Geometry Worksheet **Name**_____
Inequalities in One Triangle **Date**_____**Period**_____

In exercises 1-10, the lengths of two sides of a triangle are given. First, write an inequality to describe all possible values for x, the length of the third side of the triangle. Then, if domain of x is limited to the set $\{\frac{1}{2}, 1, 4, 7, 9.3, 14, 19\}$, list all possible values for x.

1. 7, 8
2. 5, 5
3. 1, 8
4. 3, 6
5. 10, 10
6. $6\frac{1}{3}, 4\frac{1}{3}$
7. 5.1, 4.4
8. 3.9, 2.3
9. $2\frac{1}{2}, 5\frac{1}{2}$
10. 5, 11

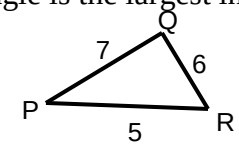
11. If the lengths of two sides of a triangle are 9 and 15, between what two numbers does the length of the third side lie?
12. If the lengths of two sides of a triangle are 3 and 7, then the length of the third side must be less than _____.
13. The lengths of two sides of a triangle are 7 and 10. Between what two numbers does the third side lie?
14. The length of a leg of an isosceles triangle is 9. Between what two numbers does the length of the third side lie?
15. Each leg of an isosceles triangle has length 12. Between what two numbers does the length of the base lie?

In exercises 16-24, state whether it is possible for a triangle to exist with sides of the given lengths.

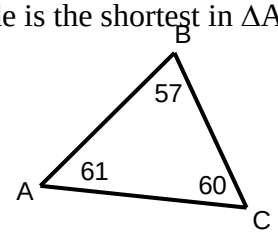
16. 6, 11, 4
17. 9, 9, 10
18. 8, 15, 7
19. x, 2x, x (x>0)
20. 3x, 2x, 4x (x>0)
21. x, x+3, x+4 (x > 1)
22. x, y, x+y (x and y > 0)
23. x, y, x-y (x and y > 0)
24. 2x, 2x+2, 4x+3 (x>0)

25. In ΔABC, m∠A = 40 and m∠ACB = 110, what is the longest side of ΔABC?

26. What angle is the largest in ΔPQR?

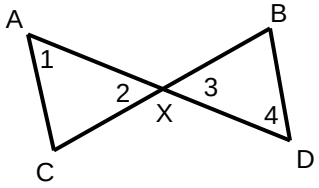


27. What side is the shortest in ΔABC?

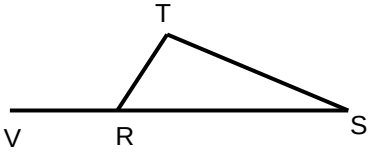


28. What side in a right triangle is the longest?

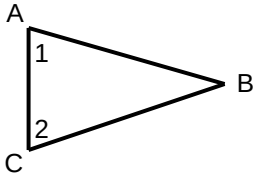
29. If AC > CX, and BX > BD, then which angle is larger, ∠1 or ∠4?



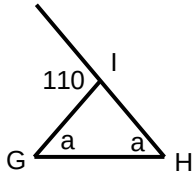
30. If m∠VRT = 120 and m∠S > m∠T, then the longest side of ΔRST is _____.



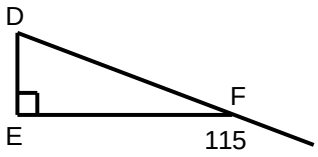
31. In ΔABC, if $\overline{AB} \cong \overline{BC}$, m∠1 = 6x + 2 and m∠2 = 8x – 20, find m∠B.



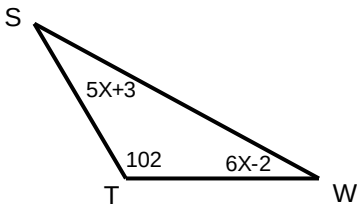
32. Which side is the longest?
the shortest?



33. Which side is the longest?
the shortest?



34. Which side is the longest?
the shortest?



If the sides of a triangle have the following lengths, find **all** possible values for x.

35. AB = 2x + 5, BC = 3x – 2, AC = 4x - 8

36. PQ = 3x, QR = 4x – 7, PR = 2x + 9