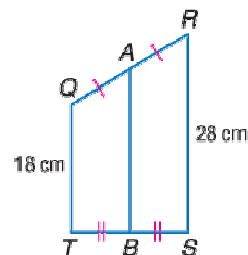


## Lesson 4-9

## Example 1

**STAGE DESIGN** The plans for two panels of a stage setting are shown in the figure at the right.

In the figure,  $\overline{QT} \cong \overline{RS}$ . Find  $AB$ .



## Solution

Quadrilateral  $QRST$  is a trapezoid.

$\overline{QT}$  and  $\overline{RS}$  are bases, and  $\overline{AB}$  is the median.

To find  $AB$ , apply the trapezoid-median theorem.

$$AB = \frac{1}{2}(QT + RS)$$

$$AB = \frac{1}{2}(18 + 28)$$

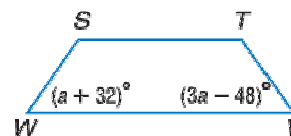
$$AB = \frac{1}{2}(46)$$

$$AB = 23$$

So, the length of  $\overline{AB}$  is 23 cm.

## Example 2

In the figure at the right,  $\overline{ST} \parallel \overline{WV}$  and  $SW = TV$ .



## Solution

Quadrilateral  $STVW$  is an isosceles trapezoid, with bases  $\overline{ST}$  and  $\overline{WV}$ . So,  $\angle W$  and  $\angle V$  are a pair of base angles, and they are equal in measure. Use this fact to write and solve an equation.

$$\begin{aligned} a + 32 &= 3a - 48 \\ a + (-a) + 32 &= 3a + (-a) - 48 && \text{Add } -a \text{ to each side.} \\ 32 &= 2a - 48 \\ 32 + 48 &= 2a - 48 + 48 && \text{Add 48 to each side.} \\ 80 &= 2a \\ \frac{80}{2} &= \frac{2a}{2} && \text{Divide each side by 2.} \\ 40 &= a \end{aligned}$$

So the value of  $a$  is 40. From the figure,  $m\angle V = (3a - 48)^\circ$ .

Substituting 40 for  $a$ ,  $m\angle V = (3 \cdot 40 - 48)^\circ = (120 - 48)^\circ = 72^\circ$ .