

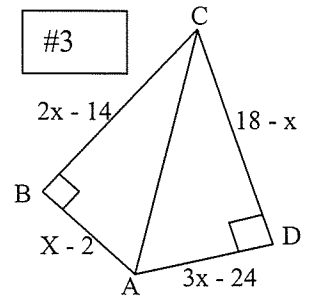
DO ALL WORK ON NOTEBOOK PAPER!

Some Triangle Problem Solving

1. $\overline{AB} \cong \overline{AC}$, $AB = x^2 + 2x + 1$, $AD = 3x - 1$, $DC = 2x + 2$. Is D a midpoint?

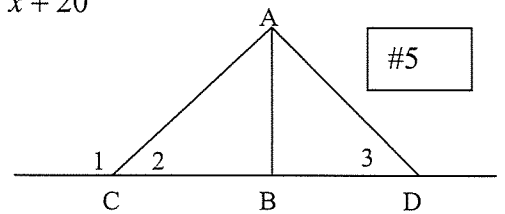
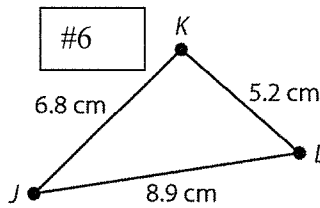
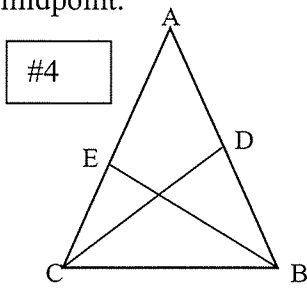
2. $\triangle ABC$ is isosceles with vertex $\angle B$, and a perimeter of 64. $AB = 3x + 4y$, $BC = 5x - 2y + 2$, and $AC = 2x + 3y + 2$. Find AC.

3. The area of $\triangle ABC$ is 24. Find the value of x and tell me if $\triangle ABC \cong \triangle ADC$. Support your answer either way.



4. Suppose that $\overline{BE} \perp \overline{AC}$. If $m\angle AEB = 3x + 15$, $AD = 2x - 8$, and $BD = x + 15$, determine if D is a midpoint.

5. Find the $m\angle 2$ if \overline{AB} is the perpendicular bisector of \overline{CD} $m\angle 1 = 2x + 40$ and $m\angle 3 = x + 20$



6. $\triangle JKL$ is shown. Arrange the angle measures from least to greatest.

7. $\triangle WXY$ has $m\angle W = 40^\circ$, $m\angle X = 60^\circ$, and $m\angle Y = 80^\circ$. Which side has the least measure?

8. A triangle has sides 12 cm and 22 cm. What are the possible side lengths of the third side?

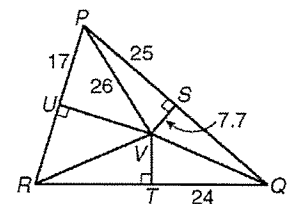
Use the figure for the following problems. \overline{SV} , \overline{TV} , and \overline{UV} are perpendicular bisectors of the sides of $\triangle PQR$. Find each length.

9. RV _____

10. TR _____

11. VT _____

12. UV _____

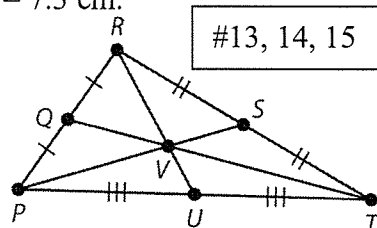


In $\triangle PRT$ $PS = 12.0$ cm, $UV = 2.7$ cm, and $ST = 7.3$ cm.

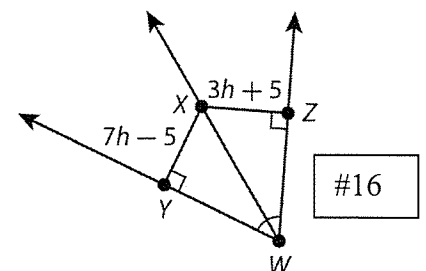
13. What is the measure of \overline{RV} ?

14. What is the measure of \overline{RS} ?

15. What is the measure of \overline{PV} ?



16. For what value of h will \overline{WX} be an angle bisector?

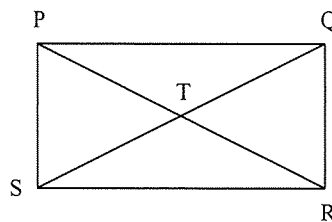


17. Triangle ABC has coordinates A(4, -5), B(-2, 7) and C(-6, 11). **Find the coordinate of the circumcenter.**
18. Triangle ABC has coordinates A(4, -5), B(-2, 7) and C(-6, 11). **Find the coordinate of the centroid.**
19. Triangle ABC has coordinates A(4, -5), B(-2, 7) and C(-6, 11). **Find the coordinate of the orthocenter.**

Find the values of x and y in rectangle PQRS.

20. $PT = 3x - y$
 $ST = x + y$
 $TQ = 5$

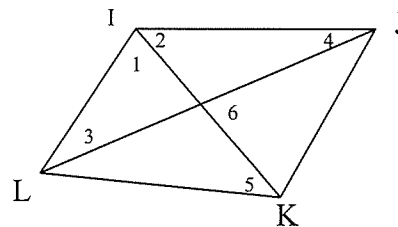
21. $PS = y$
 $QR = x + 7$
 $PQ = y - 2x$
 $SR = x + 1$



Use rhombus IJKL and the given information to solve each problem.

22. If $m\angle 3 = 2x + 30$ and $m\angle 4 = 3x - 1$, find x.

23. If $m\angle 3 = 4(x+1)$ and $m\angle 5 = 2(x+1)$, find x.

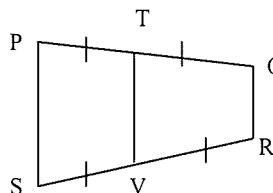


Problem Solving

24. Find the number of sides of a regular polygon if each interior angle has a measure of 176.25.
25. Will one regular hexagon and 4 regular triangles tile a plane? Show all work and explain.
26. ABXY is a parallelogram. If $AB = 5x + 24$ and $BX = x^2$, for what values of x is ABXY a rhombus?
27. Find the number of sides of a polygon if the sum of the measures of its interior angles is four times the sum of the measures of its exterior angles.
28. Bob wrote a problem involving kite KITE but forgot to say which pairs of sides were congruent. $KI = 2x + 30$, $IT = 20 + 3x$ and $KE = 6 - 2x$. Determine which pair of sides are congruent.

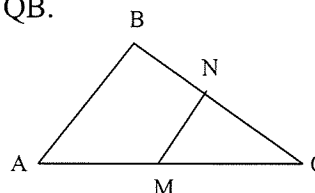
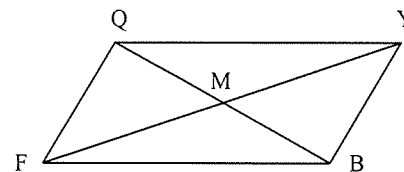
PQRS is an isosceles trapezoid with bases \overline{PS} and \overline{QR} . Use the figure and the given information to solve each problem.

28. If $QR = 14.3$ and $TV = 23.2$, find PS.
29. If $TV = x + 7$ and $PS + QR = 5x + 2$ find x.
30. If $m\angle VTP = a$, find $m\angle TPS$ in terms of a.



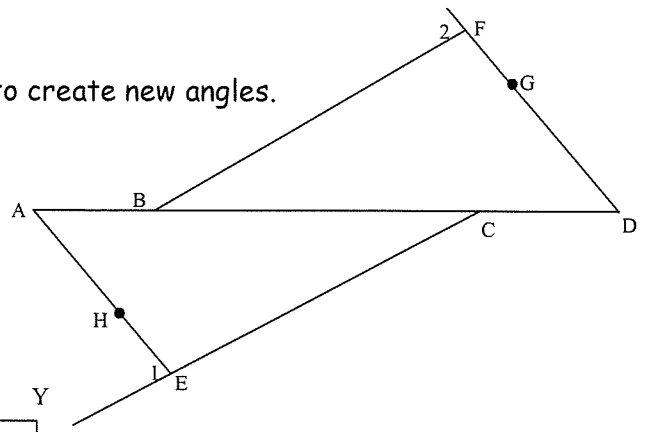
Quick Ones

31. Assume that QYBF is a rectangle. If $QM = 13$, find FY.
32. Assume that QYBF is a rhombus. If $m\angle YBQ = 52$, find $m\angle YBF$.
33. Assume that QYBF is a square. If $QM = 3x - 7$ and $MY = x + 3$, find QB.
34. M and N are midpoints of sides \overline{AC} and \overline{BC} . If $AM = 2x + 2$, $MC = y + 3$, $MN = 3x$, and $AB = 4y - 2$, find the lengths of \overline{MN} and \overline{AB} .

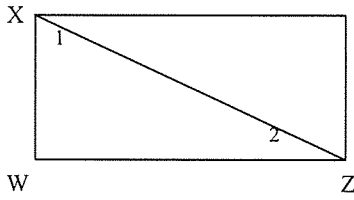


Proofs/Constructions. Do not add or extend any lines to create new angles.

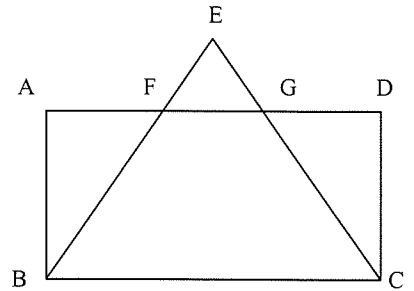
1. Given: $\overline{BF} \parallel \overline{CE}$
 $AH = DG$
 $HE = GF$
 $\angle 1 \cong \angle 2$
 Prove: $\overline{AB} \cong \overline{CD}$



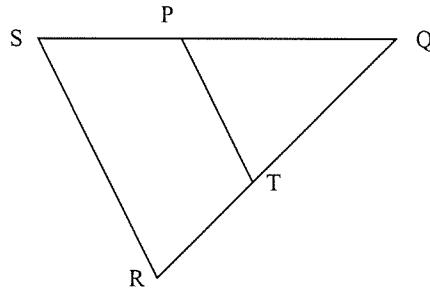
2. Given: Parallelogram WXYZ
 $\angle 1$ and $\angle 2$ are complementary
 Prove: WXYZ is a rectangle.



3. Given: Rectangle ABCD
 $\overline{BE} \cong \overline{CE}$
 Prove: $\overline{AF} \cong \overline{DG}$



4. Given: $\triangle SQR$ is isosceles
 $\triangle PQT$ is isosceles
 $\overline{TP} \parallel \overline{RS}$
 Prove: RSPT is an isosceles trapezoid

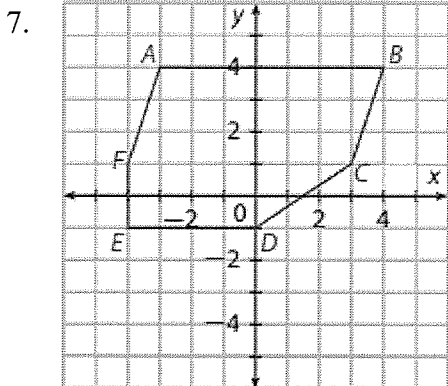


5. Construct an Isosceles triangle. Justify how you know your construction is an isosceles triangle.
 6. Write a coordinate proof for the following.

Given: $\triangle ABC$ is isosceles. M is the midpoint of \overline{AB} . N is the midpoint of \overline{AC} . $\overline{AB} \cong \overline{AC}$
Prove: $\overline{MC} \cong \overline{NB}$

Area Problems:

Find the area of each figure by addition.



Find the area of each figure by subtraction.

