## Lesson 1-2

## Example 1 Length in Metric Units

Find the length of $\overline{A B}$ using each ruler.
a.


The ruler is marked in centimeters. Point $B$ is closer to the 4-centimeter mark than to 3 centimeters. Thus, $\overline{A B}$ is about 4 centimeters long.

## Example 2 Length in Customary Units

## Find the length of $\overline{A B}$ using each ruler.

a.


The long marks are half inch, the shorter marks are quarter inch. Point $B$ is closer to the $1 \frac{1}{4}$-inch mark. Thus, $\overline{A B}$ is about $1 \frac{1}{4}$ inches long.


The long marks are centimeters, and the shorter marks are millimeters. There are 10 millimeters for each centimeter.
Thus, $\overline{A B}$ is about 36 millimeters long.

## Example 3 Precision

Find the precision for each measurement. Explain its meaning.
a. 7 millimeters

The measurement is accurate to within 0.5 millimeters. So, the measurement of 7 millimeters could be 6.5 to 7.5 millimeters.
b. $4 \frac{1}{2}$ inches

The measuring tool is divided into $\frac{1}{2}$-inch increments. Thus, the measurement is accurate to within $\frac{1}{2}$ of $\frac{1}{2}$ or $\frac{1}{4}$ inch. Therefore, the measurement could be between $4 \frac{1}{4}$ inches and $4 \frac{3}{4}$ inches.

## Example 4 Find Measurements

a. Find $X Y$.
$X Y$ is the measure of $\overline{X Y}$.
Point $T$ is between $X$ and $Y . X Y$ can be found by adding $X T$ and $T Y$.


$$
\begin{aligned}
X T+T Y & =X Y & & \text { Sum of parts }=\text { whole } \\
3.2+5.7 & =X Y & & \text { Substitution } \\
8.9 & =X Y & & \text { Add. }
\end{aligned}
$$

So, $\overline{X Y}$ is 8.9 centimeters long.
b. Find FG.

FG is the measure of $\overline{F G}$.

$$
\begin{aligned}
F G+G H & =F H & & \text { Sum of parts }=\text { whole } \\
F G+10 \frac{1}{4} & =15 & & \text { Substitution } \\
F G+10 \frac{1}{4}-10 \frac{1}{4} & =15-10 \frac{1}{4} & & \text { Subtract } 10 \frac{1}{4} \text { from each side. } \\
F G & =4 \frac{3}{4} & & \text { Simplify. }
\end{aligned}
$$



So, $\overline{F G}$ is $4 \frac{3}{4}$ inches long.
c. Find $x$ and $M N$ if $N$ is between $M$ and $P, M P=60, M N=6 x-7$, and $N P=2 x+3$.

Draw a figure to represent this information.

$$
\begin{aligned}
M P & =M N+N P & & \\
60 & =6 x-7+2 x+3 & & \text { Substitute known values. } \\
60 & =8 x-4 & & \text { Simplify. } \\
60+4 & =8 x-4+4 & & \text { Add } 4 \text { to each side. } \\
64 & =8 x & & \text { Simplify. } \\
8 & =x & & \text { Divide each side by } 8 .
\end{aligned}
$$



$$
\begin{array}{ll}
M N=6 x-7 & \text { Given } \\
M N=6(8)-7 & x=8 \\
M N=41 & \text { Simplify } .
\end{array}
$$

## Example 5 Congruent Segments

EXPENSES In the graph at the right, suppose a segment was drawn along the side of each bar. Which categories would have segments that are congruent? Explain. The segments on the bars for January and March would be congruent because they both represent $\$ 120$.

The segments on bars for April and May would be congruent because they both represent $\$ 95$.


