

Lesson 1-6: Angle Bisectors

Agenda

- Check and Review Homework 1-5
- Warm Up Quiz *Need Pouch
- Lesson 1-6 Notes

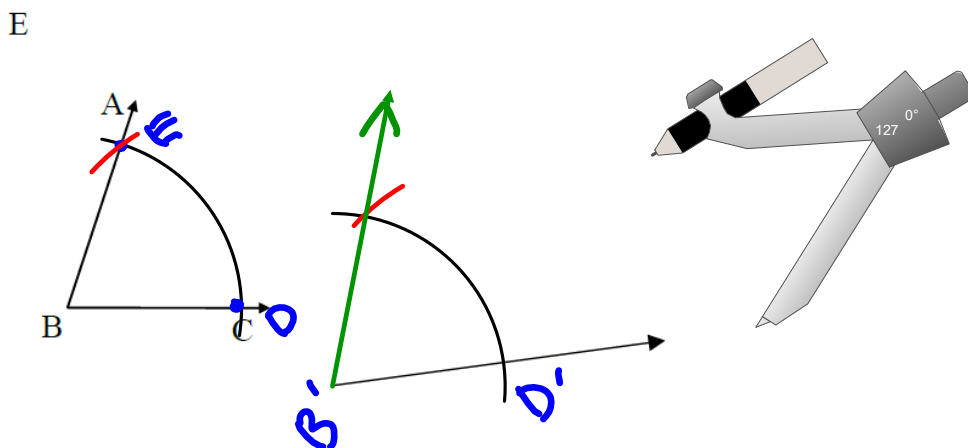
Homework - Day 6

Textbook p. 25-26 #17,18,28,39,43,45, (#47 Extra Credit)

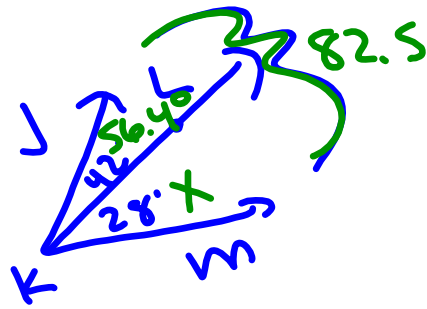
+ Worksheet Unit 1 - Day 6

Continue to complete Lesson Summaries to prepare for Quiz

1) Copy $\angle ABC$ onto the given ray.



2. Which point is the vertex of $\angle BCD$? Which rays form the sides of $\angle BCD$? C ; \overrightarrow{CB} , \overrightarrow{CD}



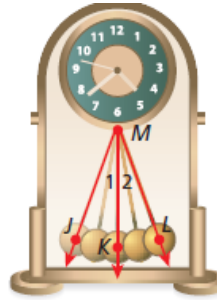
L is in the interior of $\angle JKM$. Find each of the following.

7. $m\angle JKM$ if $m\angle JKL = 42^\circ$ and $m\angle LKM = 28^\circ$ 70°
 8. $m\angle LKM$ if $m\angle JKL = 56.4^\circ$ and $m\angle JKM = 82.5^\circ$ 26.1°

PRACTICE AND PROBLEM SOLVING

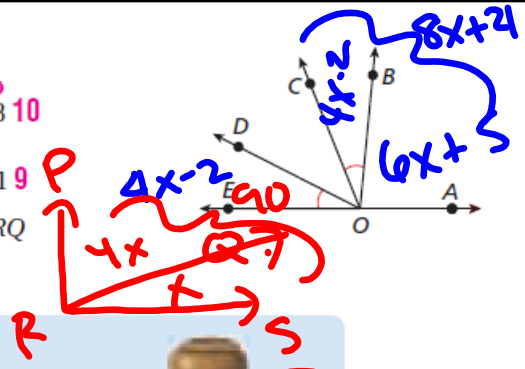
11. **Physics** Pendulum clocks have been used since 1656 to keep time. The pendulum swings back and forth once or twice per second. Name all of the angles in the diagram.

$\angle 1$ or $\angle JMK$; $\angle 2$ or $\angle LMK$; $\angle M$ or $\angle JML$



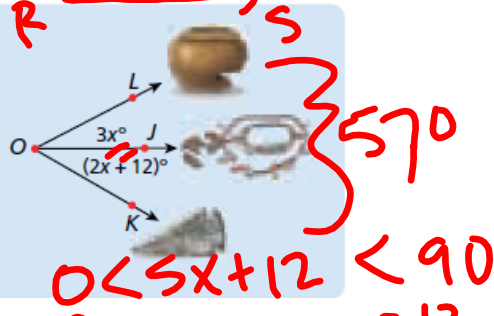
30. $m\angle AOB = 4x - 2$, $m\angle BOC = 5x + 10$, $m\angle COD = 3x - 8$ 10

31. $m\angle AOB = 6x + 5$, $m\angle BOC = 4x - 2$, $m\angle AOC = 8x + 21$ 9
 32. **Multi-Step** Q is in the interior of right $\angle PRS$. If $m\angle PRQ$ is 4 times as large as $m\angle QRS$, what is $m\angle PRQ$? 72°



33. This problem will prepare you for the Multi-Step Test Prep on page 34. An archaeologist standing at O looks for clues on where to dig for artifacts.

- a. What value of x will make the angle between the pottery and the arrowhead measure 57° ? 9
 b. What value of x makes $\angle LOJ \cong \angle JOK$? 12
 c. What values of x make $\angle LOK$ an acute angle?
 $0 < x < 15.6$



38. The measure of an obtuse angle is $(5x + 45)^\circ$. What is the largest value for x ? 27

$$\begin{aligned} 5x + 45 &< 180^\circ \\ 5x &< 135 \\ x &< 27 \end{aligned}$$

$$\begin{aligned} -12 &< 5x < 78 \\ -12/5 &< x < 78/5 \end{aligned}$$

Construction: Bisecting an Angle

Construct the bisector of $\angle A$.

- 1 Place the point of the compass at A and draw an arc. Label its points of intersection with $\angle A$ as B and C .
- 2 Without changing the compass setting, draw intersecting arcs from B and C . Label the intersection of the arcs as D .
- 3 Use a straightedge to draw \overrightarrow{AD} . \overrightarrow{AD} bisects $\angle A$.

Note – given points on the angle rays may not be equidistant from the vertex. Don't use them.

Practice 1: Bisect $\angle ABC$

Practice 2: Construct a 45° angle with vertex G .

① DRAW HELPER ARC

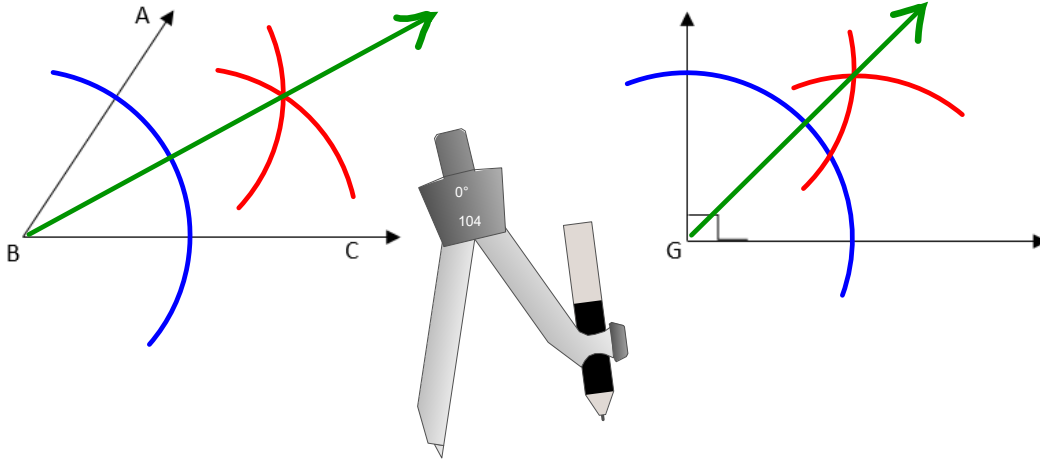
② DRAW ARCS FROM POINTS ON SIDE RAY

③ DRAW RAY

Note – given points on the angle rays may not be equidistant from the vertex. Don't use them.

Practice 1: Bisect $\angle ABC$.

Practice 2: Construct a 45° angle with vertex G.



Angle Bisectors

- Definition: A ray, line, segment, or plane that divides an angle into 2 CONGRUENT ADJACENT angles. Thus: Angle bisector \leftrightarrow two congruent adjacent angles.
- ALWAYS start by drawing a picture and writing an equation* with the angle names. Then substitute, solve, check.
 *Write the general equation using angle names with 1) the angle addition postulate (use the same expression or measure for each little angle) or 2) the congruent little angles (set the little angle measures equal to each other).

Example 1: \overline{QS} bisects $\angle PQR$, $m\angle PQS = (5y - 1)^\circ$, and $m\angle PQR = (8y + 12)^\circ$. Find $m\angle PQS$.

Draw it: 68° Equation: $m\angle PQS + m\angle SQR = m\angle PQR$ Reason: ANGLE ADDITION POST.

Statement: $\angle PQS \cong \angle SQR$ Reason: \angle BISECTOR \rightarrow 2 \cong \angle 's

Equation: $m\angle PQS = m\angle SQR$ Reason: \cong ANGLES HAVE = MEASURE

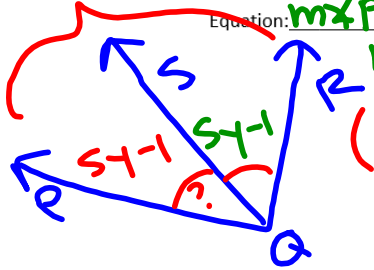
$(5y - 1) + (5y - 1) = 8y + 12$

$10y - 2 = 8y + 12$
 $-8y \quad -8y$

$2y - 2 = 12$
 $+2 \quad +2$

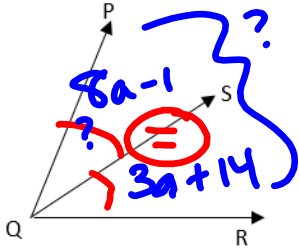
$2y = 14$
 $y = 7$

$m\angle PQS = 5(7) - 1 = 34^\circ$



→ 2 ≅ ANGLES

Example 2: \overline{QS} bisects $\angle PQR$. $m\angle PQS = (8a-1)^\circ$; $m\angle SQR = (3a+14)^\circ$. Find $m\angle PQS$ and $m\angle PQR$.



Equation: $m\angle PQS + m\angle SQR = m\angle PQR$ Reason: \angle ADDITION POSTULATE

Statement: $\angle PQS \cong \angle SQR$ Reason: \angle BISECTOR → 2 ≅ ∠'S

Equation: $m\angle PQS = m\angle SQR$ Reason: \cong FIGURES HAVE = MEASURE

$$8a - 1 = 3a + 14$$

$$5a = 15$$

$$a = 3$$

$$m\angle PQS = 8(3) - 1 = 23^\circ$$

$$m\angle SQR = 3(3) + 14 = 23^\circ$$

$$m\angle PQR = 23^\circ + 23^\circ = 46^\circ$$

Try on your own:

→ 2 ≅ ANGLES

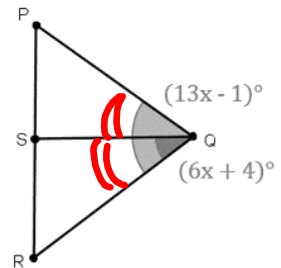
1) \overline{QS} bisects $\angle PQR$; $m\angle PQR = (13x - 1)^\circ$; $m\angle RQS = (6x + 4)^\circ$. Write equations that would allow you to solve for x.

Equation: $m\angle PQS + m\angle RQS = m\angle PQR$ Reason: ANGLE ADD POST.

Statement: $\angle PQS \cong \angle RQS$ Reason: \angle BISECTOR → 2 ≅ ∠'S

Equation: $m\angle PQS = m\angle RQS$ Reason: \cong FIGURES ↔ = MEASURE

$$6x + 4 + 6x + 4 = 13x - 1$$



2) Given $\angle GRY$

- Construct $\angle TRY \cong \angle GRY$ such that they are adjacent.
- Construct and label the angle bisector of $\angle TRY$ as \overline{RM} .
- Use your frequent angle maker to check to see if $\angle MRG$ is a right angle.

