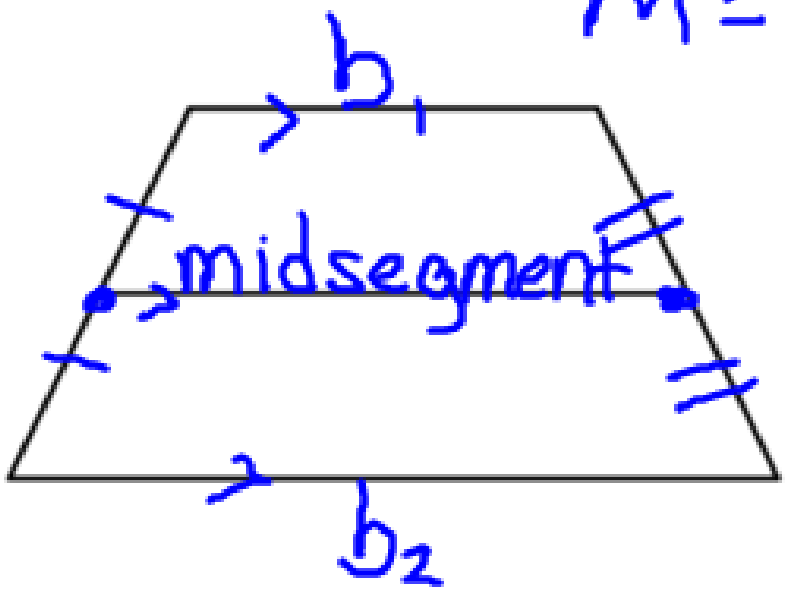
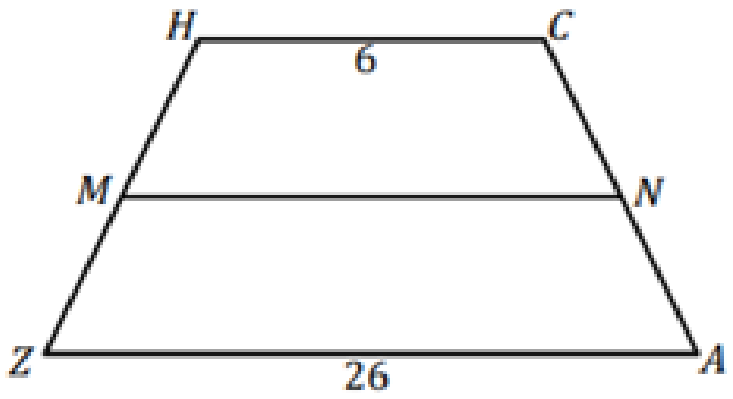
The midsegment Theorem

The midsegment of a trapezoid is parallel to each base and its length is half the sum of the lengths of the bases.

$$M = \frac{1}{2}(b_1 + b_2)$$



$ZACH$ is an isosceles trapezoid with midsegment $\overline{MN}$.

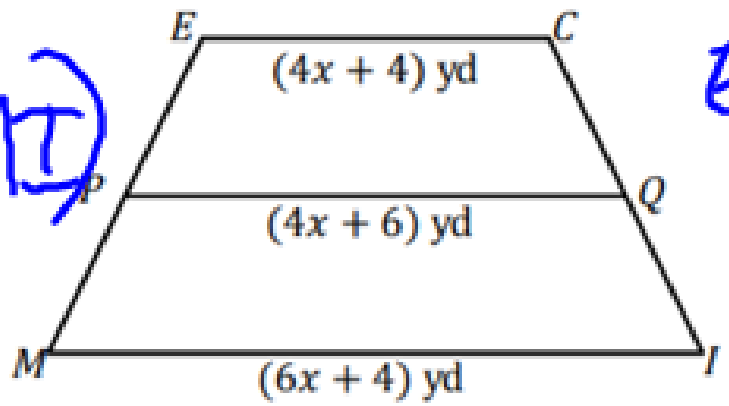


Determine the length of $\overline{MN}$.

16

$\frac{6+26}{2}$

$MICE$ is an isosceles trapezoid with midsegment $\overline{PQ}$.



$PQ = \frac{1}{2}(EC + MI)$

$EC = 4(2) + 4$
$= 12$

$PQ = 4(2) + 6$
$= 14$

$MI = 6(2) + 4$
$= 16$

Determine the lengths of $\overline{MI}$, $\overline{PQ}$, and $\overline{EC}$.

$4x + 6 = \frac{1}{2}(4x + 4 + 6x + 4)$

$4x + 6 = \frac{1}{2}(10x + 8)$

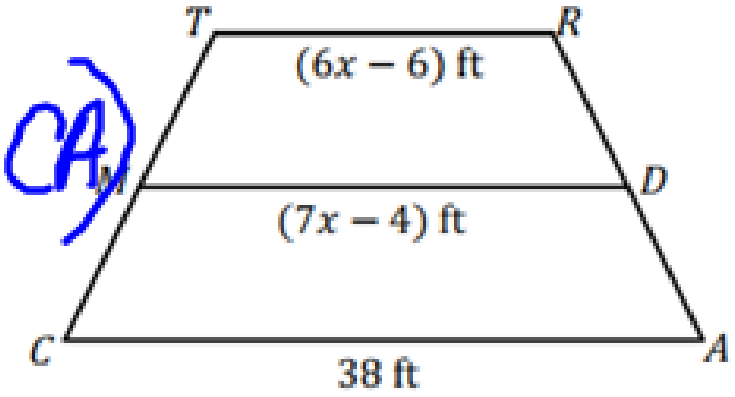
$4x + 6 = 5x + 4$

$-4x \quad -4x$

$6 = x + 4$

$2 = x$

$CART$ is an isosceles trapezoid with midsegment $\overline{MD}$.



$MD = \frac{1}{2}(TR + CA)$

$TR = 6(5) - 6$
$= 24$

$MD = 7(5) - 4$
$= 31$

Determine the length of $\overline{TR}$ and $\overline{MD}$.

$7x - 4 = \frac{1}{2}(6x - 6 + 38)$

$7x - 4 = \frac{1}{2}(6x + 32)$

$7x - 4 = 3x + 16$

$-3x \quad -3x$

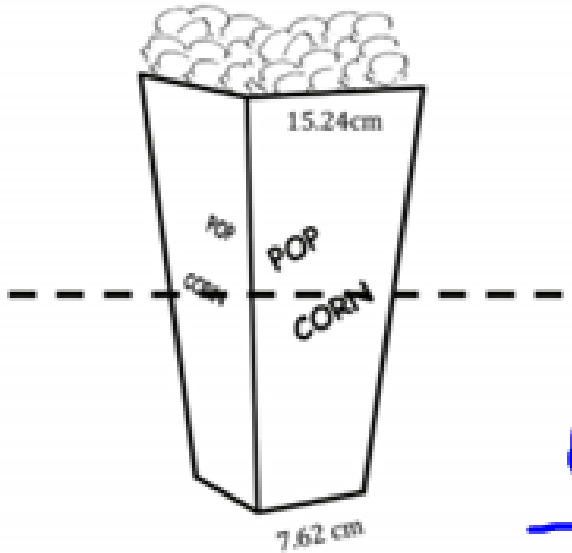
$4x - 4 = 16$

$+4 \quad +4$

$4x = 20$

$x = 5$

Julia is designing a popcorn box. She wants the end of the box to be a trapezoid with the dimensions shown. If she wants to cut the box through the middle to make the box smaller for her little sister, about how wide would the top base of the smaller box be?



$$\frac{15.24 + 7.62}{2}$$

11.43 centimeters