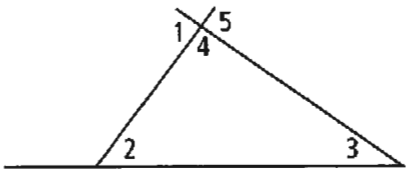
Name Answers Date

5.5 – Inequalities in Triangles

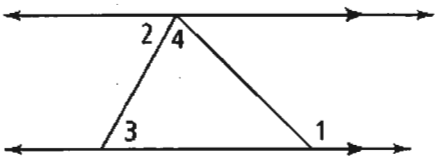
Explain why $m\angle 1 > m\angle 2$.

1)



∠1 is an exterior angle. Thus, the sum of ∠2+∠3 must equal to it. Due to this fact ∠1 must be greater than ∠2.

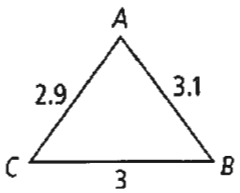
2)



m∠2 = m∠3 due to AIA. m∠1 > m∠3 due to the fact that ∠1 is an exterior angle. Thus, m∠1 > m∠2 due to the transitive property

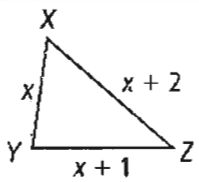
List the angles of each triangle in order from smallest to largest.

3)



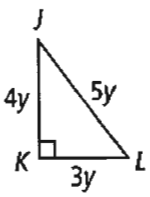
∠B, ∠A, ∠C

4)



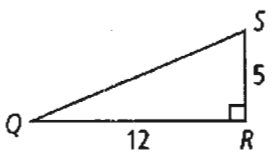
∠Z, ∠X, ∠Y

5)



∠J, ∠L, ∠K

6)



∠Q, ∠S, ∠R

7) ΔABC, where $AB = 17$, $AC = 13$, and $BC = 29$

∠B, ∠C, ∠A

Thanks Hailey!

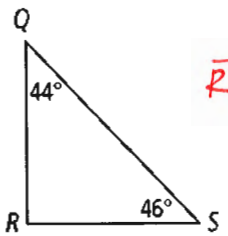
8) ΔMNO, where $MN = 4$, $NO = 12$, and $MO = 10$

∠O, ∠N, ∠M

Thanks Sasha!

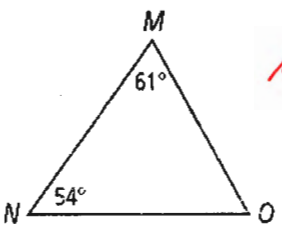
List the sides of each triangle in order from smallest to largest.

9)



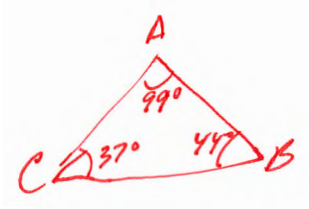
$\overline{RS}$, $\overline{QR}$, $\overline{QS}$

10)



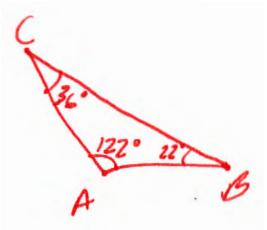
$\overline{MO}$, $\overline{NO}$, $\overline{MN}$

11) ΔABC, with $m\angle A = 99$, $m\angle B = 44$, and $m\angle C = 37$



$\overline{BA}, \overline{AC}, \overline{CB}$

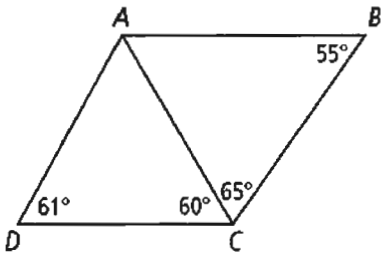
12) ΔABC, $m\angle A = 122$, $m\angle B = 22$, and $m\angle C = 36$



$\overline{AC}, \overline{BA}, \overline{CB}$

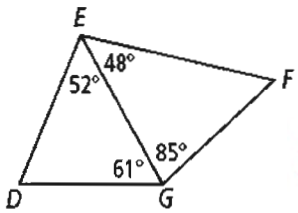
Determine which side is shortest in the diagram.

13)



$\overline{DC}$

14)



$\overline{DG}$

Can a triangle have sides with the given lengths? Explain.

15) 8 cm, 7 cm, 9 cm

Yes
Sum of any 2 sides is greater than the third side.

16) 7 ft, 13 ft, 6 ft

No.
$7+6=13$

17) 20 in., 18 in., 16 in.

Yes
Sum of any two sides is greater than the third side

18) 3 m, 11 m, 7 m

No
$3+7<11$

The lengths of two sides of a triangle are given. Describe the possible lengths for the third side.

19) 5, 11

$6 < x < 16$

20) 12, 12

$0 < x < 24$

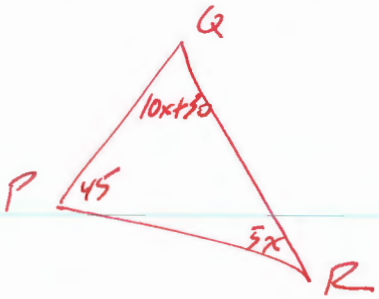
21) 25, 10

$15 < x < 35$

22) 6, 8

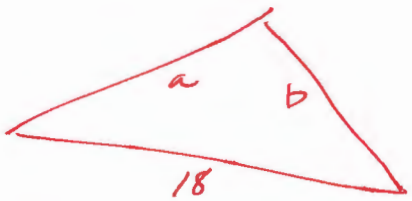
$2 < x < 14$

23) List the sides in order from shortest to longest in ΔPQR, with $m\angle P = 45$, $m\angle Q = 10x + 30$, and $m\angle R = 5x$.



$\overline{PQ}, \overline{QR}, \overline{PR}$

24) A student draws a triangle with a perimeter 36 cm. The student says that the longest side measures 18 cm. How do you know that the student is incorrect? Explain.



If the longest side is 18, the other two sides a and b must be equal to 18 if the perimeter is 36. However this is impossible due to the triangle inequality postulate.