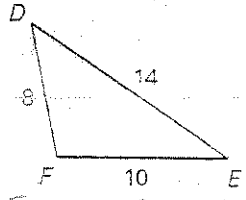
Adv. Geometry 5.5 Δ inequality

Key

List the sides and the angles in order from smallest to largest.

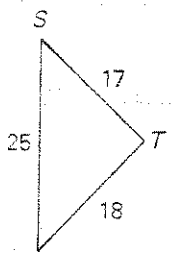
4.



∠E < ∠D < ∠F

$\overline{DF} < \overline{FE} < \overline{DE}$

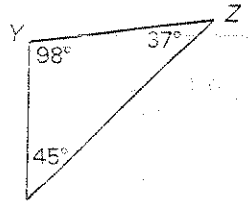
5.



∠R, ∠S, ∠T

$\overline{ST}$ $\overline{RT}$ $\overline{SR}$

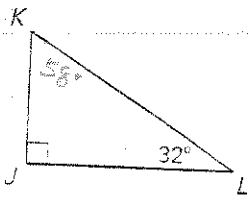
6.



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

∠Z, ∠X, ∠Y

7.



$\overline{KJ}, \overline{JL}, \overline{KL}$

∠L ∠K ∠J

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

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

13. 3, 4, 5

yes

14. 1, 4, 6

NO

1+4 ≯ 6

15. 17, 17, 33

yes

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

19. 6 in., 9 in.

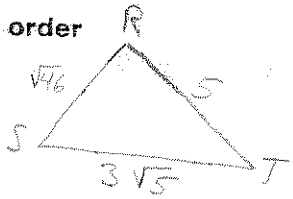
3 < x < 15

20. 4 ft, 12 ft

8 < x < 16

Is it possible to build a triangle using the given side lengths? If so, order the angle measures of the triangle from least to greatest.

25. $RS = \sqrt{46}$, $ST = 3\sqrt{5}$, $RT = 5$



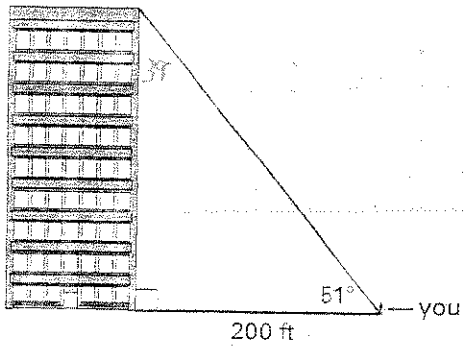
yes & ∠S, ∠R, ∠T

31. **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.

70 < x < 1350 ⇒ more than 70 miles apart or less than 1350 miles apart

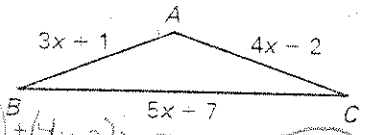
29. Building You are standing 200 feet from a tall building. The angle of elevation from your feet to the top of the building is 51° (as shown in the figure). What can you say about the height of the building?

More than 200 ft tall



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

7.



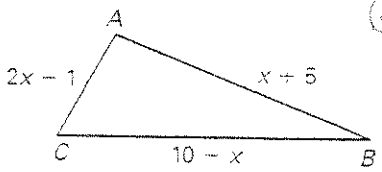
$(3x+1)+(4x-2) > 5x-7$

$7x-1 > 5x-7$

$2x > -6$

$x > -3$

8.



$(x+5)+(2x-1) > (10-x)$

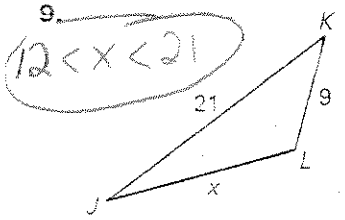
$3x+4 > 10-x$

$4x > 6$

$x > \frac{3}{2}$

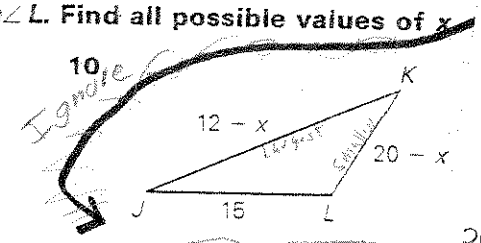
In Exercises 9 and 10, $m\angle J < m\angle K < m\angle L$. Find all possible values of x.

9.



$12 < x < 21$

10.



$20-x < 15 < 12+x$

$20-x < 15$ and $15 < 12+x$

$5 < x$ and $3 < x$

$20-x+15 > 12+x$

$35-x > 12+x$

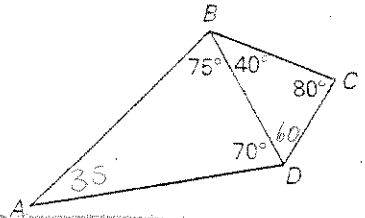
$23 > 2x$

$11.5 > x$

$5 < x < 11.5$

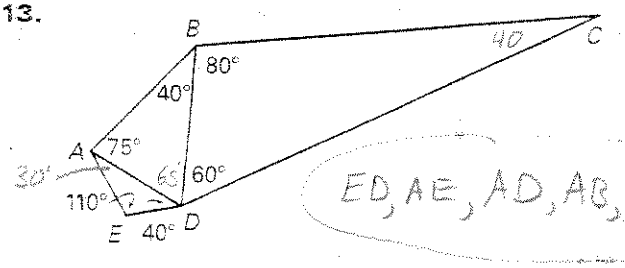
List the sides in order from shortest to longest.

12.



CD, BC, BD, AB, AD

13.



ED, AE, AD, AB, BD, BC, DC

18. 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?

3rd side $< x$

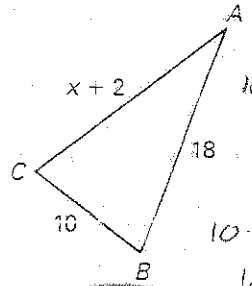
$x + 100 > 200$ or $100 + 200 > x$

$x > 100$ $\quad x < 300$

600 feet

In Exercises 1–4, $m\angle A < m\angle B < m\angle C$. Describe the possible values of x.

1.



$10 < x+2 < 18$

$10 < x+2$ $\quad x+2 < 18$

$8 < x$ $\quad x < 16$

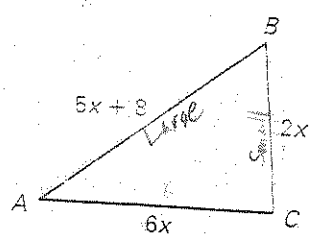
$10 + x + 2 > 18$

$12 + x > 18$

$x > 6$

$8 < x < 16$

3.



$2x+3 < 6x < 5x+8$

$2x+3 < 6x$ & $6x < 5x+8$

$3 < 4x$ $\quad x < 8$

$\frac{3}{4} < x$

$2x+3+6x > 5x+8$

$8x+3 > 5x+8$

$3x > 5$

$x > \frac{5}{3}$

$\frac{5}{3} < x < 8$