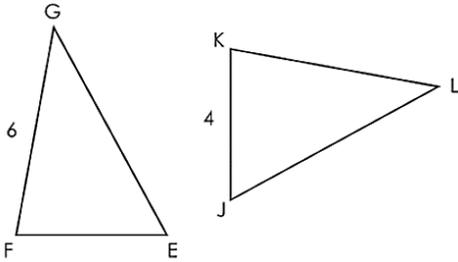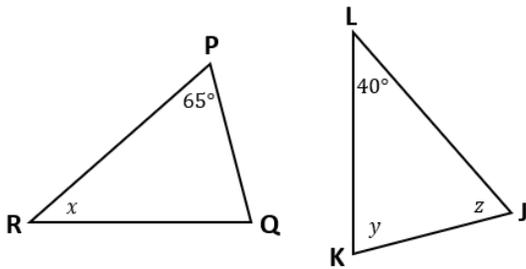# Congruence and Similarity

1) Triangle EFG is congruent to triangle JKL.
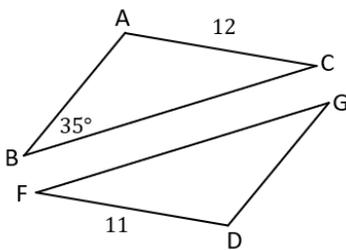

What is KL?

[ ]

2) In the diagram below $\Delta PQR \cong \Delta JKL$. Find the values of x, y, and z.
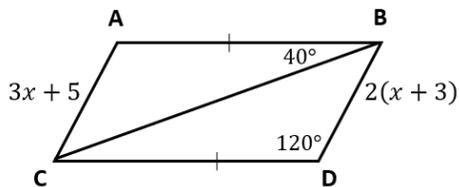

A. $x = 40°, y = 65°, z = 75°$

B. $x = 40°, y = 75°, z = 65°$

C. $x = 75°, y = 65°, z = 40°$

D. $x = 75°, y = 40°, z = 65°$

3) In the diagram below $\Delta ABC \cong \Delta DFG$. Select All the true statements.

A. $AB = 11$

B. $DG = 12$

C. $m\angle D = 35°$

D. $m\angle F = 35°$

E. $m\angle G = 35°$

4) In the figure below $\Delta ABC \cong \Delta DCB$. Select All the true statements.

A. $x = 1$

B. $x = 2$

C. $AC = 10$

D. $\angle ABC \cong \angle CBD$

E. $\angle ACB \cong \angle CBD$

Congruence and Similarity

5) Triangle ERT is congruent to triangle CVB.

   • The measure of $\angle E$ is $32°$.

   • The measure of $\angle C$ is $(7x + 4)°$.
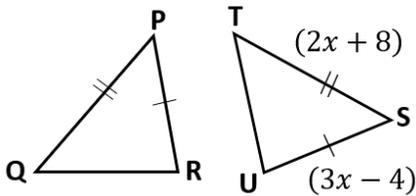
   • The measure of $\angle B$ is $(15x + 7)°$.

   What is the measure of $\angle V$?

   A. $m\angle V = 4°$

   B. $m\angle V = 32°$

   C. $m\angle V = 67°$

   D. $m\angle V = 81°$

6) If $\triangle ABC \cong \triangle SDF$ and $m\angle A = 3x + 5$, $m\angle B = 5x - 9$ and $m\angle S = 1.5x + 17$. Find $m\angle B$.
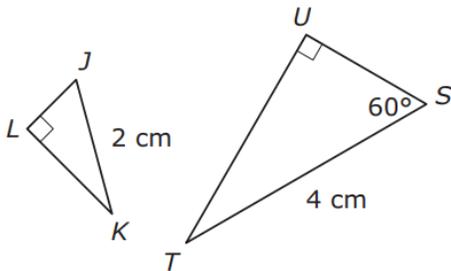
   A. $m\angle B = 7°$

   B. $m\angle B = 8°$

   C. $m\angle B = 26°$

   D. $m\angle B = 31°$

7) Find the length of $\overline{US}$, given that $\angle P \cong \angle S$ and the length of $\overline{PQ}$ is 20.

   A. $US = 6$

   B. $US = 8$

   C. $US = 14$

   D. $US = 20$

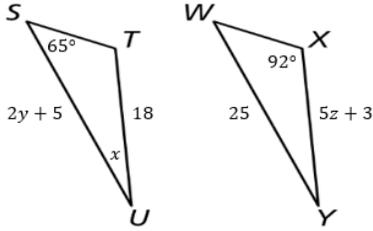8) In this diagram, $\triangle JKL \sim \triangle STU$

   Based on the measurements in the diagram, what is the measure of $\angle K$?

   A. $15°$

   B. $30°$

   C. $45°$

   D. $60°$

Congruence and Similarity

9) In the figure $\triangle STU \cong \triangle WXY$. What are the values of x, y, and z?

S
65° T

W

92° X

2y + 5   18   25   5z + 3

x

U

Y

A. $x = 92°, y = 6.5, z = 4.4$

B. $x = 92°, y = 10, z = 3$

C. $x = 23°, y = 6.5, z = 4.4$

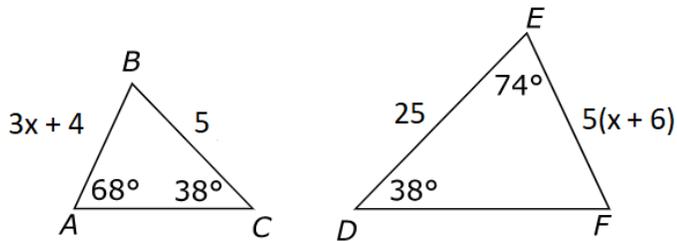D. $x = 23°, y = 10, z = 3$

10) Triangle EFG is similar to triangle JKL.

- The measure of $\angle E$ is 32°.

- The measure of $\angle K$ is 49°.

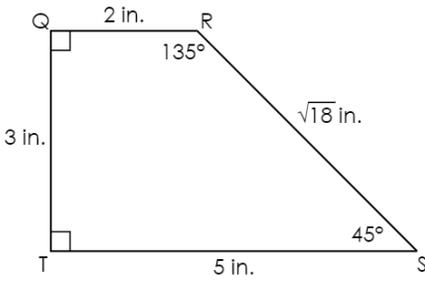What is the measure of $\angle F$?

A. 32°

B. 49°

C. 81°

D. 99°

11) Given the two triangles shown, find the value of x.

E
B
74°
3x + 4   5   25   5(x + 6)
68° 38°   38°
A   C   D   F

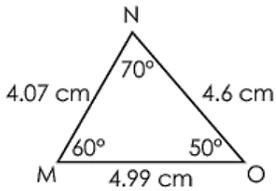$x =$ ☐

Congruence and Similarity

12) Quadrilateral $QRST$ is shown, with side lengths in inches (in.) and angle measures in degrees.

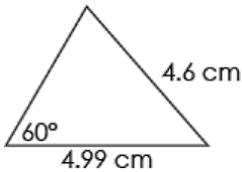Lynn draws quadrilateral $WXYZ$, which is similar to quadrilateral $QRST$, with $WX = 5$ in. Select All the true statements.

A. $WZ = \frac{15}{2}$ in.

B. $m\angle Z = 45°$

C. $ZY = 25$ in.

D. $m\angle X = 135°$

E. The area of quadrilateral $WXYZ$ is $\frac{525}{8}$ in.^{2}
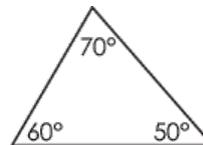
13) Triangle MNO is shown.

Which triangle can be shown to be congruent to triangle MNO with only the given information?
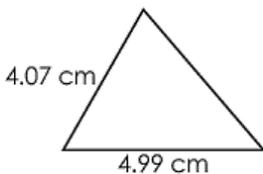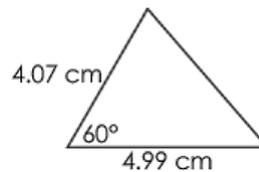
A.

B.

C.

D.

Congruence and Similarity

14) Quadrilateral $STUV$ is similar to quadrilateral $GHIJ$.

- The length of $\overline{SV}$ is $(x + 1)$.

- The length of $\overline{ST}$ is 3.

- The length of $\overline{UV}$ is 4.

- The length of $\overline{GJ}$ is 17.5.

- The length of $\overline{JI}$ is 10.

What is the value of x?

A. 16.5
B. 9
C. 6
D. 2.5

15) Given $\triangle DEF \sim \triangle GHI$ and

- $m\angle D = 50°$
- $m\angle E = (2 + 5y)°$
- $m\angle G = (102 - x)°$
- $m\angle H = (x + 15)°$

Find the values of $x, y, m\angle I$.

A. $x = 13$, $y = 52$, and $m\angle I = 63°$

B. $x = 52$, $y = 13$, and $m\angle I = 63°$

C. $x = 13$, $y = 52$, and $m\angle I = 67°$

D. $x = 52$, $y = 13$, and $m\angle I = 67°$

16) Given $\overline{AD} \cong \overline{CD}$, which statement is sufficient to prove that $\triangle ABD \cong \triangle CBD$?
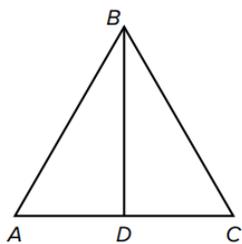
A. $\angle ABD \cong \angle CBD$

B. $\overline{AD} \cong \overline{BD}$

C. $\angle BAD \cong \angle CDB$

D. $\angle ADB \cong \angle CDB$

Congruence and Similarity

17) Consider the two rectangles shown.

Using the statements in the table, complete the sentences below to determine whether the rectangles are similar.
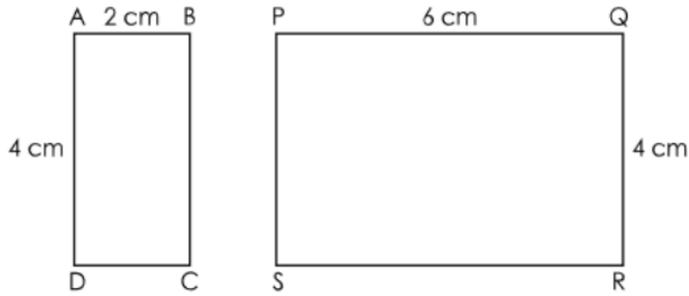
Rectangle $ABCD$ _____ similar to rectangle $PQRS$ because _____, so

rectangle $ABCD$ _____ dilated to fit exactly over rectangle $PQRS$.

is	all rectangles are similar	can be
is not	all quadrilaterals are similar	cannot be
	their corresponding sides are congruent	
	their corresponding sides are not congruent	
	their corresponding sides are proportional	
	their corresponding sides are not proportional	

18) Base on the information given below, which of the following congruence theorems can be used to prove that $\Delta LMN \cong JKN$? Select All that apply.
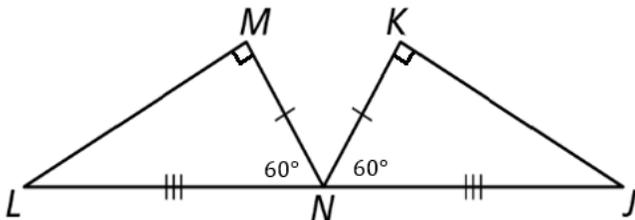
   A. Side-Side-Side

   B. Side-Angle-Side

   C. Angle-Side-Angle

   D. Angle-Angle-Angle

   E. Hypotenuse-Leg

Congruence and Similarity

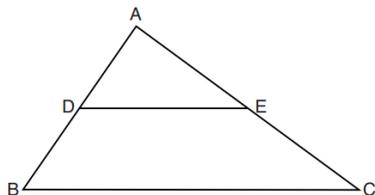19) In the diagram below of $\triangle ABC$, D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$, respectively, and $\overline{DE}$ is drawn.
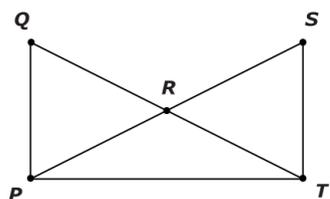
Which methods could be used to prove $\triangle ABC \sim \triangle ADE$?

    I.   AA similarity
    II.   SSS similarity
    III. SAS similarity

A. I only

B. I and II

C. II and III

D. I, II, and III

20) In the figure, $\angle QPT$ and $\angle STP$ are right angles.

Sides $\overline{PQ}$ and $\overline{TS}$ are congruent. Which statement is always true?

A. $\overline{RS} \cong \overline{PQ}$

B. $\overline{RS} \cong \overline{RQ}$

C. $\overline{RS} \cong \overline{ST}$

D. $\overline{PS} \cong \overline{PT}$

21) The elementary school in your town wants to replace its current playground. The space used for the new playground will be similar to that of the current playground. The current space is rectangular and has a length of 18 feet and a width of 15 feet. The length of the new playground is 30 feet. Find the perimeter of the space used for the new playground.

A. 25 feet

B. 66 feet

C. 90 feet

D. 110 feet

22) Quadrilateral $ACDG$ is similar to quadrilateral $QYWT$. Find the value of x.
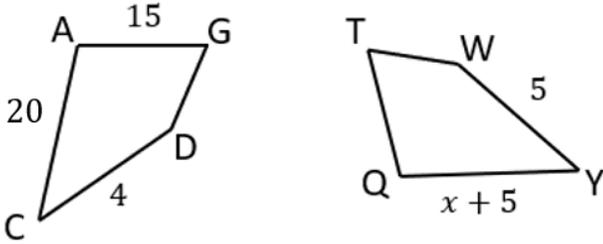
Note: Figures not drawn to scale.

A. $x = 10$

B. $x = 15$

C. $x = 20$

D. $x = 25$

23) The following statements describe triangles ABC and PQR.

For $\triangle ABC$: $AC = 2$, $AB = 4$, and $BC = 5$.

For $\triangle PQR$: $QR = 7.5$, $PR = 3$, and $PQ = 6$.

Which statement explains why $\triangle ABC$ and $\triangle PQR$ are similar or not similar?

A. $\triangle ABC$ and $\triangle PQR$ are not similar because $\dfrac{AC}{QR} \neq \dfrac{AB}{PR}$.

B. $\triangle ABC$ and $\triangle PQR$ are similar because $\dfrac{AC}{PR} = \dfrac{PQ}{AB} = \dfrac{BC}{QR}$.

C. $\triangle ABC$ and $\triangle PQR$ are similar because $\dfrac{AB}{PQ} = \dfrac{BC}{QR}$.

D. $\triangle ABC$ and $\triangle PQR$ are similar because $\dfrac{AC}{PR} = \dfrac{BC}{QR} = \dfrac{AB}{PQ}$.

24) A park has a sandbox in a shape of a quadrilateral. Christian wants to create a smaller sandbox at his backyard having the same angles as the park sandbox.

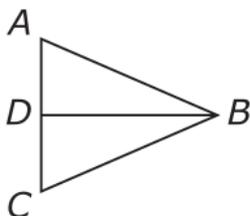Drawings of both sandboxes are shown.
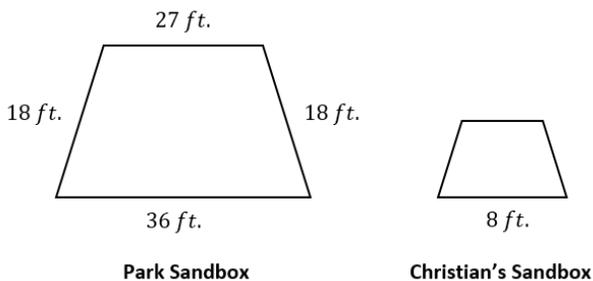
What is the perimeter, in feet (ft), of Christian's sandbox?

Congruence and Similarity

25) A partial proof is given, using isosceles triangle ABC, where angle B is the vertex angle.

Given: Isosceles $\triangle ABC$
$\overline{BD}$ bisects $\angle ABC$
Prove: $\triangle ABD \cong \triangle CBD$

	Statements	Reasons
1.	Isosceles $\triangle ABC$	Given
2.	$\overline{AB} \cong \overline{BC}$	Definition of an isosceles triangle
3.	$\overline{BD}$ bisects $\angle ABC$	Given
4.	$\angle ABD \cong \angle CBD$	Definition of an angle bisector
5.	?	?
6.	$\triangle ABD \cong \triangle CBD$	Side-Angle-Side (SAS)

Which statement and reason complete the proof?

A. $\overline{BD} \cong \overline{BD}$, Reflexive Property.

B. $\overline{AD} \cong \overline{DC}$, Definition of midpoint.

C. $\angle ADB \cong \angle CDB$, All right angles are congruent.

D. $\angle A \cong \angle C$, Base angles of an isosceles triangle are congruent.

26) Segments AC and BD are diagonals of parallelogram $ABCD$.
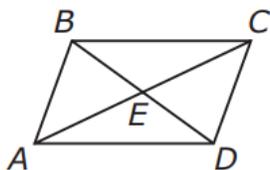
Using $\overline{AD} \cong \overline{BC}$, which pairs of angles must be congruent to prove $\triangle AED \cong \triangle CEB$ by the Angle-Side-Angle theorem? Select All that apply.

A. $\angle BCA \cong \angle BDA$

B. $\angle BEC \cong \angle AED$

C. $\angle CAD \cong \angle BCA$

D. $\angle DAC \cong \angle DBC$

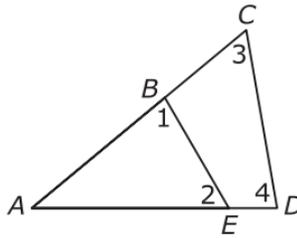E. $\angle DBC \cong \angle BDA$

Congruence and Similarity

27) A partial proof is given. Two statements are missing.

Given: $\frac{AB}{AD} = \frac{AE}{AC}$
Points A, B, and C are collinear.
Points A, E, and D are collinear.

Prove: $\angle 1 \cong \angle 4$

Statement 1: $\frac{AB}{AD} = \frac{AE}{AC}$; Points A, B, and C are collinear; Points A, E, and D are collinear.
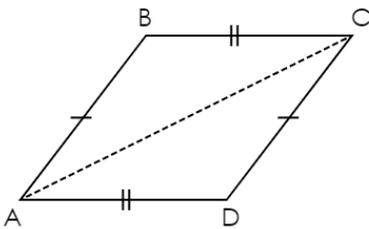
Statement 2: _____

Statement 3: _____

Statement 4: $\angle 1 \cong \angle 4$

Which relationships could be the two missing statements? Select All that apply.

A. $\angle 2 \cong \angle 3$

B. $\angle A \cong \angle A$

C. $\frac{AB}{BE} = \frac{CD}{AD}$

D. $\triangle ABE \sim \triangle ACD$

E. $\triangle EAB \sim \triangle CAD$

28) In quadrilateral ABCD, $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$, as shown.

Select a term from the table for each blank to complete the proof that $\triangle ABC \cong \triangle CDA$.

By the _____ property of congruence, we can show that _____.

Therefore, it can be established that $\triangle ABC \cong \triangle CDA$ by the _____ congruence theorem.

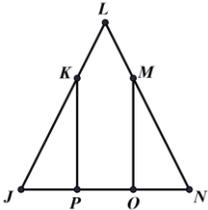| reflexive	$\overline{AB} \cong \overline{AD}$	A.S.A.
symmetric	$\overline{AC} \cong \overline{CA}$	S.A.S.
transitive	$\angle ABC \cong \angle CDA$	S.S.S.
	$\angle BAC \cong \angle ACD$	

Congruence and Similarity

29) A partial proof is given. For each blank, select a reason from the Reason Bank to complete the proof.

Given: $\angle J \cong \angle N, \overline{KP} \cong \overline{MO}$
$\qquad \overline{KP} \perp \overline{JN}, \overline{MO} \perp \overline{NJ}$
Prove: $\overline{JK} \cong \overline{NM}$

	Statements	Reasons
1.	$\overline{KP} \perp \overline{JN}, \overline{MO} \perp \overline{NJ}$	Given
2.	$\angle JPK$ & $\angle NOM$ are right angles	
3.	$\angle JPK \cong \angle NOM$	
4.	$\angle J \cong \angle N, \ \overline{KP} \cong \overline{MO}$	Given
5.	$\triangle JPK \cong \triangle NOM$	
6.	$\overline{JK} \cong \overline{NM}$	C.P.C.T.C.

Reasons Bank

A.A.S.
A.S.A.
S.A.S.
S.S.S.

Definition of midpoint
Definition of perpendicular lines
Vertical angles are congruent
All right angles are congruent
Base angles of an isosceles triangle are congruent

Reflexive Property of congruence
Transitive Property of congruence
Symmetric Property of congruence

30) The Temple of Kukulkan is one of the tallest and most remarkable examples of the Mayan architecture. Fabio wants to build a smaller wooden version keeping the heights, lengths, and widths proportional and the angles congruent. A sample drawing of both structures is shown below.

Temple of Kukulkan.

Fabio's wooden version
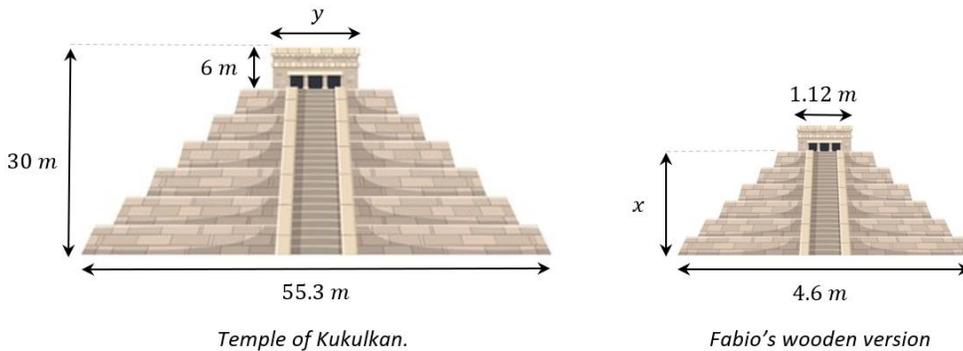
Note: Figures not drawn to scale.

Find the length in meters (m) of x and y. Round your answer to the nearest tenth.

$x \approx$ [ ] $y \approx$ [ ]

Congruence and Similarity

31) Your town wants to expand the community dog park with one similar in shape to the current dog park. The current dog park is rectangular and has a length of 75 feet and a width of 60 feet. The length of the new dog park is 100 feet. Find the area of the new dog park.

A. $4,500\ ft.^2$

B. $6,000\ ft.^2$

C. $8,000\ ft.^2$

D. $12,500\ ft.^2$