

# EXERCISES

- A** 1. Given:  $\triangle ABC$  with  $\overline{AB}$  and  $\overline{CB}$ ;  
 $\overline{AC} \cong \overline{BC}$ .

Prove:  $\angle 3 \cong \angle 1$ .

2. Given:  $\triangle ABC$  with  $\overline{AB}$  and  $\overline{CB}$ ;  
 $\angle 3 \cong \angle 1$ .

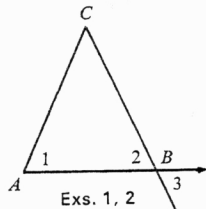
Prove:  $\overline{AC} \cong \overline{BC}$ .

3. Given:  $\triangle ABR$  with  $\overline{AR}$ ;  $\overline{RS} \parallel \overline{AB}$ ;  
 $\angle 1 \cong \angle 2$ .

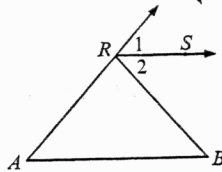
Prove:  $\overline{RA} \cong \overline{RB}$ .

4. Given:  $\triangle ABR$  with  $\overline{AR}$ ;  $\overline{RA} \cong \overline{RB}$ ;  
 $\overline{RS} \parallel \overline{AB}$ .

Prove:  $\angle 1 \cong \angle 2$ .



Exs. 1, 2



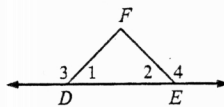
Exs. 3, 4

5. Given:  $\triangle DEF$  and  $\overline{DE}$ ;  $\overline{DF} \cong \overline{EF}$ .

Prove:  $\angle 3 \cong \angle 4$ .

6. Given:  $\triangle DEF$  and  $\overline{DE}$ ;  $\angle 3 \cong \angle 4$ .

Prove:  $\overline{DF} \cong \overline{EF}$ .



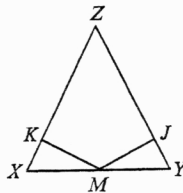
Exs. 5, 6

7. Given:  $\triangle XYZ$ ;  $\overline{XZ} \cong \overline{YZ}$ ;  $M$  is midpoint  
of  $\overline{XY}$ ;  $\overline{MK} \perp \overline{XZ}$ ;  $\overline{MJ} \perp \overline{YZ}$ .

Prove:  $\overline{MK} \cong \overline{MJ}$ .

8. Given:  $\triangle XYZ$ ;  $\overline{MK} \perp \overline{XZ}$ ;  $\overline{MJ} \perp \overline{YZ}$ ;  
 $\overline{XK} \cong \overline{YJ}$ ;  $\overline{MK} \cong \overline{MJ}$ .

Prove:  $\triangle XYZ$  is isosceles.



Exs. 7, 8

9. Prove Theorem 6-4 by using the perpendicular from the vertex to the base line as your auxiliary line. You may assume that the perpendicular intersects the base segment.

10. Prove Theorem 6-5 by drawing an auxiliary line as in Exercise 9.

11. Given:  $\triangle ARQ$ ;  $\overline{AR} \cong \overline{AQ}$ ;  
 $\overline{RS} \cong \overline{QT}$ .

Prove:  $\overline{AS} \cong \overline{AT}$ .

12. Given:  $\triangle ARQ$ ;  $\overline{AR} \cong \overline{AQ}$ ;  
 $\angle 1 \cong \angle 3$ .

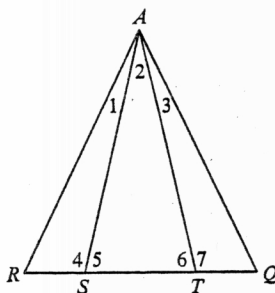
Prove:  $\overline{AS} \cong \overline{AT}$ .

13. Given:  $\triangle ARQ$ ;  $\angle R \cong \angle Q$ ;  
 $\overline{AS} \cong \overline{AT}$ .

Prove:  $\overline{RS} \cong \overline{QT}$ .

14. Given:  $\triangle ARQ$ ;  $\overline{AR} \cong \overline{AQ}$ ;  
 $\overline{RS} \cong \overline{QT}$ .

Prove:  $\angle RAT \cong \angle QAS$ .



Exs. 11-14

Write complete demonstrations for each of the following statements:

15. The bisector of the vertex angle of an isosceles triangle is perpendicular to the base.
16. The median containing the vertex of an isosceles triangle bisects the vertex angle.
17. The line through the vertex of an isosceles triangle and perpendicular to the base bisects the base.
18. Segments drawn perpendicular to the base of an isosceles triangle from the midpoints of the legs are congruent.