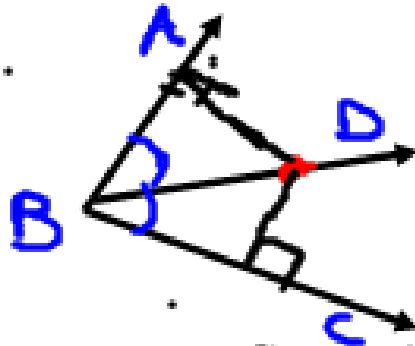


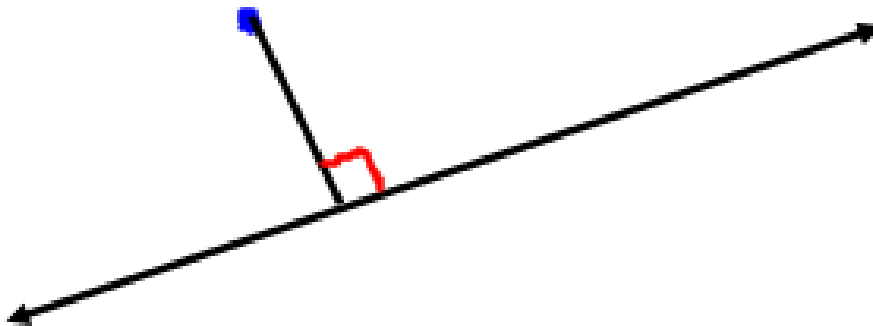
5.3 Warm-Up;

1. Draw and describe an angle bisector.



\overrightarrow{BD} bisects $\angle ABC$

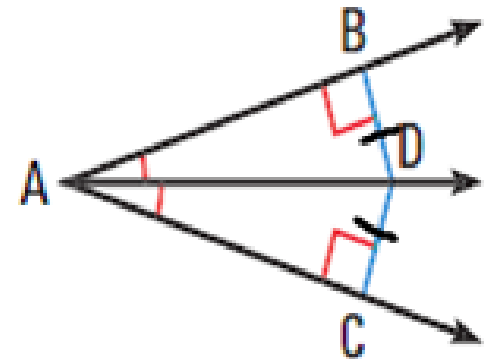
2. How can we find the distance from a point to a line?
Draw a representation.



Angle Bisector Theorem:

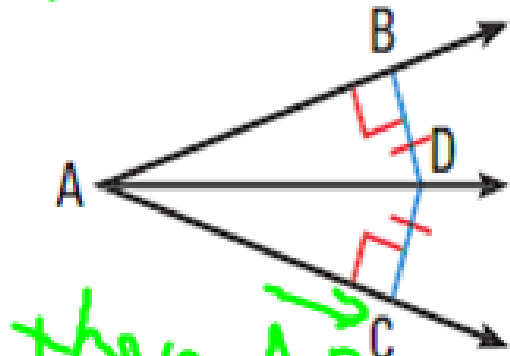
If a point is on the angle bisector, then it is equidistant from the two sides of the angle.

If \overrightarrow{AD} bisects $\angle BAC$,
then $BD = CD$



Converse of the Angle Bisector Thm:

If $DB = DC$

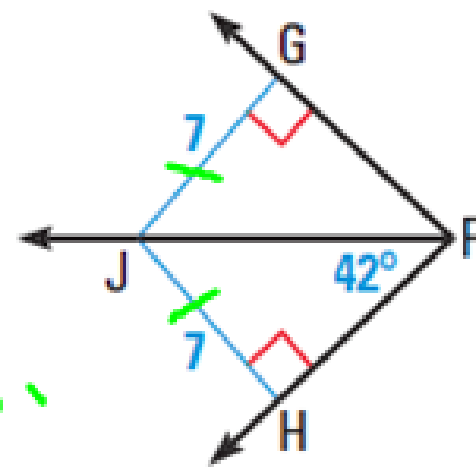


then \overrightarrow{AD}
bisects $\angle BAC$.

If a point is equidistant from the 2 sides of an angle, then it is on the angle bisector.

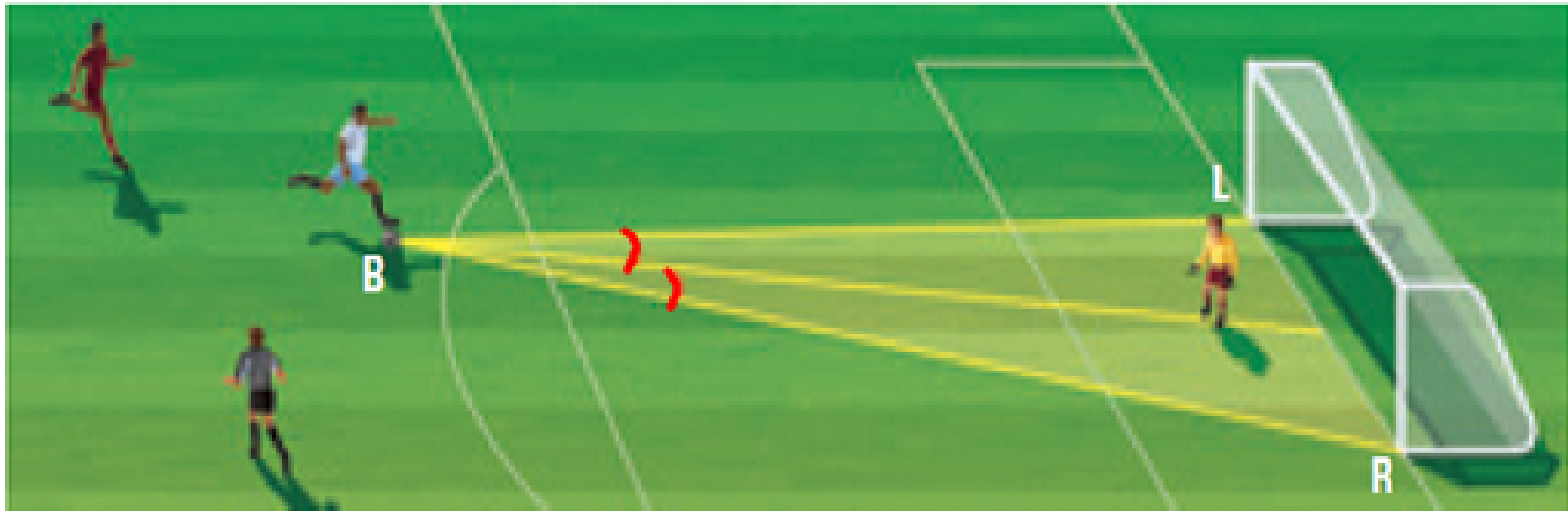
Find the measure of $\angle GFJ$.

Use the Converse
of \angle Bisector Thm.

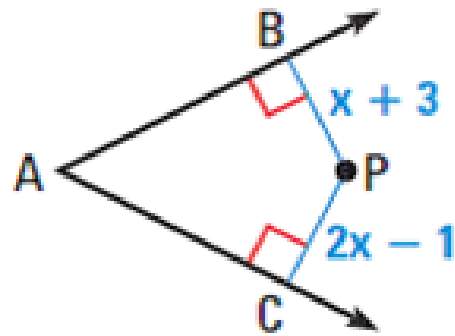


$$m \angle GFJ = 42^\circ$$

SOCCER A soccer goalie's position relative to the ball and goalposts forms congruent angles, as shown. Will the goalie have to move farther to block a shot toward the right goalpost R or the left goalpost L ?



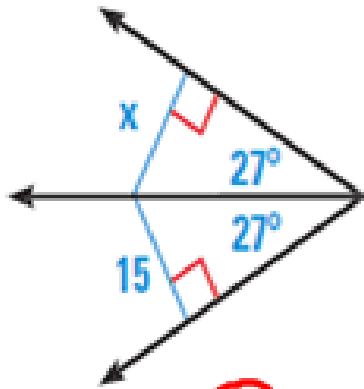
For what value of x does P lie on the bisector of $\angle A$?



$$BP = CP$$
$$x + 3 = 2x - 1$$
$$-x + 1 \quad -x + 1$$
$$4 = x$$

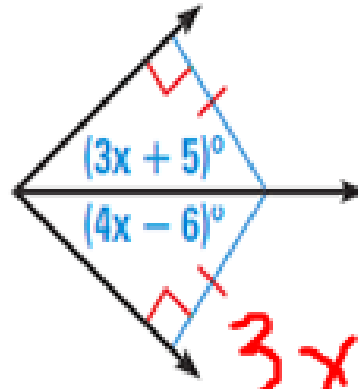
In Exercises 1-3, find the value of x .

1.



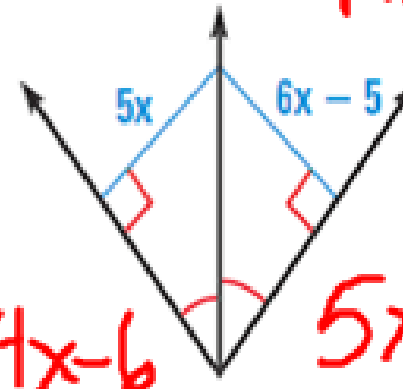
$x = 15$
Angle Bisector
Thm

2.



$3x + 5 = 4x - 6$
 $11 = x$
Converse

3.

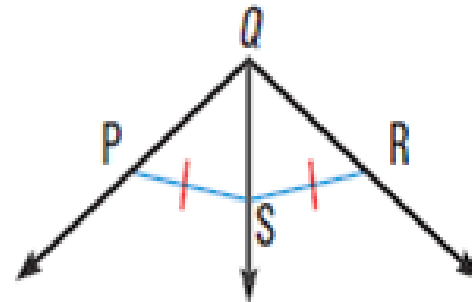


Angle
Bisector
Thm
 $5x = 6x - 5$
 $x = 5$

4. Do you have enough information to conclude that \overrightarrow{QS} bisects $\angle PQR$? Explain.

No, \overline{PS} & \overline{RS}

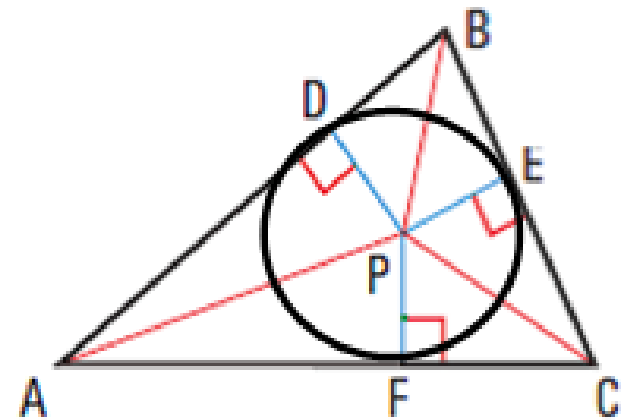
Need to be \perp to the sides.



Concurrency of Angle Bisectors of a Triangle

The angle bisectors of a triangle intersect at a point that is equidistant from the sides of the triangle.

\overline{AP} , \overline{BP} , & \overline{CP} are
angle bisectors,
So $DP = EP = FP$



incenter -
where angle
bisectors meet,
(At P)

In the diagram, N is the incenter of $\triangle ABC$. Find ND .

$$ND = NF = NE$$

$\triangle ANF$ is right.

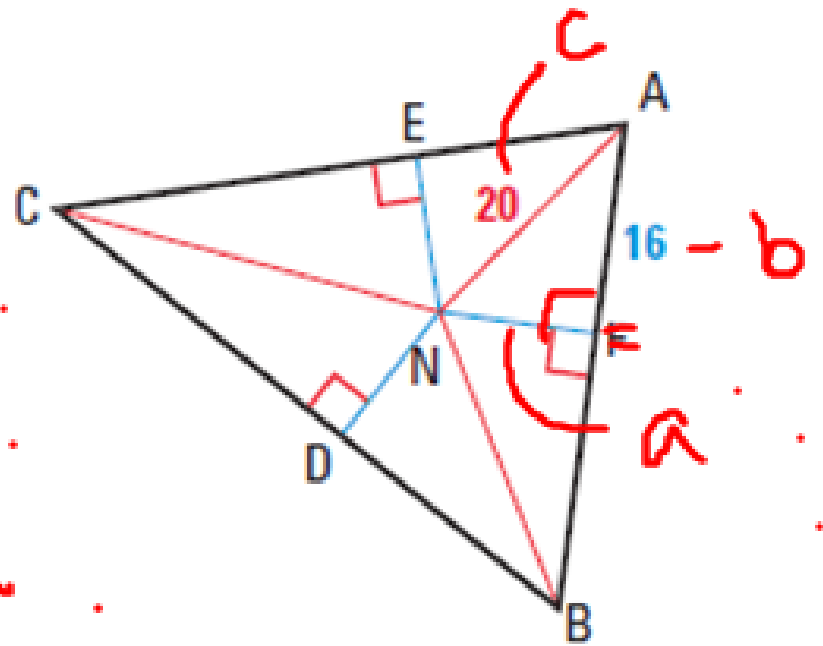
Use $a^2 + b^2 = c^2$.

$$a^2 + 16^2 = 20^2$$

$$a^2 + 256 = 400$$

$$a^2 = \frac{-256}{144}$$

$$ND = NF = a = 12$$



Homework:

p 313

#'s 2-14, 16-22 E, 28, 30