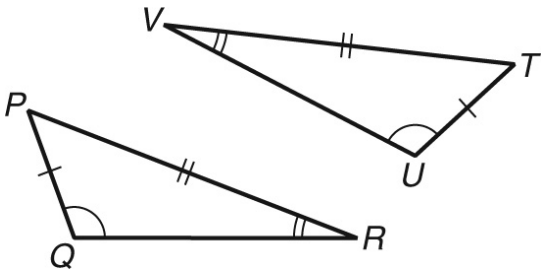
9th Grade Geometry Standards

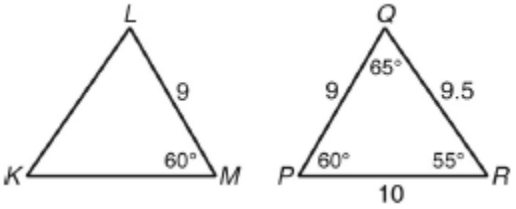
Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which CANNOT be used to justify the statement $\triangle PQR \cong \triangle TUV$?



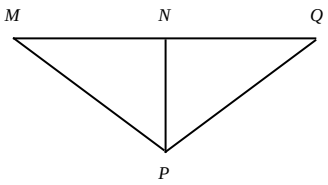
a. SSS
b. SAS
c. AAS
d. ASA

____ 2. What information is needed to prove $\triangle MLK \cong \triangle PQR$ by SAS?



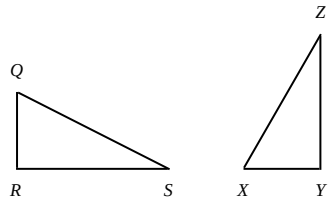
a. $KM = 10$
b. $KL = 10$
c. $KM = 9.5$
d. $KL = 9.5$

____ 3. Δ*MNP* and Δ*QNP* have the following properties: $\overline{MN} \cong \overline{QN}$, $\overline{PM} \cong \overline{PQ}$, and $\overline{NP}$ is a common side.



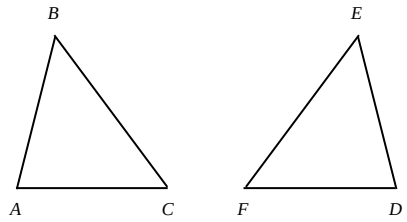
If $\overline{MN}$ = 4, $\overline{MP}$ = 13, $\overline{QN}$ = x + 2, and $\overline{QP}$ = y – 1, determine the values of x and y.
a. $x = 5, y = 15$
b. $x = 2, y = 14$
c. $x = 3, y = 12$
d. $x = 4, y = 13$

____ 4. For congruent triangles Δ*QRS* and Δ*XYZ*, identify the congruent corresponding parts to $\overline{SQ}$ and $\angle R$, respectively.



a. $\overline{ZX}$; $\angle Y$
b. $\overline{XY}$; $\angle Y$
c. $\overline{YZ}$; $\angle X$
d. $\overline{XY}$; $\angle Z$

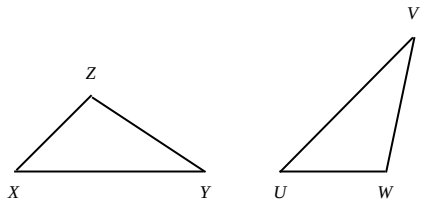
____ 5. ΔABC and ΔDEF have the following properties: $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and $\angle B \cong \angle E$.



If $\overline{AB}$ = 21, $\overline{BC}$ = 22, and m$\angle B$ = 60°, and $\overline{DE}$ = n + 12, $\overline{EF}$ = 3n – 5, and m$\angle E$ = (5n + 15)°, determine the value of n.

a. n = 12
b. n = 9
c. n = 14
d. n = 16

____ 6. ΔXYZ and ΔUVW have the following properties: $\overline{XY} \cong \overline{UV}$, $\overline{YZ} \cong \overline{VW}$, and $\overline{ZX} \cong \overline{WU}$.



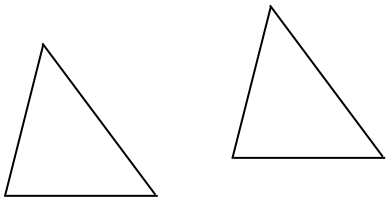
If $\overline{UV}$ = 11, $\overline{VW}$ = 8, and $\overline{WU}$ = 11, and $\overline{XY}$ = 2k – 5, $\overline{YZ}$ = k, and $\overline{ZX}$ = k + 3, determine the value of k.

a. k = 5
b. k = 8
c. k = 3
d. k = 15

____ 7. Why is there no congruence relationship for all three angles (AAA) of a triangle?

a. Triangles with three identical angles are never congruent.
b. To show the congruence of two triangles, only two angles at most need to be known.
c. Triangles with congruent corresponding angles are the same shape, but may not be the same size.
d. To show the congruence of two triangles, only one angle and the length of one side, at most, need to be known.

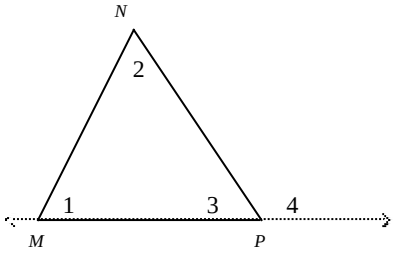
____ 8. For two triangles with identical orientation, what rigid motion is necessary for SAS congruence to be shown?



a. Translation
b. Rotation
c. Reflection
d. Dilation

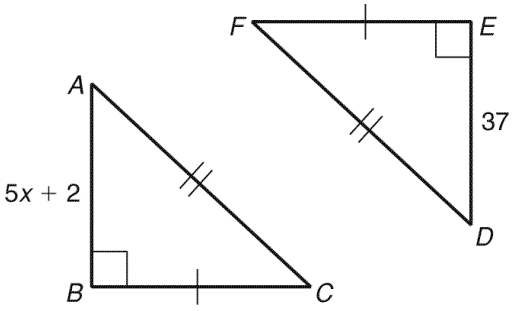
____ 9. For two isosceles right triangles, what is **not** enough information to prove congruence?
a. The lengths of all sides of each triangle.
b. The lengths of the hypotenuses for each triangle.
c. The lengths of a pair of corresponding legs.
d. The measures of the non-right angles in each triangle.

____ 10. Given $\triangle MNP$, Anna is proving $m\angle 1 + m\angle 2 = m\angle 4$. Which statement should be part of her proof?



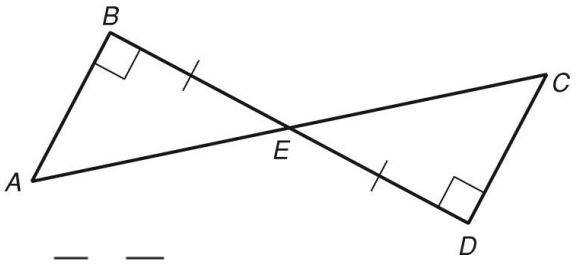
a. $m\angle 1 = m\angle 2$
b. $m\angle 1 = m\angle 3$
c. $m\angle 1 + m\angle 3 = 180$
d. $m\angle 3 + m\angle 4 = 180$

____ 11. Which value for *x* proves that $\triangle ABC \cong \triangle DEF$ by SSS?



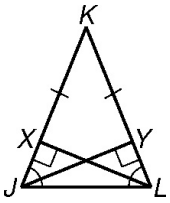
a. 7
b. 37

____ 12. What additional information will prove $\triangle ABE \cong \triangle CDE$ by HL?



a. $\overline{AB} \cong \overline{CD}$
b. $\overline{AE} \cong \overline{CE}$

____ 13. **Given:** $\overline{JK} \cong \overline{LK}$; $\angle JYL$ and $\angle LXJ$ are right angles.

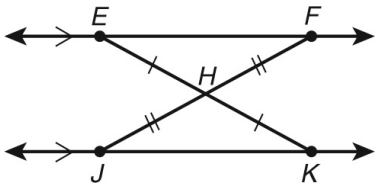


Prove: $\overline{JY} \cong \overline{LX}$
Proof:

Statements	Reasons
1. $\angle KJL \cong \angle KLJ$	1. ____?____
2. $\overline{JL} \cong \overline{LJ}$	2. ____?____
3. $\angle JYL$ and $\angle LXJ$ are rt. $\measuredangle$.	3. Given
4. $\angle JYL \cong \angle LXJ$	4. ____?____
5. $\triangle JYL \cong \triangle LXJ$	5. ____?____
6. $\overline{JY} \cong \overline{LX}$	6. ____?____

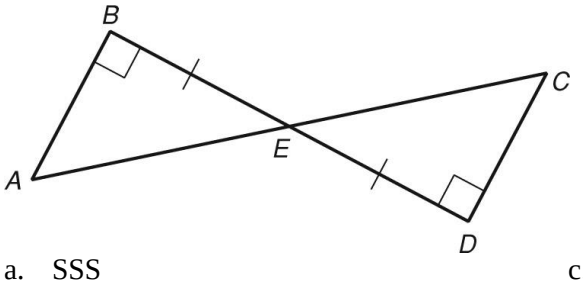
Which justification belongs in Step 1?
a. Isosceles $\triangle$ Theorem
b. Reflexive Property of Congruence
c. Right Angles are Congruent Theorem
d. CPCTC

____ 14. In the figure, *H* is the midpoint of $\overline{EK}$ and $\overline{FJ}$. What reason can be used in a proof to show $\overline{EF} \cong \overline{JK}$?



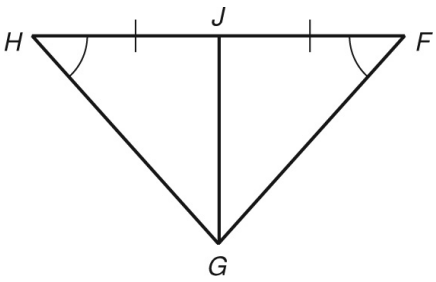
a. AAS
b. ASA
c. Def. of bisects
d. CPCTC

____ 15. Which postulate or theorem can you use to prove $\triangle ABE \cong \triangle CDE$?



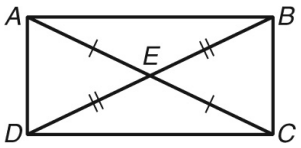
a. SSS
b. SAS
c. ASA
d. AAS

____ 16. Which postulate or theorem can you use to prove $\overline{HG} \cong \overline{FG}$?



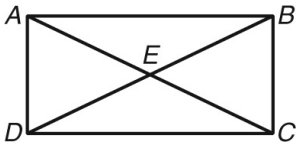
a. Isosceles Triangle Theorem
b. Converse of Isosceles Triangle Theorem

____ 17. If $AD = 5y + 7$ and $BC = 7y - 3$, what must the value of *y* be to prove $\triangle AED \cong \triangle CEB$ by SSS?



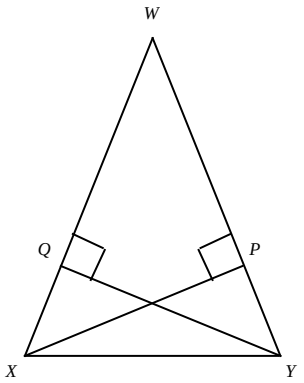
a. 2
b. 5
c. 17
d. 32

____ 18. If $\angle ADC$ and $\angle ABC$ are right angles, $AC = BD$, and $AB = DC$, which postulate or theorem proves $\triangle ABC \cong \triangle CDA$?



a. SSS
b. SAS
c. ASA
d. HL

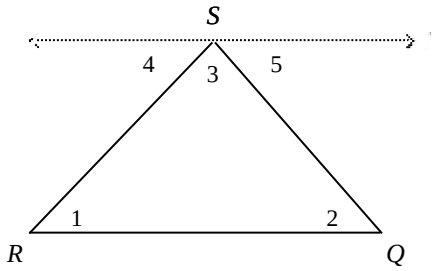
____ 19. $\overline{YQ}$ and $\overline{XP}$ are altitudes to the congruent sides of isosceles triangle $\triangle WXY$.



Keisha is going to prove $\overline{YQ} \cong \overline{XP}$ by showing they are congruent parts of the congruent triangles $\triangle QXY$ and $\triangle PYX$.
By what congruence postulate is $\triangle QXY \cong \triangle PYX$?

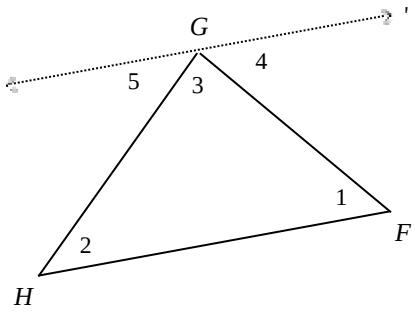
a. AAS - because triangle *WXY* is isosceles, its base angles are congruent. Perpendicular lines form right angles, which are congruent; and segment $\overline{XY}$ is shared.
b. SSS - because segment $\overline{QP}$ would be parallel to segment $\overline{XY}$.
c. SSA - because segment $\overline{XY}$ is shared; segments $\overline{XP}$ and $\overline{YQ}$ are altitudes, and *WXY* is isosceles, so base angles are congruent.
d. ASA - because triangle *WXY* is isosceles, its base angles are congruent. Segment $\overline{XY}$ is shared; and perpendicular lines form right angles, which are congruent.

____ 20. Given $\triangle QRS$, Miguel is proving $m\angle RQS + m\angle QRS + m\angle QSR = 180°$. He has drawn auxiliary line *l*, parallel to $\overline{QR}$. Which of the following congruencies is likely to be part of his proof?



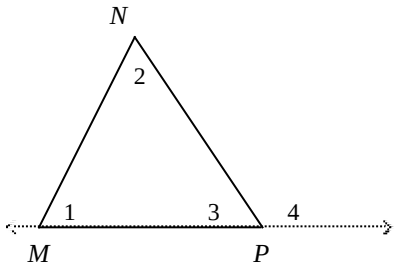
a. $\angle 1 \cong \angle 4$
b. $\angle 4 \cong \angle 5$
c. $\angle 1 \cong \angle 2$
d. $\angle 2 \cong \angle 3$

____ 21. Jason used this figure in a proof of the Triangle Sum Theorem. For one step, Jason used the "Parallel Postulate" as a reason. For what action in his proof did he most likely use this reason?



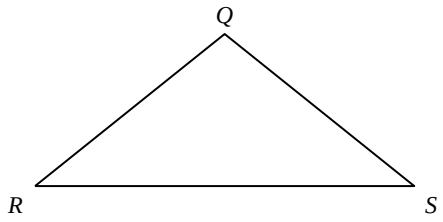
a. Stating $\angle 1$ and $\angle 4$ are congruent
b. Stating $\angle 3$, $\angle 4$, and $\angle 5$ form a straight angle
c. Constructing auxiliary line *l*
d. Stating $\angle 4$ and $\angle 5$ are congruent

____ 22. Given $\triangle MNP$, Anna is proving $m\angle 1 + m\angle 2 = m\angle 4$. Which statement should be part of her proof?



a. $m\angle 1 = m\angle 2$
b. $m\angle 1 = m\angle 3$
c. $m\angle 1 + m\angle 3 = 180°$
d. $m\angle 3 + m\angle 4 = 180°$

____ 23. Kartik is proving that the base angles of an isosceles triangle are congruent. He begins with the illustration of isosceles $\triangle QRS$ below.

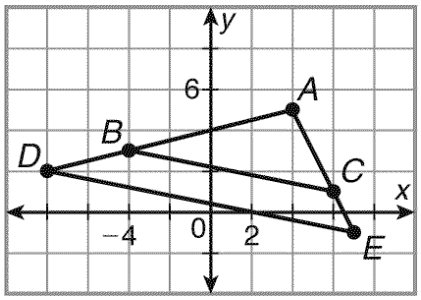


By definition, $\overline{QR} \cong \overline{QS}$ and by the reflexive property, $\overline{RS} \cong \overline{RS}$. He then asserts $\triangle QRS \cong \triangle QSR$ and $\angle S \cong \angle R$ by CPCTC.

Why is $\triangle QRS \cong \triangle QSR$?
a. AAS
b. SSS
c. ASA

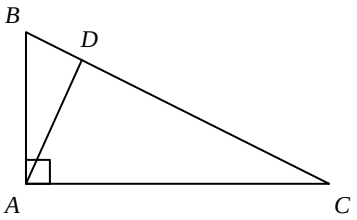
d. SAS

____ 24. Which method CANNOT be used to prove $\triangle ABC \sim \triangle ADE$?



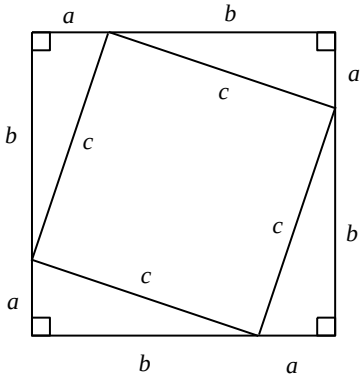
a. Use the Distance Formula to show $AB{:}AD = AC{:}AE$, and $\angle A \cong \angle A$. (SAS~)
b. Use the Distance Formula to show $AB{:}AC{:}BC = AD{:}AE{:}DE$. (SSS~)
c. $\angle A \cong \angle A$ by the Reflexive Property of Congruence. Measure to show $\angle ABC \cong \angle D$. (AA~)
d. Use the slope formula to show that the slopes of $\overline{BC}$ and $\overline{DE}$ are equal so $\overline{BC} \parallel \overline{DE}$ and corresponding angles are congruent. (AA~)

____ 25. A diagram from a proof of the Pythagorean Theorem is shown. Which statement would NOT be used in the proof?



a. $(AB)^2 + (AC)^2 = (BC)[(BD) + (DC)] \Rightarrow (AB)^2 + (AC)^2 = (BC)$
b. $\Delta BAC \sim \Delta BDA \sim \Delta ADC$
c. $\frac{AB}{BC} = \frac{BD}{AB}$ and $\frac{AC}{BC} = \frac{DC}{AC}$
d. ΔABC is a right triangle with an altitude $\overline{AD}$.

____ 26. A diagram from a proof of the Pythagorean Theorem is shown. Which statement would NOT be used in the proof?



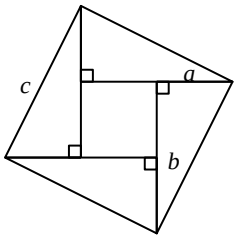
a. The area of the large square is equal to the sum of the area of the small square and the areas of the four triangles, which is $(a+b)^2 = 4(\frac{1}{2}ab) + c^2$.

b. $a^2 + 2ab + b^2 = 2ab + c^2$

c. Each triangle has an area of $\frac{1}{2}ac$.

d. The triangles together form a large square with sides $(a+b)$ and a small square with sides c.

____ 27. A diagram from a proof of the Pythagorean Theorem is shown. In each triangle, the longer leg measures b units and the shorter leg measures a units. Which statement would NOT be used in the proof?



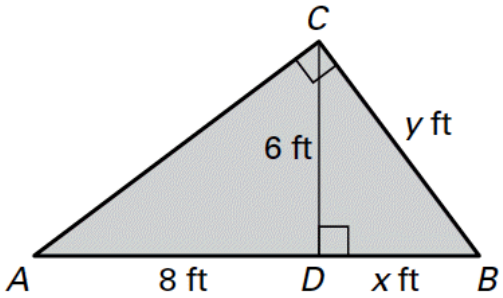
a. Each triangle has an area of $\frac{1}{2}ab$.

b. The area of the large square is equal to the sum of the area of the small square and the areas of the four triangles, which is $c^2 = (a+b)^2 + 4(\frac{1}{2}ab)$.

c. The four triangles are congruent.

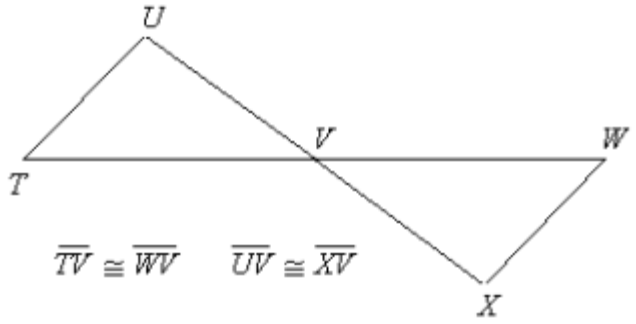
d. The triangles together form a large square with sides c and a small square with sides $(b-a)$.

____ 28. What is the value of x?



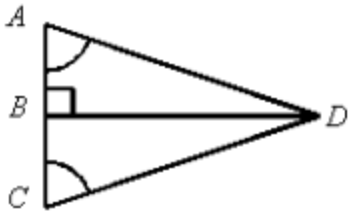
a. 4.5
b. 7.5
c. 10
d. 10.5
e. 12.5

____ 29. Refer to the figure shown. Which of the following statements is true?



a. $\Delta TUV \cong \Delta XWV$ by ASA
b. $\Delta TUV \cong \Delta VWX$ by SAS
c. $\Delta TUV \cong \Delta WXV$ by SAS
d. $\Delta TUV \cong \Delta WXV$ by SSS

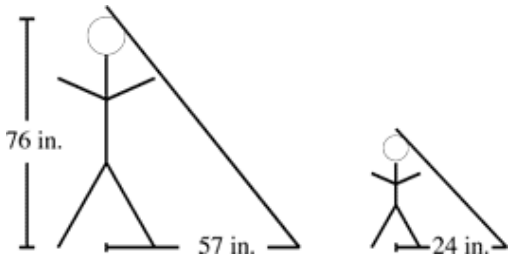
____ 30. $\Delta ABD \cong \Delta CBD$. Name the theorem or postulate that justifies the congruence.



a. ASA b. AAS c. SAS d. HL

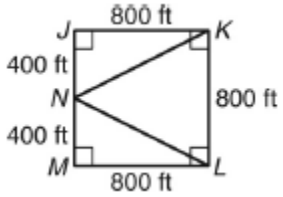
____ 31. **Given**: $\Delta ABC \cong \Delta DEF$ with $\overline{AB} \cong \overline{BC}$. Which statement of congruence is not provable?
a. $\Delta ABC \cong \Delta CBA$ b. $\Delta DEF \cong \Delta CBA$ c. $\Delta ABC \cong \Delta FDE$ d. $\Delta ABC \cong \Delta FED$

____ 32. At the same time of day, a man who is 76 inches tall casts a 57-inch shadow and his son casts a 24-inch shadow. What is the height of the man's son? (Figures may not be drawn to scale.)



a. 33 in. b. 32 in. c. 81 in. d. 108 in.

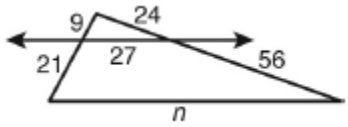
____ 33. The figure shows the paths through a park. Which justifies the statement $\triangle JKN \cong \triangle MLN$?



a. SAS c. ASA

b. SSS
d. HL

____ 34. What is the value of n?

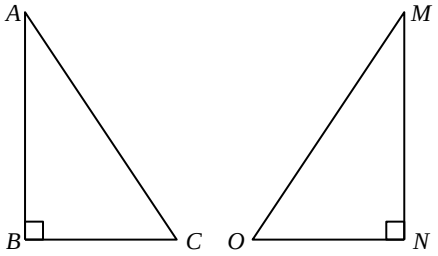


a. 39
b. 54
c. 63
d. 90

____ 35. Two American flags of difference dimensions are properly folded into two similar isosceles right triangles. The ratio of the length of the legs of the smaller triangle to that of the larger triangle is 4 : 5. If the length of the hypotenuse of the larger triangle is 2 feet, what is the length of the hypotenuse of the small triangle to the nearest tenth of a foot?

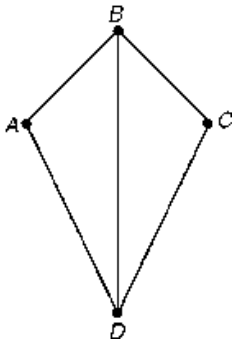
a. 0.1 ft
b. 0.6 ft
c. 1.6 ft
d. 2.5 ft

____ 36. **Given**: $\Delta ABC \cong \Delta MNO$
Identify all pairs of congruent corresponding parts.



a. $\angle A \cong \angle M$, $\angle B \cong \angle N$, $\angle C \cong \angle O$, $\overline{AB} \cong \overline{MN}$, $\overline{BC} \cong \overline{NO}$, $\overline{AC} \cong \overline{MC}$
b. $\angle A \cong \angle M$, $\angle B \cong \angle O$, $\angle C \cong \angle N$, $\overline{AB} \cong \overline{MN}$, $\overline{BC} \cong \overline{NO}$, $\overline{AC} \cong \overline{MC}$
c. $\angle A \cong \angle M$, $\angle B \cong \angle N$, $\angle C \cong \angle O$, $\overline{AB} \cong \overline{MC}$, $\overline{BC} \cong \overline{NO}$, $\overline{AC} \cong \overline{MN}$
d. $\angle A \cong \angle O$, $\angle B \cong \angle N$, $\angle C \cong \angle M$, $\overline{AB} \cong \overline{NO}$, $\overline{BC} \cong \overline{MN}$, $\overline{AC} \cong \overline{MC}$

____ 37. Given: $\overline{BD}$ bisects $\angle ABC$, $\overline{AB} \cong \overline{BC}$
Prove: $\overline{AD} \cong \overline{CD}$



Proof:

Statements	Reasons
1. $\overline{AB} \cong \overline{BC}$	1. Given
2. $\overline{BD} \cong \overline{BD}$	2. Reflexive Prop. of $\cong$
3. $\overline{BD}$ bisects $\angle ABC$	3. Given
4. ?	4. Def. of bisector
5. $\Delta ABD \cong \Delta CBD$	5. SAS Congruence Postulate
6. $\overline{AD} \cong \overline{CD}$	6. Corresponding Parts of Congruent Triangles are Congruent

The missing step in the proof is _____.

a. $\angle BAD \cong \angle BCD$
b. $\angle BDA \cong \angle BDC$
c. $\angle ABD \cong \angle CBD$
d. $\angle ABC \cong \angle CBA$

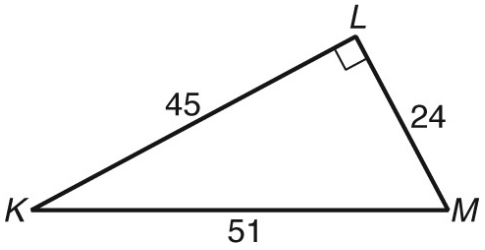
____ 38. The hypotenuse of a 30°-60°-90° triangle measures $10\sqrt{3}$ inches. What is the measure of the longer leg?

a. 5 in.
b. $5\sqrt{3}$ in.
c. 10 in.
d. 15 in.

____ 39. One leg of a 45°-45°-90° triangle measures 12 centimeters. What is the length of the hypotenuse?

a. $4\sqrt{3}$ cm
b. $6\sqrt{2}$ cm
c. $12\sqrt{2}$ cm
d. $12\sqrt{3}$ cm

____ 40. What is tan *K*?



a. $\frac{8}{17}$
b. $\frac{8}{15}$
c. $\frac{15}{17}$
d. $\frac{15}{8}$

____ 41. What is cos 30°?

a. $\frac{1}{\sqrt{3}}$
b. $\frac{\sqrt{3}}{2}$
c. $\frac{2}{\sqrt{3}}$
d. $\sqrt{3}$

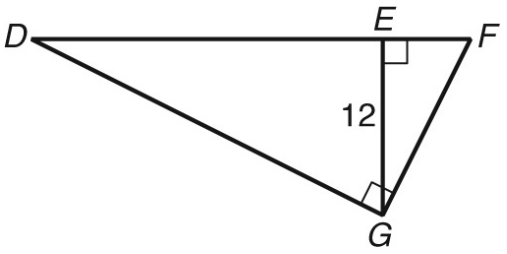
____ 42. To the nearest degree, what angle does a hill with a grade of 11% make with a horizontal line?

a. 6°
b. 11°
c. 79°
d. 84°

____ 43. Use a special right triangle to write tan 60° as a fraction.

a. $\frac{\sqrt{3}}{1}$
c. $\frac{\sqrt{2}}{1}$
b. $\frac{1}{\sqrt{3}}$
d. $\frac{\sqrt{3}}{2}$

____ 44. The altitude to the hypotenuse of a right triangle has a length of 12. What could be the lengths of the two segments of the hypotenuse?

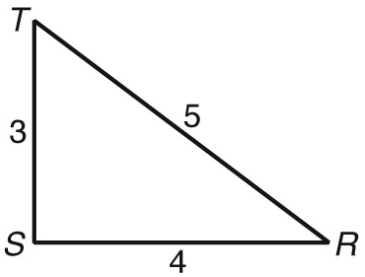


a. 2 and 6
c. 6 and 24
b. 2 and 8
d. 6 and 30

____ 45. Which trigonometric ratio is defined as $\frac{\text{opposite leg}}{\text{adjacent leg}}$?

a. cosine
c. sine
b. hypotenuse
d. tangent

____ 46. Which is equal to the cosine of $\angle R$?



a. 0.6
c. 0.8
b. 0.75
d. 1.25

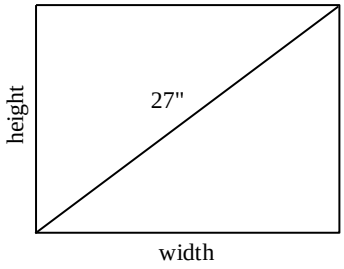
____ 47. A slide 4.1 m long makes an angle of 27° with the ground. How high is the top of the slide above the ground?

a. 1.86 m
b. 3.65 m
c. 1.93 m
d. 2.09 m

____ 48. A skateboard ramp is 3.5 feet high and 6 feet long along the horizontal. To the nearest degree, what is the measure of the angle that the ramp makes with a horizontal line?

a. 27°
c. 60°
b. 30°
d. 63°

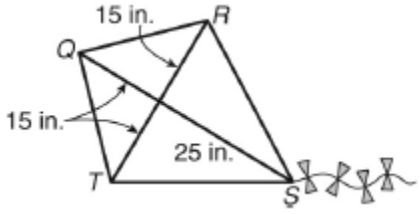
____ 49. The size of a TV screen is given by the length of its diagonal. The screen aspect ratio is the ratio of its width to its height. The screen aspect ratio of a standard TV screen is 4:3. What are the width and height of a 27" TV screen?



a. width: 21.6 in., height: 16.2 in.
b. width: 16.2 in., height: 21.6 in.
c. width: 21.6 in., height: 5.4 in.
d. width: 5.4 in., height: 21.6 in.

____ 50. A 12-foot ladder is leaning up against the side of a house. The ladder makes an angle of $62°$ with the ground. How far up the side of the house does the ladder reach?
a. 0.1 foot
b. 5.6 feet
c. 10.6 feet
d. 13.6 feet
e. 25.6 feet

____ 51. A kite frame consists of two pieces of wood placed along the diagonals. Decorative binding will be placed along the perimeter of the kite. To the nearest tenth of an inch, how much binding is needed?



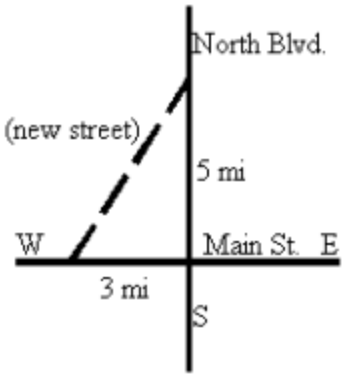
a. 70.0 in.
b. 90.4 in.
c. 100.7 in.
d. 140.0 in.

____ 52. A helicopter pilot sights a landmark at an angle of depression of $22°$. The altitude of the helicopter is 1450 feet. To the nearest foot, what is the horizontal distance from the helicopter to the landmark.
a. 543 ft
b. 586 ft
c. 3589 ft
d. 3871 ft

____ 53. A motorboat heads N $15°$ W to cross a river flowing 7.25 miles per hour due east. The boat travels at the speed necessary to head due north. To the nearest mile per hour, how fast is the motorboat traveling?
a. 2 mi/h
b. 8 mi/h
c. 27 mi/h
d. 28 mi/h

____ 54. The size of a TV screen is given by the length of its diagonal. The screen aspect ratio is the ratio of its width to its height. The screen aspect ratio of a plasma television screen is 16 : 9. To the nearest tenth of an inch, what is the height of a plasma television screen with a 50-inch diagonal?
a. 14.3 in.
b. 24.5 in.
c. 43.6 in.
d. 128.6 in.

____ 55. The city commission wants to construct a new street that connects Main Street and North Boulevard as shown in the diagram below. The construction cost has been estimated at $110 per linear foot. Find the estimated cost for constructing the street. (1 mile = 5280 ft)



a. $30,787
b. $580,800
c. $3,431,061
d. $3,386,617

____ 56. The altitude to the hypotenuse of a right triangle divides the hypotenuse into two segments measuring 11 centimeters and 5 centimeters. To the nearest tenth, what is the length of the shorter leg of the triangle?
a. 7.4 cm
b. 8.9 cm
c. 12.1 cm
d. 13.3 cm

____ 57. A camera is mounted at a point 4,400 ft from the base of a rocket launching pad. Assuming the rocket rises vertically, what is the height of the rocket from its base when the camera angle is 30°? Round your answer to the nearest foot.
a. 3,811 ft
b. 2,540 ft
c. 7,621 ft
d. 2,200 ft

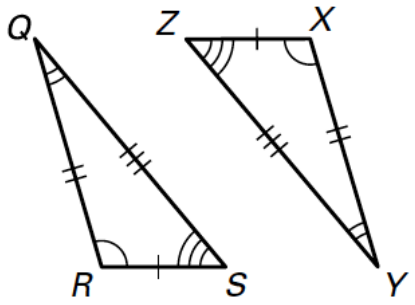
____ 58. The "Yield" traffic sign has a shape of an equilateral triangle with side length of 36 inches. What is the height of the sign? Will a rectangular metal sheet of 36 × 32 inches be big enough to make one sign?
a. The Yield sign is about 33.7 inches tall. So the rectangular metal sheet will not be big enough to make one sign.
b. The Yield sign is about 31.2 inches tall. So the rectangular metal sheet will be big enough to make one sign.
c. The Yield sign is about 25.5 inches tall. So the rectangular metal sheet will be big enough to make one sign.
d. The Yield sign is about 50.9 inches tall. So the rectangular metal sheet will not be big enough to make one sign.

____ 59. An eagle 300 feet in the air spots its prey on the ground. The angle of depression to its prey is 15°. What is the horizontal distance between the eagle and its prey? Round to the nearest foot.
a. 1,120 ft
b. 1,159 ft
c. 310 ft
d. 723 ft

Short Answer

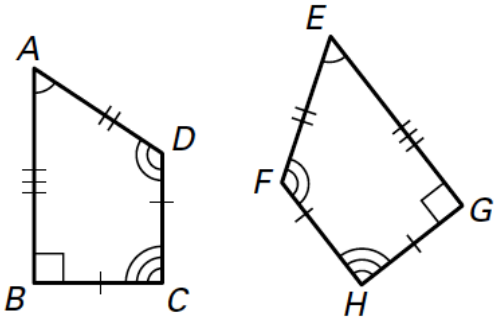
1. Complete the congruence statement for the figures.

$\triangle QRS \cong$?

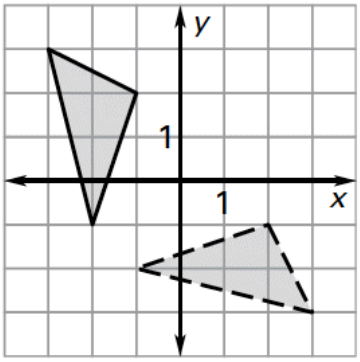


2. Complete the congruence statement for the figures.

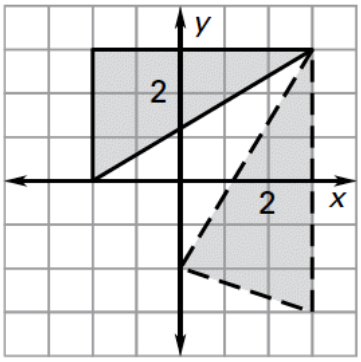
$ABCD \cong$?



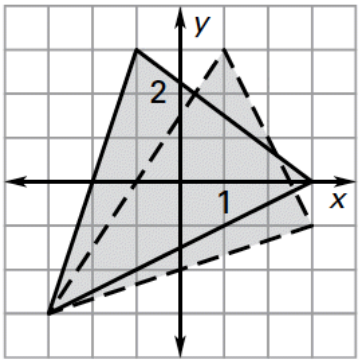
3. Tell whether a rigid motion can move the solid figure onto the dashed figure. If so, describe the transformation(s) that you can use. If not, explain why the figures are not congruent.



4. Tell whether a rigid motion can move the solid figure onto the dashed figure. If so, describe the transformation(s) that you can use. If not, explain why the figures are not congruent.



5. Tell whether a rigid motion can move the solid figure onto the dashed figure. If so, describe the transformation(s) that you can use. If not, explain why the figures are not congruent.



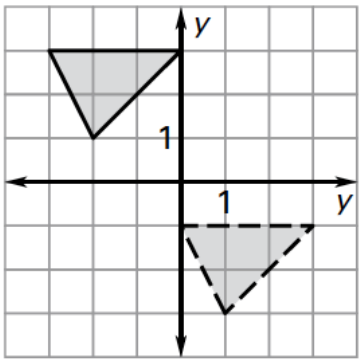
6. Given that ΔDEF is a translation of ΔABC, prove that $\angle E$ is congruent to $\angle B$.

7. Given that ΔDEF is a clockwise rotation of ΔABC, prove that $\angle D$ is congruent to $\angle A$.

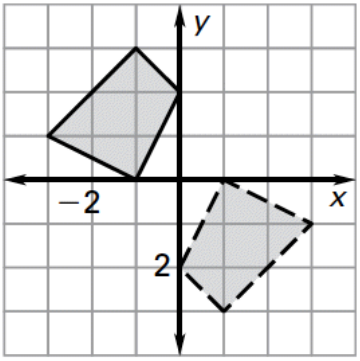
8. Given that ΔDEF is a reflection of ΔABC across the y-axis, prove that $\overline{EF}$ is congruent to $\overline{BC}$.

9. Given that ΔDEF is a translation of ΔABC, prove that $\overline{CA}$ is congruent to $\overline{FD}$.

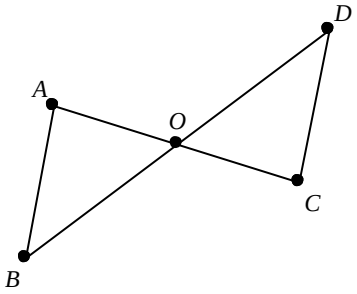
10. Tell whether a rigid motion can move the solid figure onto the dashed figure. If so, describe the transformation(s) that you can use. If not, explain why the figures are not congruent.



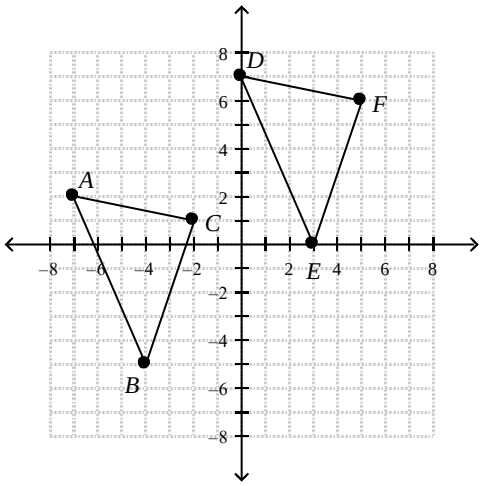
11. Tell whether a rigid motion can move the solid figure onto the dashed figure. If so, describe the transformation(s) that you can use. If not, explain why the figures are not congruent.



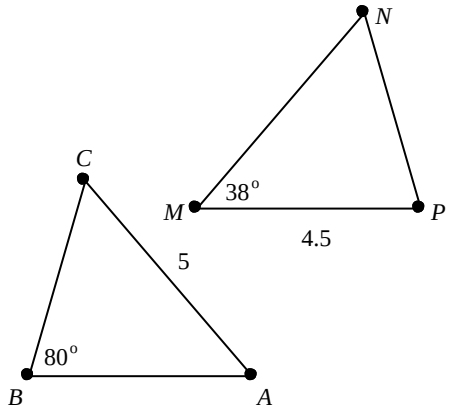
12. In the figure below, $\triangle ABO$ is a 180° rotation of $\triangle CDO$ with O as the center of rotation. Explain why $\angle CDO \cong \angle COD$.



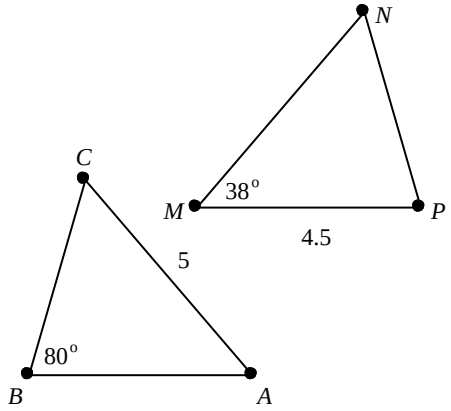
13. In the figure below, $\triangle DEF$ is a translation of $\triangle ABC$ 7 units left and 5 units up. Explain why $\angle B \cong \angle E$.



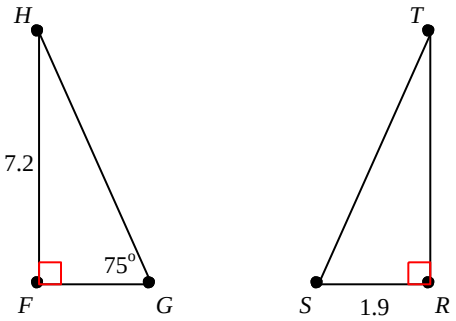
14. In the figure below, $\triangle ABC \cong \triangle MPN$ Find $m\angle A$.



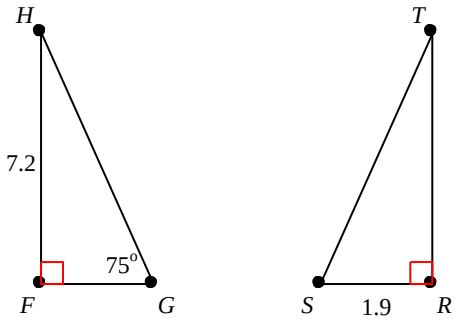
15. In the figure below, $\triangle ABC \cong \triangle MPN$
Find MN.



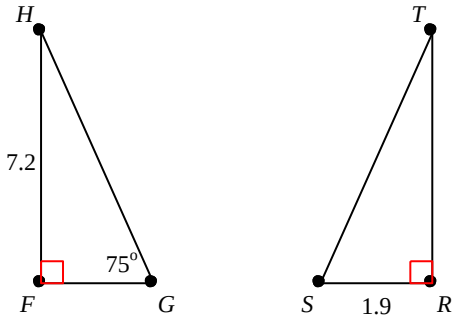
16. In the figure below, $\triangle FGH \cong \triangle RST$
Find FG.



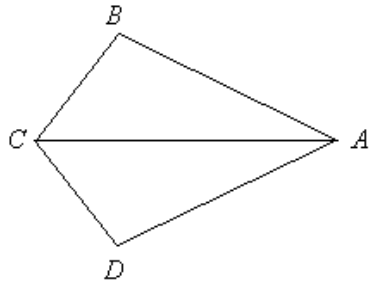
17. In the figure below, $\triangle FGH \cong \triangle RST$
Find $m\angle S$.



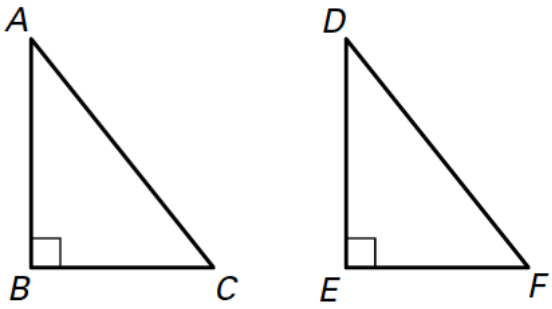
18. In the figure below, $\triangle FGH \cong \triangle RST$
Find $m\angle T$.



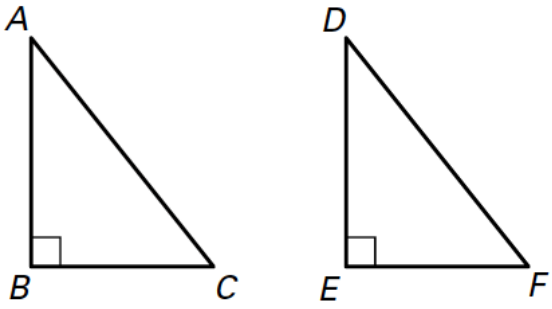
19. In the figure below, $\triangle ABC$ is a reflection of $\triangle ADC$ over $\overleftrightarrow{AC}$.
Explain why $\overline{CD} \cong \overline{CB}$.



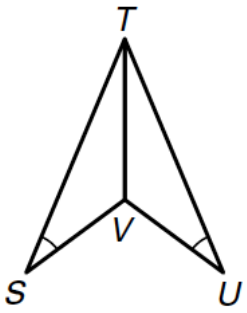
20. Given: $\overline{BC} \cong \overline{EF}$. State the congruence that is needed to prove $\triangle ABC \cong \triangle DEF$ using the Hypotenuse-Leg Congruence Theorem.



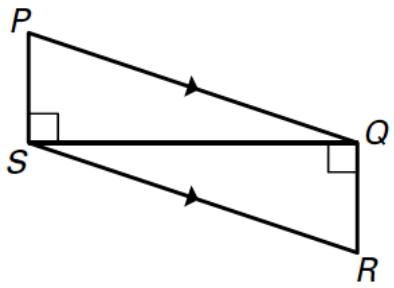
21. Given: $\angle A \cong \angle D$, $\angle C \cong \angle F$. State the congruence that is needed to prove $\triangle ABC \cong \triangle DEF$ using ASA.



22. Decide whether enough information is given to prove that the triangles are congruent. If there is enough information, state the congruence postulate or theorem you would use.



23. Decide whether enough information is given to prove that the triangles are congruent. If there is enough information, state the congruence postulate or theorem you would use.



9th Grade Geometry Standards
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   DOK: DOK 2
2. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   DOK: DOK 2
3. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence | SSS DOK: DOK 1
4. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence DOK: DOK 1
5. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence | SAS DOK: DOK 1
6. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence | SSS DOK: DOK 1
7. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence DOK: DOK 2
8. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence | rigid motion DOK: DOK 2
9. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.8
   KEY: triangle | congruence DOK: DOK 2
10. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
    DOK: DOK 2
11. ANS: A PTS: 1
    NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5
    DOK: DOK 2
12. ANS: B PTS: 1
    NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5
    DOK: DOK 2
13. ANS: A PTS: 1
    NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5
    DOK: DOK 2
14. ANS: D PTS: 1
    NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5
    DOK: DOK 2
15. ANS: C PTS: 1
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    DOK: DOK 2
16. ANS: B PTS: 1
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    DOK: DOK 2
17. ANS: B PTS: 1
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    DOK: DOK 2
18. ANS: D PTS: 1
    NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5

DOK: DOK 2

19. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
DOK: DOK 3

20. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
DOK: DOK 2

21. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
DOK: DOK 2

22. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
DOK: DOK 2

23. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10
DOK: DOK 3

24. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.4
DOK: DOK 2

25. ANS: A PTS: 1 REF: 9154df23-6ab2-11e0-9c90-001185f0d2ea
NAT: NT.CCSS.MTH.10.9-12.G.SRT.4 KEY: Pythagorean Theorem | prove
DOK: DOK 2

26. ANS: C PTS: 1 REF: 9157417e-6ab2-11e0-9c90-001185f0d2ea
NAT: NT.CCSS.MTH.10.9-12.G.SRT.4 KEY: Pythagorean Theorem | prove
DOK: DOK 3

27. ANS: B PTS: 1 REF: 9157688e-6ab2-11e0-9c90-001185f0d2ea
NAT: NT.CCSS.MTH.10.9-12.G.SRT.4 KEY: Pythagorean Theorem | prove
DOK: DOK 3

28. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
DOK: DOK 2

29. ANS: C PTS: 1 REF: MLGE0234 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
TOP: Prove Triangles Congruent by SAS and HL
KEY: triangle | parallel lines | congruence | ASA | SAS DOK: DOK 1

30. ANS: B PTS: 1 REF: MHGM0080
NAT: NT.CCSS.MTH.10.9-12.G.SRT.5 TOP: Prove Triangles Congruent by ASA and AAS
KEY: triangle | congruence | ASA | HL | AAS | SAS DOK: DOK 1

31. ANS: C PTS: 1 REF: HLGM0315
NAT: NT.CCSS.MTH.10.9-12.G.CO.7 | NT.CCSS.MTH.10.9-12.G.SRT.5
TOP: Use Isosceles and Equilateral Triangles KEY: triangle | segment | congruent
DOK: DOK 2

32. ANS: B PTS: 1 REF: MCT80490
NAT: NT.CCSS.MTH.10.8.8.G.4 | NT.CCSS.MTH.10.9-12.G.SRT.2 | NT.CCSS.MTH.10.9-12.G.SRT.5
TOP: Similarity and Dilations KEY: similar | word | model | triangle
DOK: DOK 1

33. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
DOK: DOK 1

34. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
DOK: DOK 1

35. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
DOK: DOK 1

36. ANS: A PTS: 1 REF: 1a7093be-4683-11df-9c7d-001185f0d2ea
OBJ: Naming Congruent Corresponding Parts NAT: NT.CCSS.MTH.10.9-12.G.SRT.5
LOC: MTH.C.11.01.02.03.002 | MTH.C.11.02.02.002 TOP: Congruent Triangles
KEY: correspondence | corresponding parts DOK: DOK 1

37. ANS: C PTS: 1 REF: MLGE0235 NAT: NT.CCSS.MTH.10.9-12.G.SRT.5

LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.c | NCTM.PSSM.00.MTH.9-12.REA.3 | NCTM.PSSM.00.MTH.9-12.REA.4 TOP: Use Congruent Triangles
KEY: congruent | proof | bisector DOK: DOK 3

38. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

39. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

40. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

41. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

42. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 2

43. ANS: A PTS: 1 REF: 1bc322c6-4683-11df-9c7d-001185f0d2ea
OBJ: Finding Trigonometric Ratios in Special Right Triangles
NAT: NT.CCSS.MTH.10.9-12.F.TF.3 | NT.CCSS.MTH.10.9-12.G.SRT.6
LOC: MTH.C.14.02.02.005 | MTH.C.14.02.02.006 TOP: Trigonometric Ratios
KEY: trigonometric ratio | trigonometry | tangent | special right triangles | 30-60-90
DOK: DOK 2

44. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 2

45. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

46. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.6
DOK: DOK 1

47. ANS: A PTS: 1 REF: MOT90315 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.d | NCTM.PSSM.00.MTH.9-12.PRS.2
TOP: Apply the Sine and Cosine Ratios KEY: word | trigonometric ratios | sine and cosine ratios
DOK: DOK 1

48. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 1

49. ANS: A PTS: 1 REF: 1afadc96-4683-11df-9c7d-001185f0d2ea
OBJ: Application NAT: NT.CCSS.MTH.10.9-12.G.SRT.8 STA: CA.CACS.MTH.97.GEO.G.15.0
LOC: MTH.C.10.05.10.05.01.001 | MTH.C.11.03.02.05.02.002
TOP: The Pythagorean Theorem KEY: Pythagorean Theorem | side length
DOK: DOK 2

50. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

51. ANS: C PTS: 1
NAT: NT.CCSS.MTH.10.9-12.G.SRT.5 | NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

52. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

53. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

54. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

55. ANS: D PTS: 1 REF: MLGE0379
NAT: NT.CCSS.MTH.10.8.8.G.7 | NT.CCSS.MTH.10.9-12.G.SRT.8

LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a | NCTM.PSSM.00.MTH.9-12.PRS.2
TOP: Apply the Pythagorean Theorem KEY: Pythagorean Theorem | word | right triangles
DOK: DOK 2

56. ANS: B PTS: 1
NAT: NT.CCSS.MTH.10.9-12.G.SRT.5 | NT.CCSS.MTH.10.9-12.G.SRT.8
DOK: DOK 2

57. ANS: B PTS: 1 REF: 138541ca-4683-11df-9c7d-001185f0d2ea
OBJ: Application NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
LOC: MTH.C.14.02.01.003 | MTH.C.14.02.03.001 TOP: Trigonometric Ratios
KEY: cosine | sine | tangent | trigonometric ratio DOK: DOK 2

58. ANS: B PTS: 1 REF: 1b06c862-4683-11df-9c7d-001185f0d2ea
OBJ: Using the 30-60-90 Triangle Theorem NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
STA: CA.CACS.MTH.97.GEO.G.20.0 LOC: MTH.C.11.03.02.05.03.001 | MTH.C.11.03.02.05.03.002
TOP: Applying Special Right Triangles KEY: special right triangles | equilateral triangle | 30-60-90
DOK: DOK 2

59. ANS: A PTS: 1 REF: 1bd3d34a-4683-11df-9c7d-001185f0d2ea
OBJ: Finding Distance by Using Angle of Depression NAT: NT.CCSS.MTH.10.9-12.G.SRT.8
STA: CA.CACS.MTH.97.GEO.G.19.0 LOC: MTH.C.14.02.03.001
TOP: Angles of Elevation and Depression
KEY: angle of elevation | angle of depression | trigonometry DOK: DOK 2

SHORT ANSWER

1. ANS:
$\triangle YXZ$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7 DOK: DOK 1

2. ANS:
$EGHF$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7 DOK: DOK 1

3. ANS:
yes; reflection in the line $y = x$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.6 | NT.CCSS.MTH.10.9-12.G.CO.7
DOK: DOK 2

4. ANS:
No; a rotation does not map one figure onto the other, because corresponding sides are not congruent.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.6 | NT.CCSS.MTH.10.9-12.G.CO.7
DOK: DOK 2

5. ANS:
No; a rotation or reflection maps one side to a congruent side, but other sides are not congruent.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.6 | NT.CCSS.MTH.10.9-12.G.CO.7
DOK: DOK 2

6. ANS:
ΔDEF is a translation of ΔABC. Translations are rigid motions, and by definition, rigid motions preserve angle measure. So, $\angle E \cong \angle B$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
KEY: triangle | congruence | rigid motion | translation DOK: DOK 3

7. ANS:
ΔDEF is a rotation of ΔABC . Rotations are rigid motions, and by definition, rigid motions preserve angle measures. So, $\angle D \cong \angle A$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
KEY: triangle | congruence | rigid motion | rotation DOK: DOK 3

8. ANS:
ΔDEF is a reflection of ΔABC across the y-axis. Reflections are rigid motions, and by definition, rigid motions preserve length. So, $\overline{EF} \cong \overline{BC}$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
KEY: triangle | congruence | rigid motion | reflection DOK: DOK 3

9. ANS:
ΔDEF is a translation of ΔABC. Translations are rigid motions, and by definition, rigid motions preserve length. So, $\overline{CA} \cong \overline{FD}$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
KEY: triangle | congruence | rigid motion | reflection DOK: DOK 3

10. ANS:
yes; translation 3 units right and 4 units down

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7 | NT.CCSS.MTH.10.9-12.G.CO.6
DOK: DOK 2

11. ANS:
yes; rotation 180° (clockwise or counterclockwise) around the origin

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7 | NT.CCSS.MTH.10.9-12.G.CO.6
DOK: DOK 2

12. ANS:
Rotation is a rigid motion, so $\triangle ABO \cong \triangle CDO$. Each pair of corresponding parts of the triangles are mapped by the same rigid motion, so the individual parts of the triangle are also congruent.
Therefore, $\angle CDO \cong \angle COD$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 3

13. ANS:
Translation is a rigid motion, so $\triangle ABC \cong \triangle DEF$. Each pair of corresponding parts of the triangles are mapped by the same rigid motion, so the individual parts of the triangle are also congruent.
Therefore, $\angle B \cong \angle E$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 3

14. ANS:
$m\angle A = 38°$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 2

15. ANS:
$MN = 5$ units

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 2

16. ANS:
$FG = 1.9$ units

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 2

17. ANS:
$m\angle S = 75°$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 2

18. ANS:
$m\angle T = 15°$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.a KEY: triangle | congruent
DOK: DOK 2

19. ANS:
Reflection is a rigid motion, so $\triangle ABC \cong \triangle ADC$. Each pair of corresponding parts of the triangles are mapped by the same rigid motion, so the individual parts of the triangle are also congruent.
Therefore, $\overline{CD} \cong \overline{CB}$.

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.7
LOC: NCTM.PSSM.00.MTH.9-12.GEO.1.c | NCTM.PSSM.00.MTH.9-12.REA.3 | NCTM.PSSM.00.MTH.9-12.REA.4 TOP: Use Congruent Triangles
KEY: triangle | congruence | CPCTC DOK: DOK 3

20. ANS:
$\overline{AC} \cong \overline{DF}$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10 DOK: DOK 2

21. ANS:
$\overline{AC} \cong \overline{DF}$

PTS: 1 NAT: NT.CCSS.MTH.10.9-12.G.CO.10 DOK: DOK 2

22. ANS:
Not enough information is given to prove that the triangles are congruent.

PTS: 1
NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5 |

NT.CCSS.MTH.10.9-12.G.SRT.4 DOK: DOK 2

23. ANS:
yes; AAS congruence

PTS: 1
NAT: NT.CCSS.MTH.10.9-12.G.CO.10 | NT.CCSS.MTH.10.9-12.G.SRT.5 |
NT.CCSS.MTH.10.9-12.G.SRT.4 DOK: DOK 2