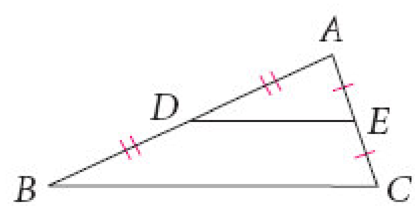
Solutions to Ch 5 Practice Test (Textbook pg. 284)

1. a. If a polygon does not have 8 sides, then it is not an octagon.
   b. If a polygon is not an octagon, then it does not have 8 sides.

2. a. If it is not a leap year, then it is not an even-numbered year.
   b. If it is not an even-numbered year, then it is not a leap year.

3. a. If it is not snowing, then it is summer.
   b. If it is summer, then it is not snowing.

4.



$DE = \frac{1}{2} BC$ and $\overline{DE} \parallel \overline{BC}$

5. I and II contradict each other. Assume for a moment that I and II are both true. Therefore, the triangle must have one right angle and one obtuse angle. Thus, the sum of the angles of the triangle would be greater than 180. This is a contradiction of the Triangle Angle Sum theorem.
6. II and III contradict each other. Vertical angles share only a vertex but no side. Adjacent angles share a vertex and a side. Therefore, only one can be true about any one pair of angles.
7. $\angle A, \angle C, \angle B$
8. $\angle B, \angle C, \angle A$
9. $\angle C, \angle B, \angle A$
10. Example: 1 cm, 4 cm, 7 cm. (Your answer must show the triangle inequality false in one instance. Here it is that 1 + 4 < 7, not 1 + 4 > 7.)
11. $\overline{ST}, \overline{RS}, \overline{RT}$
12. $\overline{KV}, \overline{VM}, \overline{KM}$

13. $$\begin{aligned} 2x &= 13 \\ x &= 6.5 \end{aligned}$$

14. $$\begin{aligned} 2(3x) &= 5x + 12 \\ 6x &= 5x + 12 \\ x &= 12 \end{aligned}$$

15. Assume the obtuse angle in an isosceles triangle is not the vertex angle. Then the obtuse angle must be a base angle. Therefore, there must be two obtuse angles. Then, the sum of the angles in the triangle will definitely be greater than 180. This contradicts the triangle angle sum theorem. Therefore, the assumption is false and the obtuse angle must be the vertex angle.

16. Since $\overline{GM}$ bisects $\angle KGP$, KM=MP so

$$\begin{aligned} 5x - 8 &= 2x + 13 \\ 3x &= 21 \\ x &= 7 \end{aligned}$$

17. Since $\overline{GM}$ bisects $\angle KGP$, KM=MP so

$$\begin{aligned} 4x &= 7x - 2 \\ -3x &= -2 \\ x &= \frac{2}{3} \end{aligned}$$

18. SKIP
19. SKIP
20. SKIP
21. The circumcenter is at (6, 1). This can be verified through use of the distance formula. (6, 1) is equidistant from all three listed points.

$$\sqrt{(6-2)^2 + (1-5)^2} = \sqrt{4^2 + (-4)^2} = \sqrt{16+16} = \sqrt{32}$$

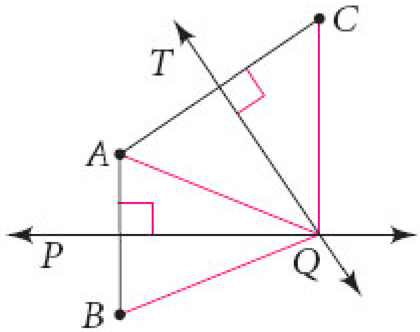
$$\sqrt{(6-2)^2 + (1+3)^2} = \sqrt{4^2 + 4^2} = \sqrt{16+16} = \sqrt{32}$$

$$\sqrt{(6-10)^2 + (1+3)^2} = \sqrt{(-4)^2 + 4^2} = \sqrt{16+16} = \sqrt{32}$$

22.

Given: $\overleftrightarrow{PQ}$ is the perpendicular bisector of $\overline{AB}$.
$\overleftrightarrow{QT}$ is the perpendicular bisector of $\overline{AC}$.

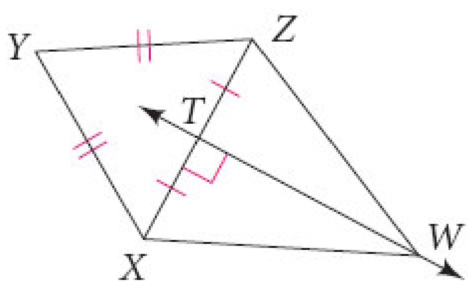
Prove: $QC = QB$



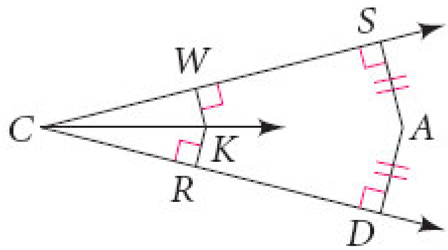
Proof: $QC =$ **a.** ___?___ and **b.** ___?___ $= QB$. Therefore, $QC = QB$ by the **c.** ___?___.

PROOF: QC=QA and QA=QB (by the Perpendicular Bisector theorem). Therefore, QC=QB by the transitive property of equality.

23.



Since Y is equidistant from X and Z, Y is on the perpendicular bisector of $\overline{XZ}$. Since $\overleftrightarrow{TW}$ is the perpendicular bisector of $\overline{XZ}$, you can also say that Y is on $\overleftrightarrow{TW}$.



24. Since A is equidistant from both sides of $\angle SCD$, A is on the bisector of $\angle SCD$. Since $\overrightarrow{CK}$ is the bisector of $\angle SCD$, you can also say that A lies on $\overrightarrow{CK}$.