

Chapter 6

Relationships Within Triangles

6.1 Perpendicular and Angle Bisectors

6.2 Bisectors of Triangles

6.3 Medians and Altitudes of Triangles

6.4 The Triangle Midsegment Theorem

6.5 Indirect Proof and Inequalities in One Triangle

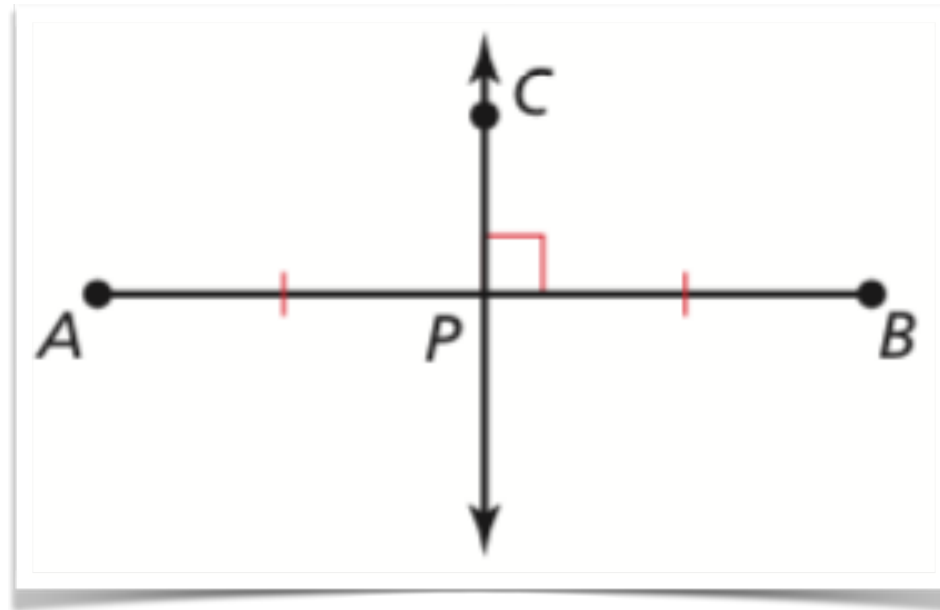
6.6 Inequalities in Two Triangles



6.1 Perpendicular and Angle Bisectors

Perpendicular Bisector

A line that is perpendicular to a segment and bisects the segment.

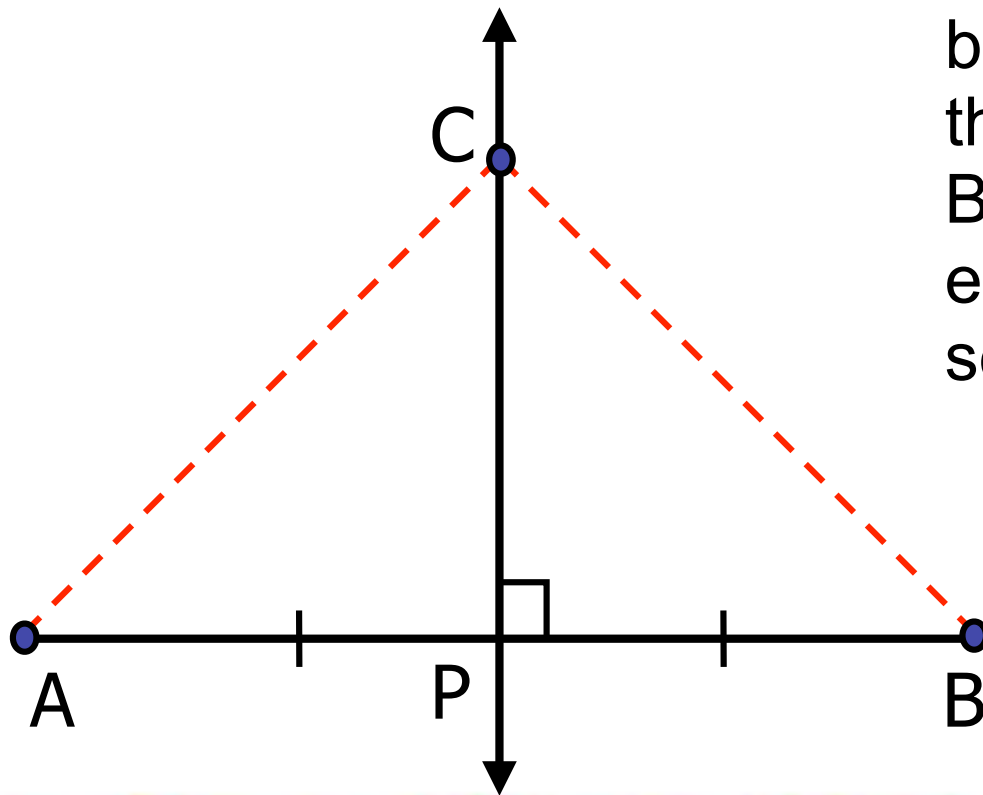


\overleftrightarrow{CP} is a \perp bisector of \overline{AB} .

6.1 Perpendicular and Angle Bisectors

Perpendicular Bisector

What can you say about the two triangles formed by the points C and P on the Perpendicular Bisector and the endpoints A and B of the segment?

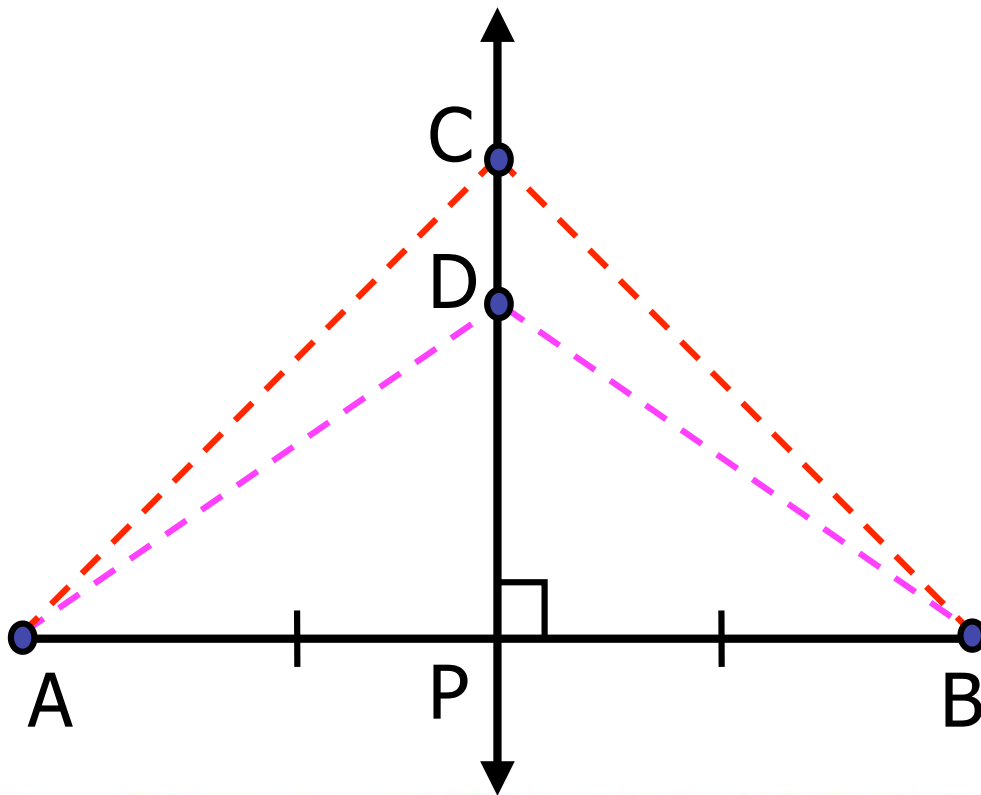


6.1 Perpendicular and Angle Bisectors

Theorem

Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.



6.1 Perpendicular and Angle Bisectors

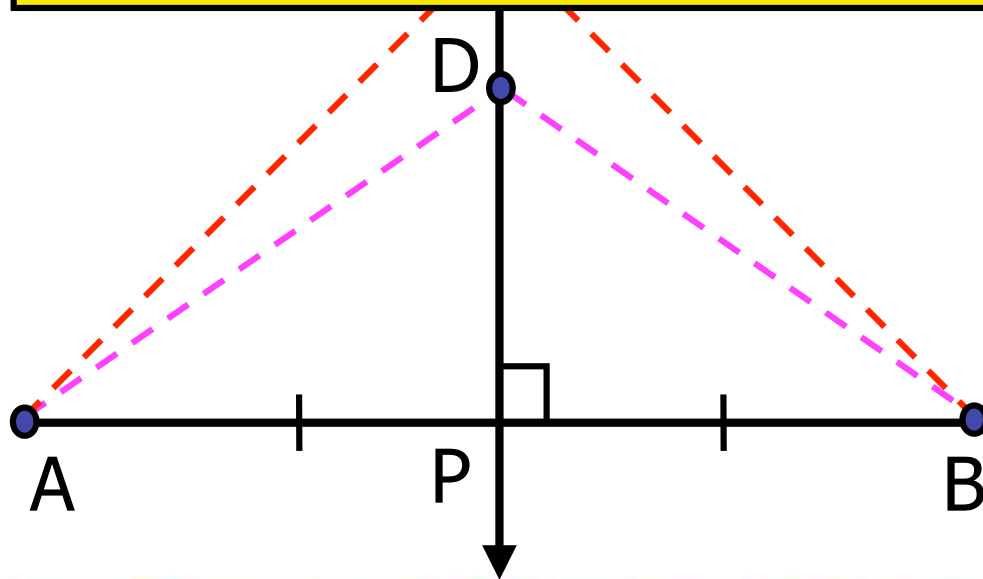
Theorem

Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

Converse of Perpendicular Bisector Theorem

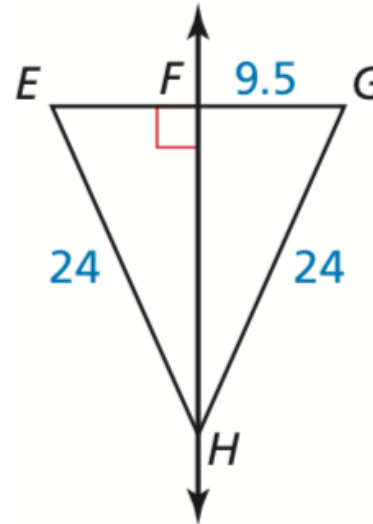
In a plane, if a point is equidistant from the endpoints of a segment, then it lies on the perpendicular bisector of the segment.



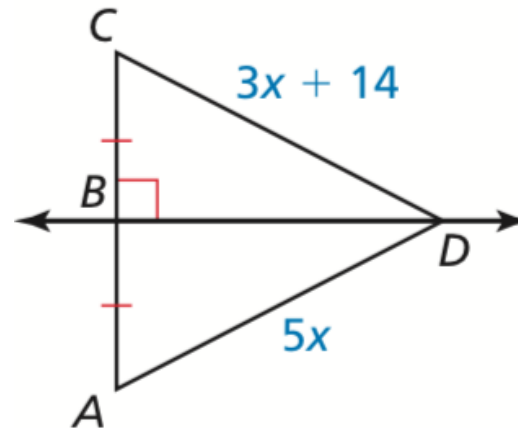
6.1 Perpendicular and Angle Bisectors

Practice:

- a) $EG =$
 $FH =$



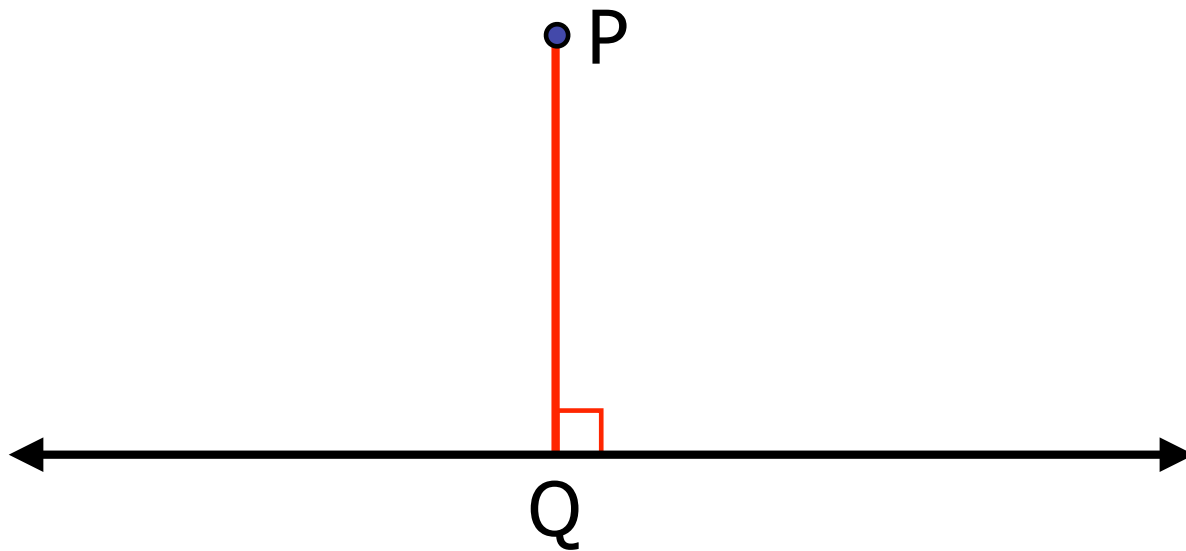
- b) $x =$
 $CD =$



6.1 Perpendicular and Angle Bisectors

What is the distance from a point to a line?

It is the length of the perpendicular segment from the point to the line.

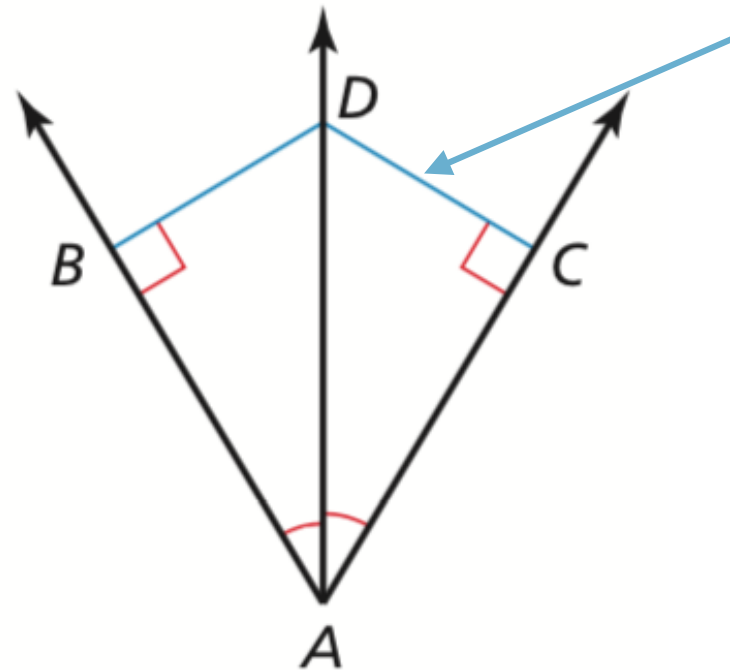


6.1 Perpendicular and Angle Bisectors

Angle Bisector

A ray that divides an angle into two congruent adjacent angles.

$$\angle BAD \cong \angle DAC$$



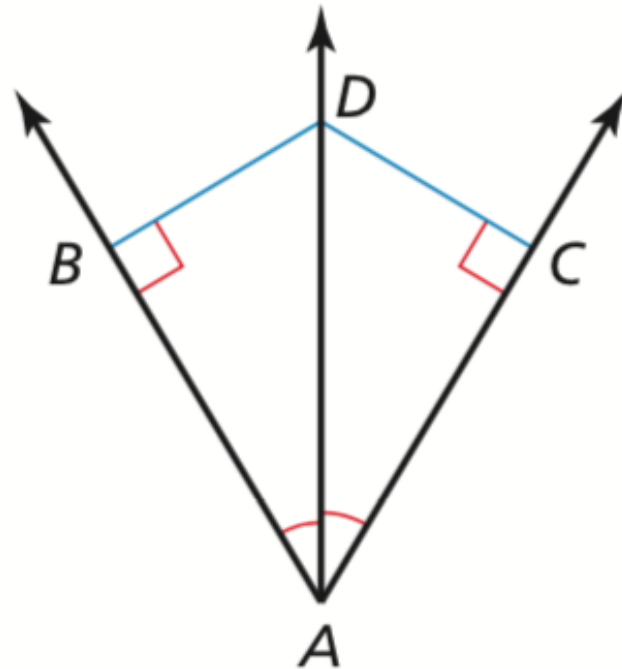
The distance from point D on the angle bisector to the ray \overrightarrow{AC}

6.1 Perpendicular and Angle Bisectors

Theorem

Angle Bisector Theorem

If a point lies on the bisector of an angle, then it is equidistant from the two sides of the angle ($DB = DC$).



6.1 Perpendicular and Angle Bisectors

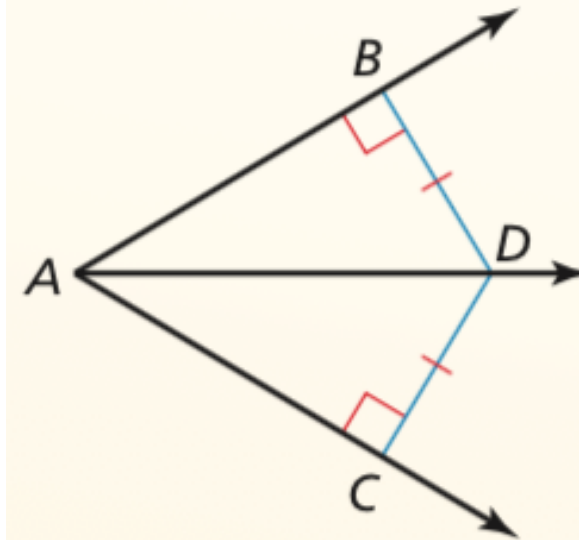
Theorem

Angle Bisector Theorem

If a point lies on the bisector of an angle, then it is equidistant from the two sides of the angle ($DB = DC$).

Converse of the Angle Bisector Theorem

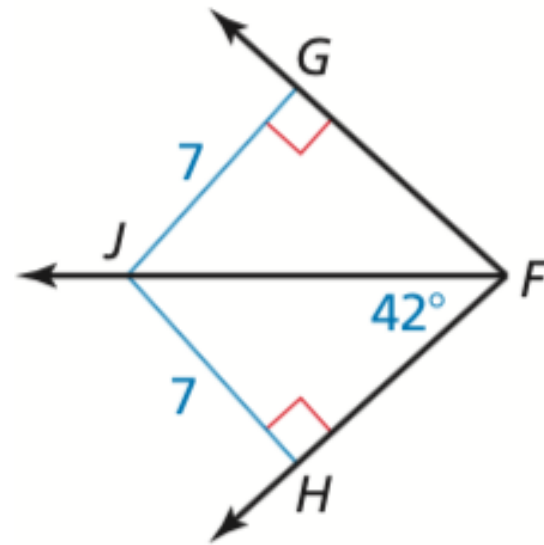
If a point is in the interior of an angle and is equidistant from the two sides of the angle, then it lies on the bisector of the angle.



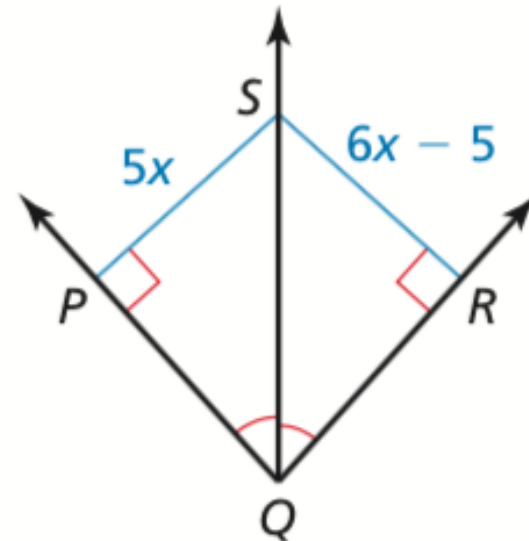
6.1 Perpendicular and Angle Bisectors

Practice:

- a) $\angle GFJ =$
 $JF =$
 $GF =$



- b) $x =$
 $PS =$



6.1 Perpendicular and Angle Bisectors

Practice:

Write an equation of the perpendicular bisector of the segment with endpoints $P(-2, 3)$ and $Q(4, 1)$.

