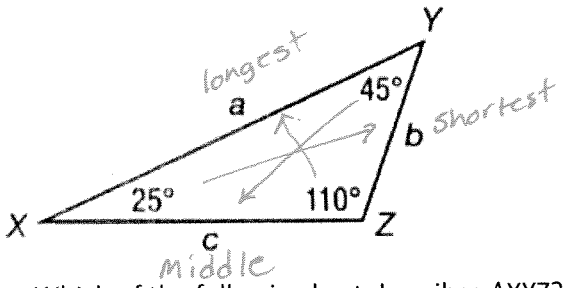
Geometry Part 2
SOL Reporting Category 2: Triangles

Name Key

Choose the best answer for each question.

Use ΔXYZ to answer questions 1 and 2.



1. Which of the following best describes ΔXYZ?

A. Acute isosceles triangle
B. Acute scalene triangle
C. Obtuse isosceles triangle
(D.) Obtuse scalene triangle

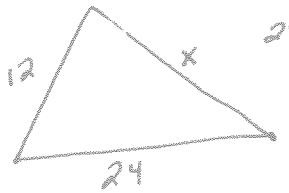
2. Which statement about this triangle is true?

A. Side XZ is the shortest side.
(B.) Side YZ is the shortest side.
C. Side XZ is the longest side.
D. Side YZ is the longest side.

3. Amandine is making a pizza in the shape of a triangle. One side is 12 inches long, and another side is 24 inches long. Which of the following could be the length of the third side?

24 − 12 = 12
24 + 12 = 36
12 < x < 36

A. 40 in.
B. 36 in.
(C.) 26 in.
D. 10 in.

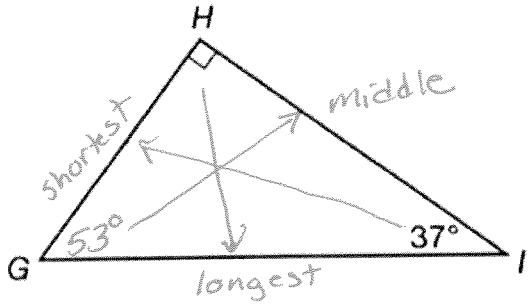


4. What is the measure of each angle in an equiangular triangle?

$\frac{180}{3} = 60$

A. 30°
B. 45°
(C.) 60°
D. 90°

Use ΔGHI below to answer questions 5 and 6.



5. What is m∠G?

90 − 37 = 53

(A.) 53°
B. 63°
C. 90°
D. 143°

6. Which of the following inequalities shows the correct relationship between the sides of ΔGHI?

A. HI < GH < GI
B. GH < GI < HI
C. GI < HI < GH
(D.) GH < HI < GI

7. Two sides of a triangle measure 21 inches and 23 inches. If the third side of the triangle measures x inches, which of the following shows the range of possible values for x?

23 − 21 = 2
23 + 21 = 44
2 < x < 44

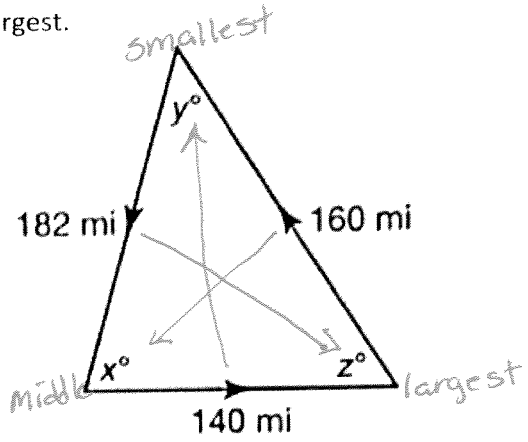
A. 0 < x < 44
B. 0 < x < 21
C. 2 < x < 23
(D.) 2 < x < 44

8. Which of the following could **not** be the lengths of the three sides of a triangular garden? a + b > c

(A.) 18 ft, 30 ft, 12 ft 18 + 12 > 30 ✗
B. 16 ft, 16 ft, 30 ft 16 + 16 > 30 ✓
C. 15 ft, 28 ft, 14 ft 15 + 14 > 28 ✓
D. 18 ft, 18 ft, 18 ft 18 + 18 > 18 ✓

Key

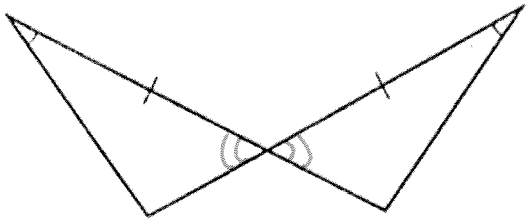
9. The diagram below shows the triangular route of an airplane. Order x, y, and z from smallest to largest.



Y, X, Z

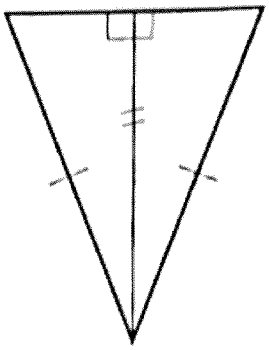
In questions 10-13, if the triangles are congruent, state which method can be used to prove the triangles congruent. If they are not necessarily congruent, choose "not congruent."

10. The figure below is formed by two intersecting segments whose endpoints are connected by two additional segments.



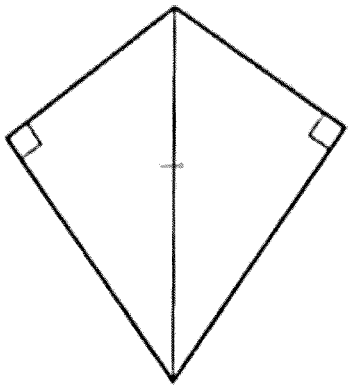
A. SSS
B. ASA
C. SAS
D. Not congruent

11.



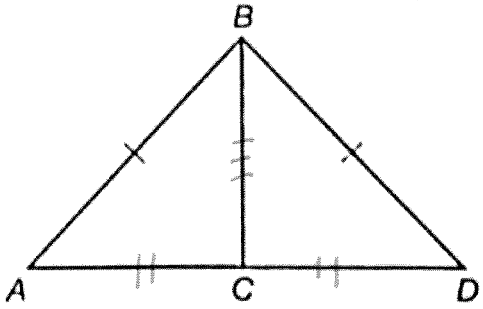
A. HL
B. SSS
C. ASA
D. Not congruent

12.



A. HL
B. ASA
C. SSS
D. Not congruent

13. In the figure below, C is the midpoint of $\overline{AD}$. Consider ΔABC and ΔDBC.



A. SSS
B. ASA
C. SAS
D. Not congruent

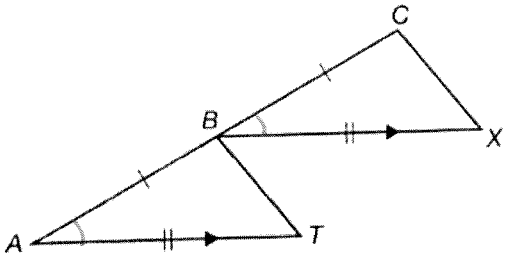
Key

14. If $\Delta ABC \cong \Delta DEF$ and $\overline{CB}$ corresponds to $\overline{FE}$, which angle corresponds to ∠CAB?

A. ∠ABC
B. ∠FDE
C. ∠DEF
D. ∠FED

In questions 15-17, choose the answer that completes the proof.

Given: B is the midpoint of $\overline{AC}$, $\overline{AT} \cong \overline{BX}$, and $\overline{AT} \parallel \overline{BX}$.
Prove: ΔABT ≅ ΔBCX



Statements	Reasons
1. B is the midpoint of $\overline{AC}$, $\overline{AT} \parallel \overline{BX}$, $\overline{AT} \parallel \overline{BX}$.	1. Given
2. $\overline{AB} \cong$ BC	2. Definition of a midpoint
3. $\angle CBX \cong \angle BAT$	3. Corr. ∠s
4. $\Delta ABT \cong \Delta BCX$	4. SAS

15. What is the missing part of Statement 2?

A. $\overline{BA}$
B. $\overline{BT}$
C. $\overline{BC}$
D. $\overline{AT}$

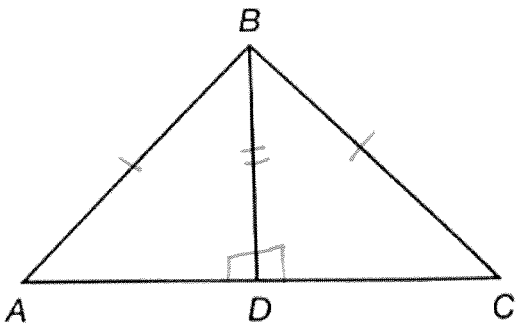
16. What is the missing reason for Step 3?

A. Alternate interior angles theorem
B. Corresponding angles theorem
C. Alternate exterior angles theorem
D. Reflexive property

17. What is the missing reason for Step 4?

A. SSS congruence postulate
B. AAS congruence theorem
C. ASA congruence postulate
D. SAS congruence postulate

18. In the diagram below, $\overline{AB} \cong \overline{CB}$ and $\overline{BD}$ is perpendicular to $\overline{AC}$. Is ΔABD ≅ ΔCBD? Why or why not?



Since $\overline{BD} \cong \overline{BD}$ by the reflexive property, the △s would be congruent by HL.

19. Which triangles are always similar?

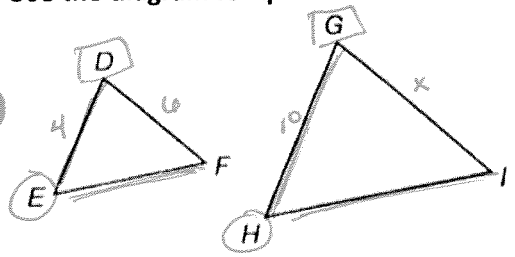
A. isosceles
B. right
C. equilateral
D. acute

20. Which of the following statements is always true about similar triangles?

A. Similar triangles have parallel bases.
B. Similar triangles have the same shape.
C. Similar triangles are the same size.
D. Similar triangles have congruent sides.

Key

Use the diagram for questions 21-23.



21. If ΔDEF ~ ΔGHI, DE = 4 units, DF = 6 units, and GH = 10 units, what is the length of $\overline{GI}$?

A. 2.4 units
B. 6.7 units
C. 12 units
D. 15 units

$\frac{4}{6} = \frac{10}{x}$

$4x = 60$

$x = 15$

22. Given $\frac{DE}{GH} = \frac{EF}{HI}$, what other piece of information would you need to prove ΔDEF ~ ΔGHI?

A. ∠F ≅ ∠I
B. ∠E ≅ ∠H
C. $\overline{DE} \cong \overline{GH}$
D. $\overline{DF} \cong \overline{GI}$

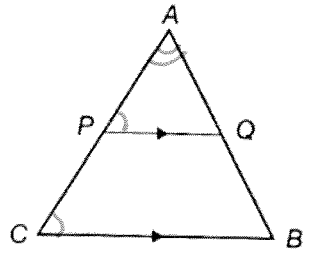
23. Given ∠D ≅ ∠G, what other information would **not** help in proving ΔDEF ~ ΔGHI?

A. ∠E ≅ ∠H ✓ AA ~
B. ∠F ≅ ∠I ✓ AA ~
C. $\frac{DE}{GH} = \frac{DF}{GI}$ ✓ SAS ~
D. $\frac{DE}{DF} = \frac{EF}{HI}$

In questions 24-26, choose the answer that completes the proof.

Given: $\overline{PQ} \parallel \overline{CB}$

Prove: $\frac{AP}{AC} = \frac{PQ}{CB}$



Statements	Reasons
1. $\overline{PQ} \parallel \overline{CB}$	1. Given
2. $\angle APQ \cong$ ∠ACB	2. Corresponding angles theorem
3. ∠A ≅ ∠A	3. Reflexive property
4. $\triangle APQ \sim \triangle ACB$	4. AA ~
5. $\frac{AP}{AC} = \frac{PQ}{CB}$	5. Definition of similar triangles

24. What is the missing part of Step 2?

A. ∠AQP
B. ∠ABC
C. ∠ACB
D. ∠CPQ

25. What is the missing statement for Step 3?

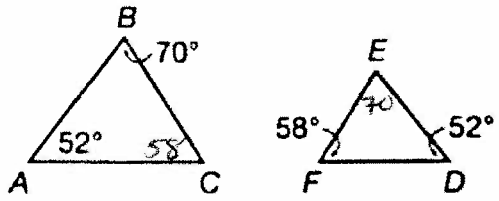
A. ∠A ≅ ∠A
B. ∠B ≅ ∠B
C. ∠C ≅ ∠C
D. $\overline{PQ} \cong \overline{PQ}$

26. What is the missing reason for Step 4?

A. SAS similarity theorem
B. AA similarity postulate
C. Alternate interior angles theorem
D. SSS similarity postulate

Key

27. Are ΔABC and ΔDEF similar? Why or why not?



Yes because all of the corresponding angles are ≅, the triangles are similar by AA ~.

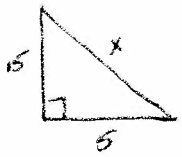
28. The hypotenuse of a right triangle is 89 units. One leg is 39 units. What is the length of the other leg?

A. 50 units
B. 62 units
C. 80 units
D. 97 units

$x^2+39^2=89^2$
$x^2+1521=7921$
$x^2=6400$
$x=80$

29. A cat is stuck 15 feet up a tree. To get it down, Amanda places a ladder 5 feet from the base of the tree. How tall must her ladder be in order to reach the cat? Round to the nearest foot.

A. 10 ft
B. 14 ft
C. 15 ft
D. 16 ft



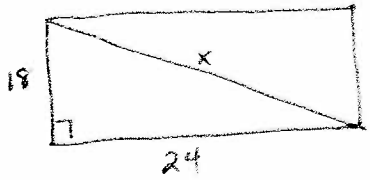
$5^2+15^2=x^2$
$25+225=x^2$
$250=x^2$
$x=16$

30. Which of the following are **not** possible lengths for the sides of a right triangle? $a^2+b^2=c^2$

A. 6, 8, 10 $6^2+8^2=10^2$ ✓
B. 7, 23, 24 $7^2+23^2=24^2$ ✗
C. 8, 15, 17 $8^2+15^2=17^2$ ✓
D. 9, 40, 41 $9^2+40^2=41^2$ ✓

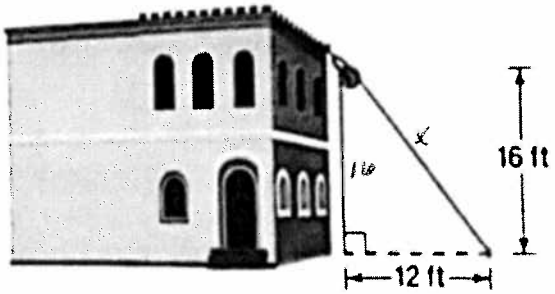
31. A rectangular classroom is 24 feet long by 18 feet wide. What is the length of its diagonal?

A. 30 ft
B. 32 ft
C. 36 ft
D. 42 ft



$18^2+24^2=x^2$
$324+576=x^2$
$900=x^2$
$x=30$

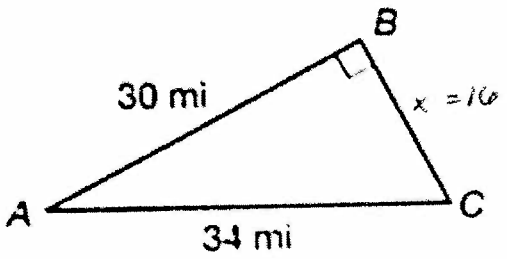
32. To lift a heavy beam, construction workers attach a rope to the beam at the base of a building. They then run the rope over a pulley wheel at the top of the building and down to a winch on the ground 12 feet away from building, as shown below. What is the minimum length of rope needed?



A. 20 ft
B. 28 ft
C. 32 ft
D. 36 ft

$12^2+16^2=x^2$
$144+256=x^2$
$400=x^2$
$x=20$

33. The diagram shows the course of a bicycle race, with the start and finish at point A and checkpoints at points B and C. The participants begin the race at point A and must pass checkpoints B and C before returning to point A. What is the total length of the bicycle race course?



A. 68 mi
B. 72 mi
C. 80 mi
D. 109 mi

$x^2+30^2=34^2$
$x^2+900=1156$
$x^2=256$
$x=16$

Total = 30 + 16 + 34
= 80