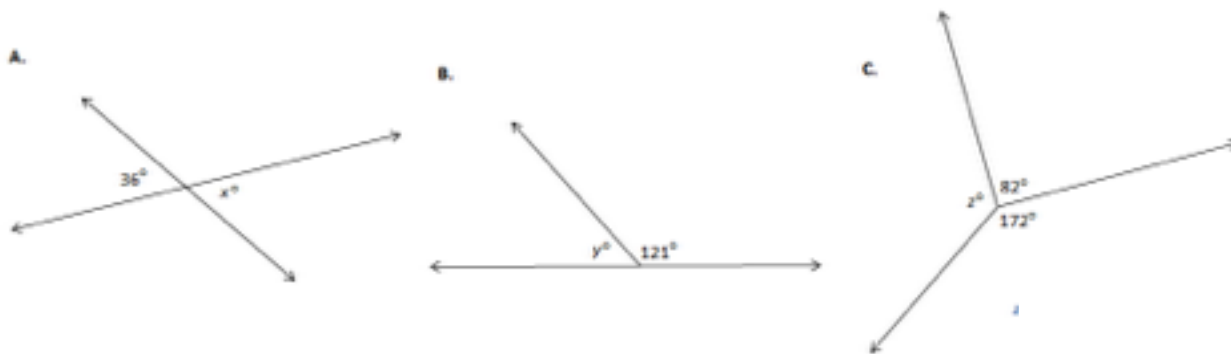


Lesson 6: Solve for Unknown Angles—Angles and Lines at a Point

Classwork

Opening Exercise

Determine the measure of the missing angle in each diagram.



What facts about angles did you use?

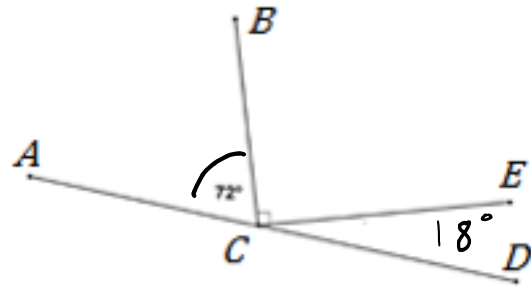
Discussion

Two angles $\angle A$ and $\angle B$, with a common side \overline{AC} , are _____ if $\angle C$ belongs to the interior of $\angle A$. The sum of angles on a straight line is 180° and two such angles are called a linear pair. Two angles are called supplementary if the sum of their measures is _____, two angles are called complementary if the sum of their measures is _____ . Describing angles as supplementary or complementary refers only to the measures of their angles. The positions of the angles or whether the pair of angles is adjacent to each other is not part of the definition.

In the figure, line segment \overline{CD} is drawn.

Find

$$\begin{array}{r} 72 \\ + 90 \\ \hline 162 \end{array} \quad \begin{array}{r} 180^\circ \\ - 162 \\ \hline 18^\circ \end{array}$$

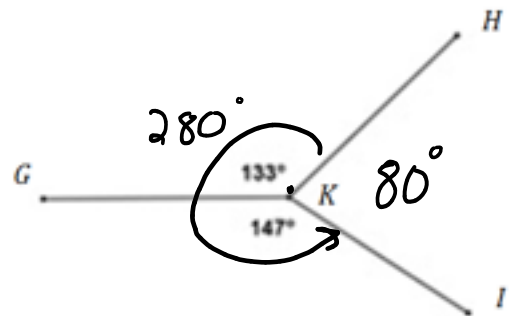


3

The total measure of adjacent angles around a point is 360° .

Find the measure of $\angle H$.

$$\begin{array}{r} 133 \\ 147 \\ \hline 280 \end{array} \quad \begin{array}{r} 360 \\ - 280 \\ \hline 80 \end{array}$$

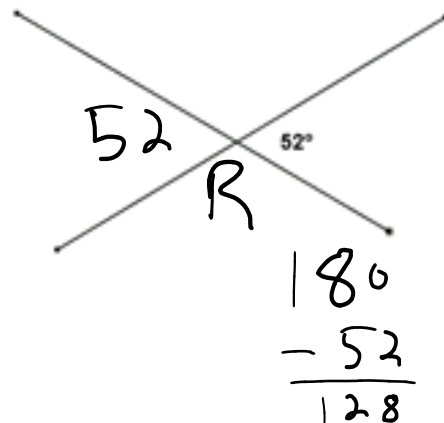


Angle Sum around a Point
is 360° .

Vertical angles have equal measure. Two angles are vertical if their sides form opposite rays.

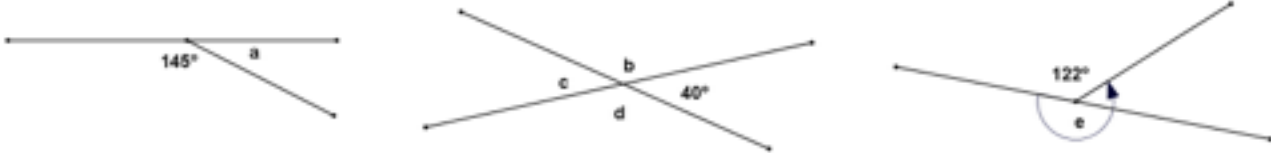
Find R .

$$\begin{aligned} 360 &= 52 + 52 + R + R \\ 360 &= 104 + 2R \\ -104 &\quad -104 \\ \hline 256 &= 2R \end{aligned} \quad \boxed{R = 128^\circ}$$



Example 1

Find the measures of each labeled angle. Give a reason for your solution.

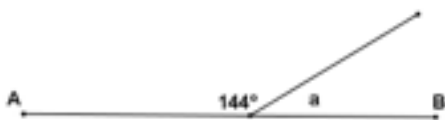


Angle	Angle measure	Reason

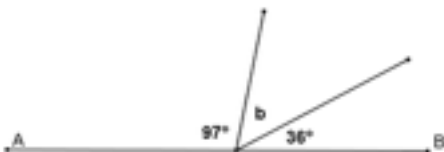
Exercises 1–12

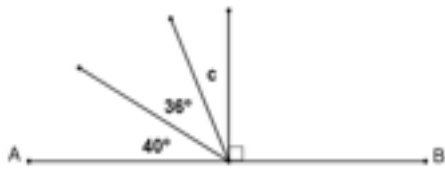
In the figures below, , , and are straight-line segments. Find the measure of each marked angle or find the unknown numbers labeled by the variables in the diagrams. Give reasons for your calculations. Show all the steps to your solutions.

1.

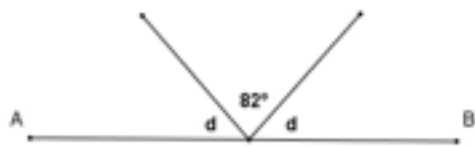


2.



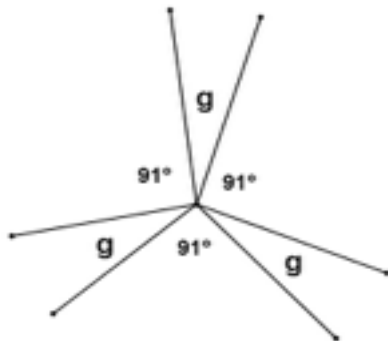


3.



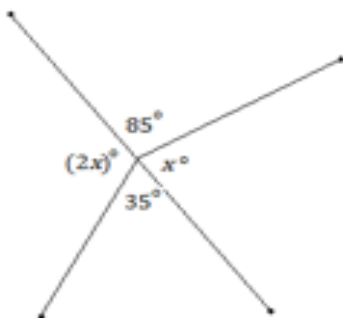
4.

5.

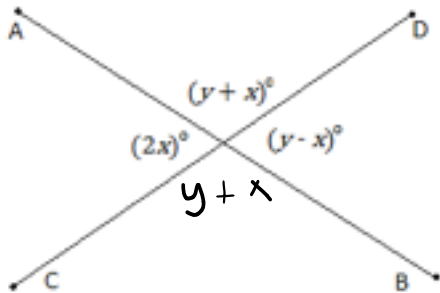


For Problems 6–12, find the values of x and y . Show all work.

6.



7.



$$= \underline{90^\circ} \quad = \underline{30^\circ}$$

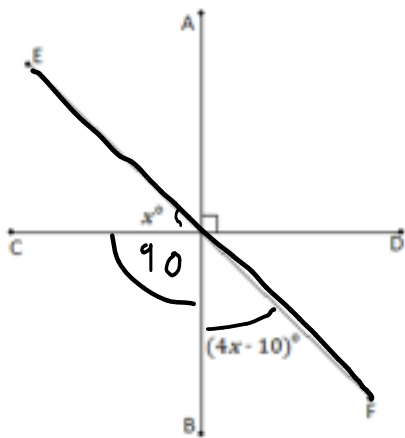
$$180 = 2x + (y + x)$$

$$180 = 2x + 90 + x$$

$$180 = 3x + 90$$

$$\begin{array}{r} -90 \\ 90 = 3x \\ \hline = 30 \end{array} \Rightarrow \boxed{x = 30}$$

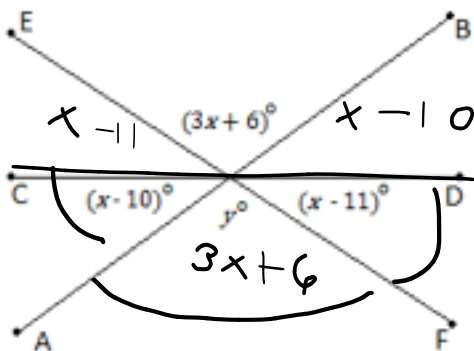
8.



$$x + 90 + 4x - 10 = 180$$

$$x = 20$$

9.



= _____

$$\begin{aligned} x - 10 + 3x + 6 + x - 11 \\ = 180 \end{aligned}$$

10.

Handwritten work:

$$y = 80$$

$$\frac{3}{4}(80) - 2 = 58$$

$$y = 180 - 58 = 122$$

11.

= _____

12.

= _____ = _____

Relevant Vocabulary

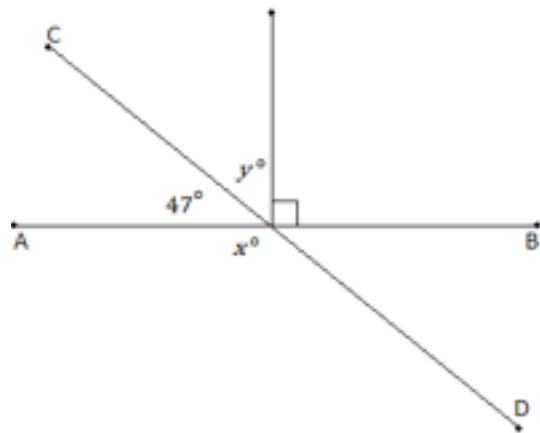
Straight Angle: If two rays with the same vertex are distinct and collinear, then the rays form a line called a *straight*

angle.

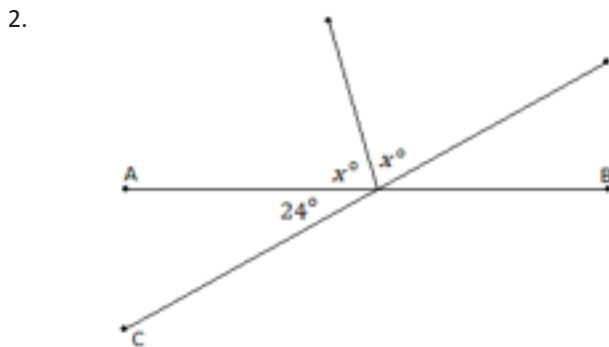
Vertical Angles: Two angles are *vertical angles* (or vertically opposite angles) if their sides form two pairs of opposite rays.

Problem Set

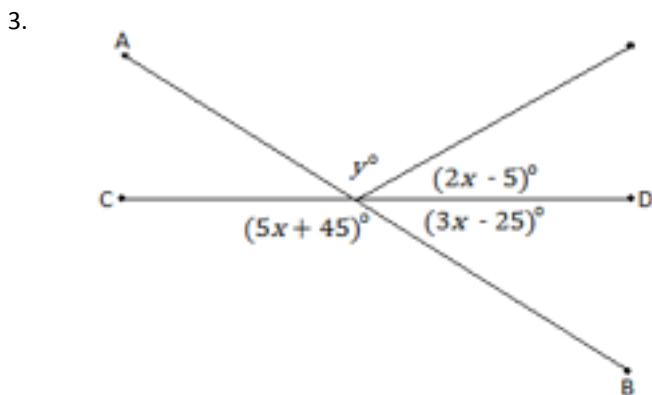
In the figures below, and are straight line segments. Find the value of and/or in each diagram below. Show all the steps to your solution and give reasons for your calculations.



1.
= _____
= _____



2. = _____



3. = _____
= _____