts that should be congruent so that each pair of triangles become congruent by the specified postulate or theorem.



C. Illustrate the congruent triangles then complete the statement or find the indicated measure.

1.  $\triangle PAX \cong \triangle HUM$ ;  $PA = 8$ ;  $AX = 7$ ;  $HM = 12$ ;  $m\angle A = 106^\circ$ ;  $m\angle M = 40^\circ$

a.  $\overline{MH} \cong \underline{\hspace{2cm}}$  b.  $HU = \underline{\hspace{2cm}}$  c.  $PX = \underline{\hspace{2cm}}$  d.  $\angle P \cong \underline{\hspace{2cm}}$  e.  $m\angle P = \underline{\hspace{2cm}}$  f.  $MU = \underline{\hspace{2cm}}$  g.  $m\angle X = \underline{\hspace{2cm}}$

2.  $\triangle BOX \cong \triangle LMUG$ ;  $BO = 15$ ;  $UG = 22$ ;  $m\angle O = 54^\circ$ ;  $m\angle M = 62^\circ$

a.  $\overline{BO} \cong \underline{\hspace{2cm}}$  b.  $\angle XBO \cong \underline{\hspace{2cm}}$  c.  $m\angle G = \underline{\hspace{2cm}}$  d.  $XO = \underline{\hspace{2cm}}$  e.  $m\angle U = \underline{\hspace{2cm}}$  f.  $\overline{GU} \cong \underline{\hspace{2cm}}$  g.  $MU = \underline{\hspace{2cm}}$

3.  $\triangle BIG \cong \triangle SML$ ,  $BI = 12.5$  in.,  $IG = 13.5$  in.,  $BG = 16.5$  in.

a.  $\angle LMS \cong \underline{\hspace{2cm}}$  b.  $\angle BGI \cong \underline{\hspace{2cm}}$  c.  $SL = \underline{\hspace{2cm}}$  d. perimeter of  $\triangle SML$

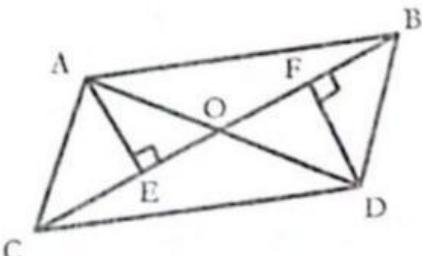
4.  $\triangle ANT \cong \triangle BUG$ ,  $AN = 3x + 4$ ,  $AT = x$ ,  $BU = 4x - 1$ ,  $UG = 3x + 2y$ ,  $BG = 4y - 3$

a.  $\angle ANT \cong \underline{\hspace{2cm}}$  b.  $\overline{GU} \cong \underline{\hspace{2cm}}$  c.  $x = \underline{\hspace{2cm}}$  d.  $y = \underline{\hspace{2cm}}$  e.  $NT = \underline{\hspace{2cm}}$

5.  $\triangle CAN \cong \triangle DIP$ ,  $m\angle C = 3x - 2$ ,  $m\angle I = 2x + 15$ ,  $m\angle N = x + 17$ ,  $AN = x - 6$

a.  $x = \underline{\hspace{2cm}}$  b.  $m\angle D = \underline{\hspace{2cm}}$  c.  $m\angle A = \underline{\hspace{2cm}}$  d.  $m\angle P = \underline{\hspace{2cm}}$  e.  $IP = \underline{\hspace{2cm}}$

D. 1. In the figure on the right,  $\overline{AB} \parallel \overline{CD}$  and  $\overline{AC} \parallel \overline{BD}$ . Two diagonals  $AD$  and  $BC$  meet at  $O$ .  $\overline{AE} \perp \overline{BC}$  at  $E$  and  $\overline{DF} \perp \overline{BC}$  at  $F$ . How many pairs of congruent triangles are in the figure?



H. Which of the following lengths of line segments will form a triangle?

1. 2, 2, 2

3. 3, 5, 9

5. 2.3, 1.4, 5.6

2. 12, 8, 4

4. 11, 12, 16

6. 4.5, 2.36, 2.15