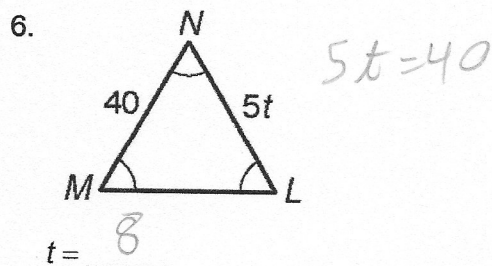
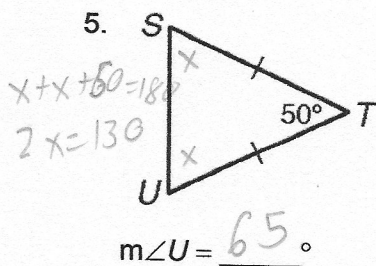
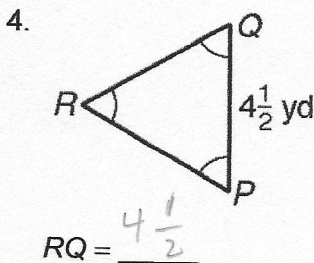
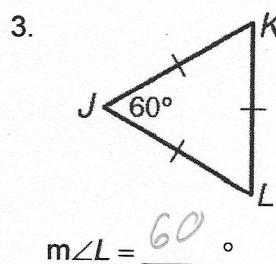
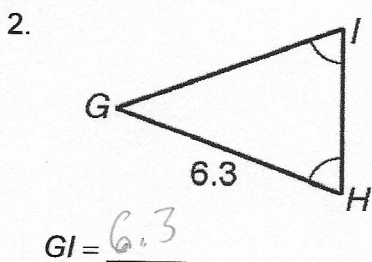
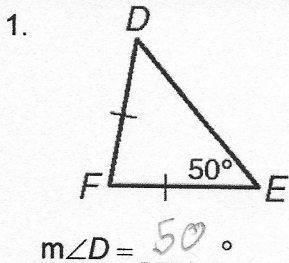


Isosceles and Equilateral Triangles

Practice and Problem Solving: A/B

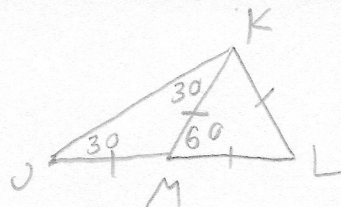
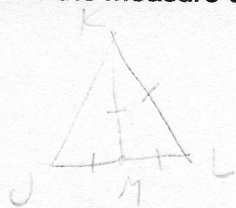
For Problems 1–6, find each value.



Use principles of isosceles and equilateral triangles to answer Problems 7–9.

7. Point M lies on side JL of triangle JKL . \overline{KM} bisects \overline{JL} and forms equilateral triangle KLM .

What is the measure of $\angle J$? 30° Make a sketch and explain your answer.



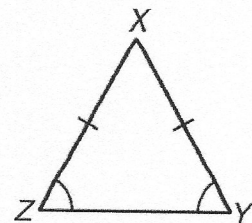
Name the parts of the figure. The first one is done for you.

10. base: \overline{ZY}

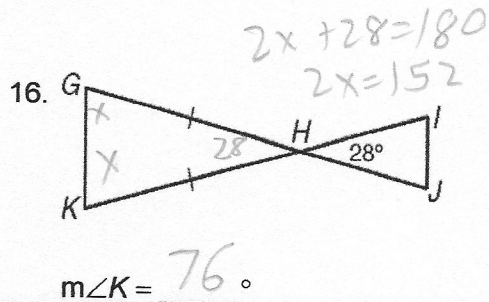
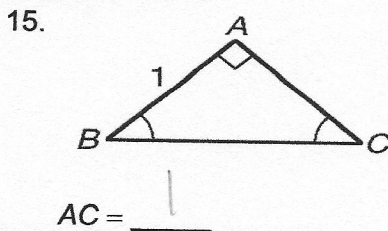
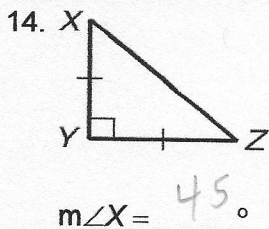
11. legs: \overline{XZ} and \overline{XY}

12. base angles: $\angle Z$ and $\angle Y$

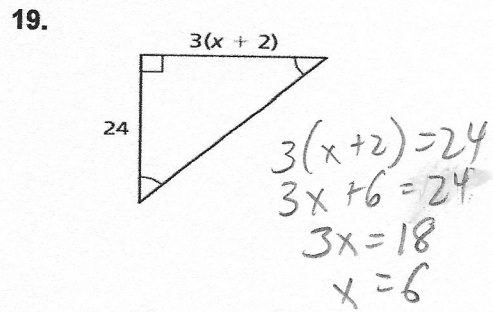
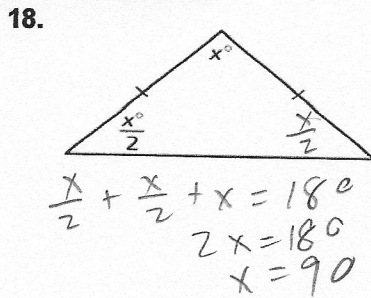
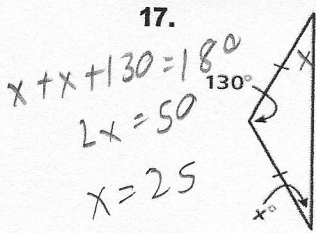
13. vertex angle: $\angle X$



Find each value. The first one is done for you.



In Exercises 17-19, find the value of x .



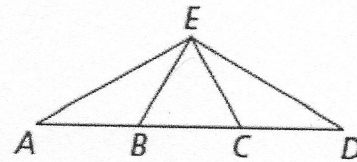
In Exercises 20 – 23, copy and complete the statement. Give reasons for each.

20. If $\overline{AE} \cong \overline{DE}$, then $\angle A \cong \angle D$.

21. If $\overline{AB} \cong \overline{EB}$, then $\angle A \cong \angle AEB$.

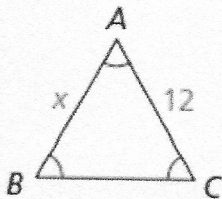
22. If $\angle D \cong \angle CED$, then $\overline{CE} \cong \overline{CD}$.

23. If $\angle EBC \cong \angle ECB$, then $\overline{EB} \cong \overline{EC}$.



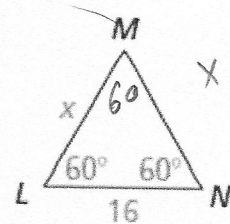
In Exercises 24 – 27, find the value of x .

24.



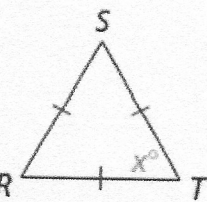
Handwritten work: $x = 12$

25.



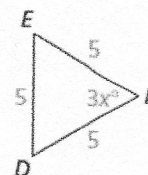
Handwritten work: $x = 16$

26.



Handwritten work: $x = 60$

27.

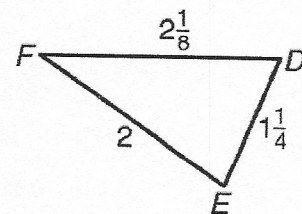


Handwritten work:
 $3x = 60$
 $x = 20$

For Problems 1–3, name the angles or sides.

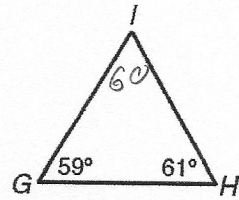
1. Write the angles of $\triangle DEF$ in order from smallest to largest.

Handwritten answer: $\angle F$ $\angle D$ $\angle E$



2. Write the sides of $\triangle GHI$ in order from shortest to longest.

IH GH IG



3. The sides of triangle XYZ are given in order below from longest to shortest. Name the angles from largest to smallest.

\overline{XZ} \overline{ZY} \overline{YX}
 \angle Y \angle X \angle Z

Use your knowledge of triangle inequalities to solve Problems 4–5.

4. Can three segments with lengths 8, 15, and 6 make a triangle? Explain your answer.

no $8 + 6 \not> 15$

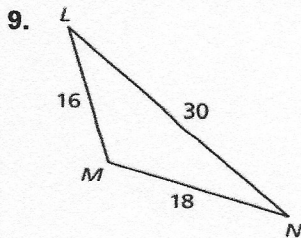
5. Aaron, Brandon, and Clara sit in class so that they are at the vertices of a triangle. It is 15 feet from Aaron to Brandon, and it is 8 feet from Brandon to Clara. Give the range of possible distances, d , from Aaron to Clara.

$15 + 8 = 23$ $7 \rightarrow 23$
 $15 - 8 = 7$

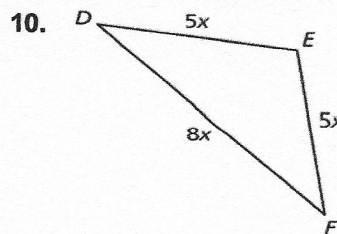
For Problems 6–8, choose the correct words to complete the statements. The first one is done for you.

6. The longest side of a triangle is opposite the largest (largest/smallest) angle.
7. The sum of any two side lengths of a triangle is greater than (less than/greater than) the third side length.
8. The smallest angle of a triangle is opposite (next to/opposite) the shortest side.

In Exercises 9 and 10, list the angles of the given triangle from smallest to largest.

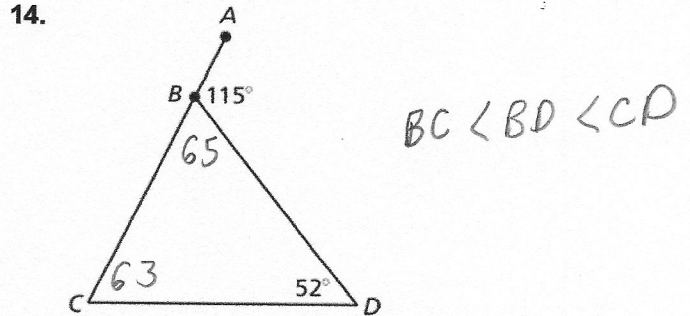
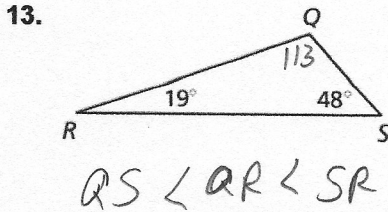
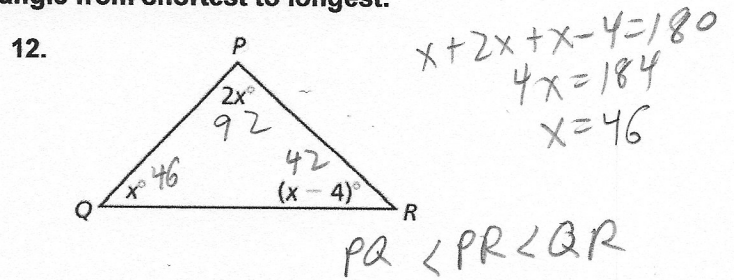
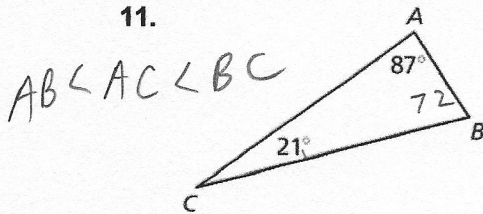


$\angle N, \angle L, \angle M$



$\angle D = \angle F < \angle E$

In Exercises 11-14, list the sides of the given triangle from shortest to longest.



In Exercises 15 - 20, is it possible to construct a triangle with the given side lengths? Explain.

15. 15, 37, 53 $15 + 37 = 52 < 53$
 no

16. 9, 16, 8 $8 + 9 > 16$ ✓
 yes

17. 6, 7, 11 $6 + 7 > 11$
 yes

18. 3, 6, 9 $3 + 6 < 9$
 no

19. 28, 17, 46 $28 + 17 = 45 < 46$
 no

20. 35, 120, 125 $35 + 120 > 125$
 yes

21. Is it possible to construct a triangle with side lengths $5(2x - 6)$, $3x + 80$, and $x^2 + 41$ if $x = 9$? Explain.

$60 + 107 > 122$
 yes

$5(2 \cdot 9 - 6)$	$3(9) + 80$	$9^2 + 41$
$5(12)$	$27 + 80$	$81 + 41$
60	107	122

22. In $\triangle DEF$, $m\angle D = (x + 25)^\circ$, $m\angle E = (2x - 4)^\circ$, and $m\angle F = 63^\circ$. List the side lengths and angle measures of the triangle in order from least to greatest.

$x + 25 + 2x - 4 + 63 = 180$
 $3x + 84 = 180$
 $3x = 96$
 $x = 32$

$m\angle D = 57$
 $m\angle E = 60$
 $m\angle F = 63$

$EF < DF < DE$

In Exercises 23 – 26, describe the possible lengths of the third side of the triangle given the lengths of the other two sides.

23. 5 inches, 12 inches

$$12 + 5 = 17$$

$$12 - 5 = 7$$

$$7 < x < 17$$

24. 12 feet, 18 feet

$$18 + 12 = 30$$

$$18 - 12 = 6$$

$$6 < x < 30$$

25. 2 feet, 40 inches

$$2 \text{ feet} = 24 \text{ inches}$$

$$40 - 24 = 16$$

$$40 + 24 = 64$$

$$\text{Range is } 16 < x < 64$$

26. 25 meters, 25 meters

$$25 + 25 = 50$$

$$25 - 25 = 0$$

$$0 < x < 50$$