LESSON 5.5

Exercise Set A

MM1G3b Understand and use the triangle inequality, the side-angle inequality, and the exterior-angle inequality.

Use a ruler and protractor to draw the given type of triangle. Mark the largest angle and longest side in red and the smallest angle and shortest side in blue. What do you notice?

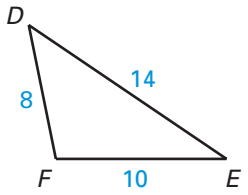
1. Obtuse scalene

2. Acute isosceles

3. Right isosceles

List the sides and the angles in order from least to greatest.

4.



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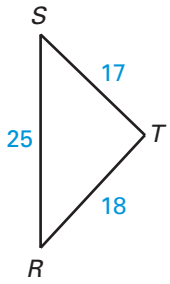

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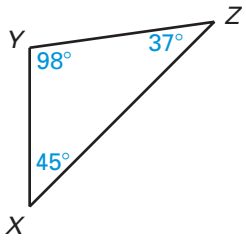

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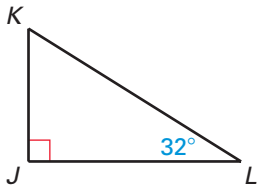

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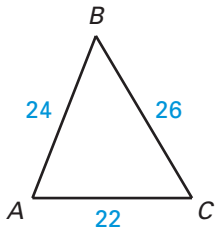

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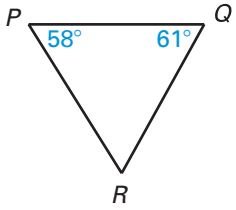


Sketch and label the triangle described.

10. Side lengths: 14, 17, and 19, with longest side on the bottom
Angle measures: 45°, 60°, and 75°, with smallest angle at the right

11. Side lengths: 11, 18, and 24, with shortest side on the bottom
Angle measures: 25°, 44°, and 111°, with largest angle at the left

12. Side lengths: 32, 34, and 48, with shortest side arranged vertically at the right.
Angle measures: 42°, 45°, and 93°, with largest angle at the top.

Is it possible to construct a triangle with the given side lengths? If not, explain why not.

13. 3, 4, 5

14. 1, 4, 6

15. 17, 17, 33

16. 22, 26, 65

17. 6, 43, 39

18. 7, 54, 45

***Describe* the possible lengths of the third side of the triangle given the lengths of the other two sides.**

19. 6 in., 9 in.

20. 4 ft, 12 ft

21. 9 m, 18 m

22. 21 yd, 16 yd

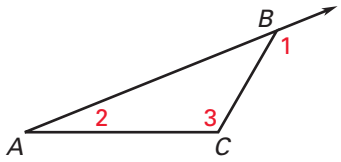
23. 22 in., 2 ft

24. 24 in., 1 yd

UNIT 5

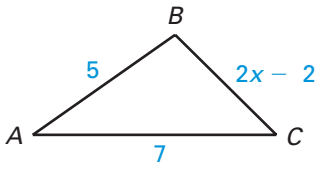
Exercise Set A *(continued)*

25. Write an inequality that relates $m\angle 1$ to $m\angle 2$ and $m\angle 1$ to $m\angle 3$.



***Describe* the possible values of *x*.**

26.



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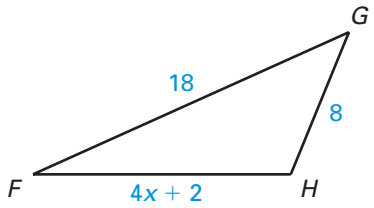
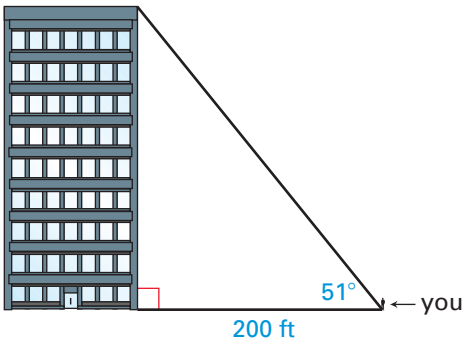
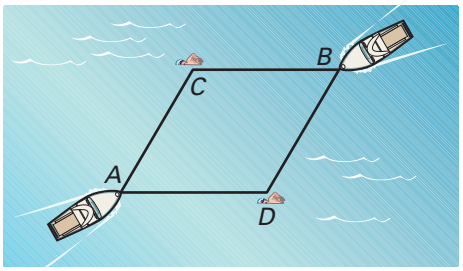


28. Building You are standing 200 feet from a tall building. The angle of elevation from your feet to the top of the building is 51° (as shown in the figure). What can you say about the height of the building?



29. Sea Rescue The figure shows the relative positions of two rescue boats and two people in the water. Talking by radio, the captains use certain angle relationships to conclude that boat *A* is the closest to person *C* and boat *B* is the closest to person *D*. *Describe* the angle relationships that would lead to this conclusion.



30. Airplanes Two airplanes leave the same airport heading in different directions. After 2 hours, one airplane has traveled 710 miles and the other has traveled 640 miles. *Describe* the range of distances that represents how far apart the two airplanes can be at this time.

31. Baseball A pitcher throws a baseball 60 feet from the pitcher's mound to home plate. A batter pops the ball up and it comes down just 24 feet from home plate. What can you determine about how far the ball lands from pitcher's mound? *Explain* why the Triangle Inequality Theorem can be used to describe all but the shortest and longest possible distances.

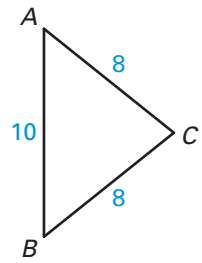
LESSON 5.5

Exercise Set B

MM1G3b Understand and use the triangle inequality, the side-angle inequality, and the exterior-angle inequality.

Name the smallest and largest angles of the triangle.

1.



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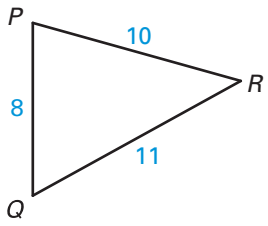

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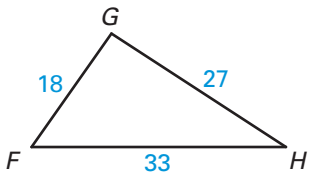
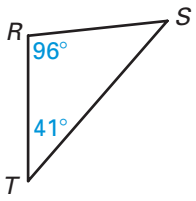


Name the shortest and longest sides of the triangle.

4.



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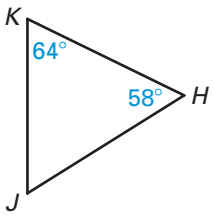

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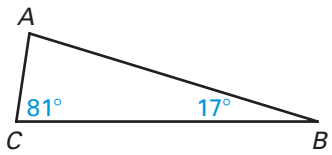
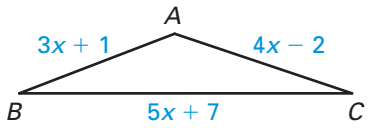


Solve the inequality *AB* + *AC* > *BC* for *x*.

7.



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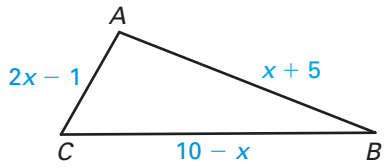
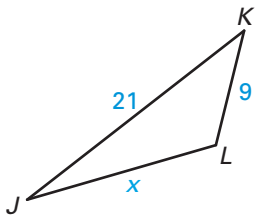


In Exercises 9 and 10, $m\angle J < m\angle K < m\angle L$. Find all possible values of *x*.

9.



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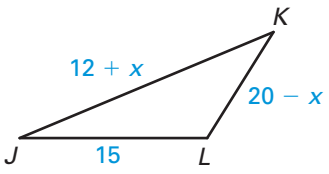


11. A triangle has sides that are 32, 48, and 61 units long and angles of 31°, 52°, and 97°. Sketch and label a diagram with the longest side on the top and the smallest angle at the right.

Is it possible to construct a triangle with the given side lengths? If not, explain why not.

12. 10, 11, 20

13. 13, 14, 15

14. 14, 20, 38

15. 21, 34, 13

16. 49, 25, 23

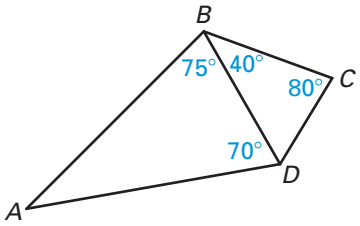
17. 17, 51, 36

UNIT 5

Exercise Set B *(continued)*

List the sides in order from shortest to longest.

18.



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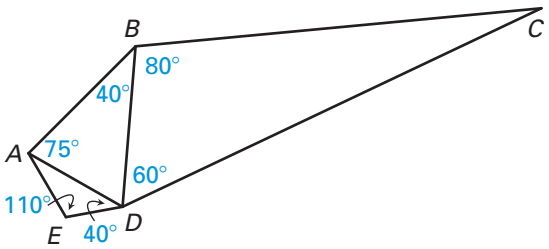


Describe **the possible lengths of the third side of the triangle given the lengths of the other two sides.**

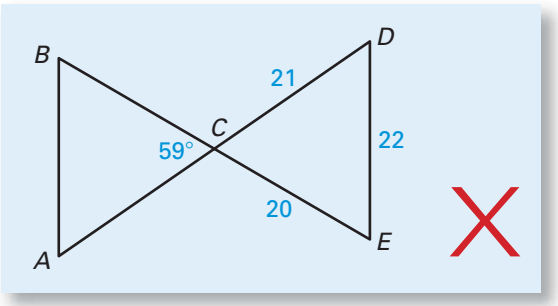
20. 6 ft, 6 ft

21. 9 in., 5 in.

22. 11 yd, 6 yd

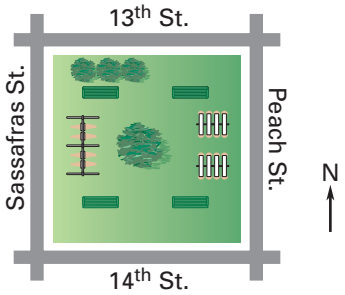
23. 7 ft, 24 in.

24. **Error Analysis** *Explain* why the diagram must be incorrect.



25. **Playground** You are asked to fence in a triangular playground. Two sides of the playground have lengths of 100 feet and 200 feet. What is the maximum total length of fence you could possibly need?

26. **Shortcut** You are walking your dog north on the sidewalk of Peach Street. When you reach 14th Street, you cut across the park to the corner of 13th Street and Sassafras Street. *Explain* why taking this route is shorter than continuing to walk to 13th Street and then to Sassafras Street.



27. **Proof** Write a paragraph proof.

GIVEN: $\overline{RT} \perp \overline{TS}$

PROVE: $RS > RT$