

1. A diagonal of a rhombus that is on the coordinate plane can be modeled by the equation $6x + y = 13$. What is the slope of the other diagonal?

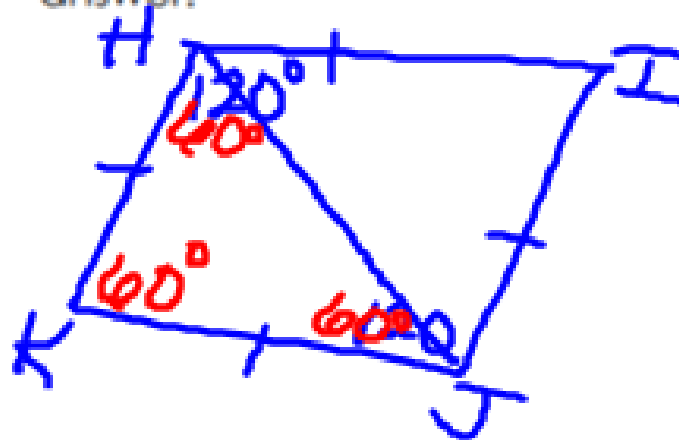
$$\begin{array}{r} 6x + y = 13 \\ -6x \quad -6x \\ \hline \end{array}$$

$$y = -6x + 13 \quad m = -6$$

$$y = \underline{m}x + b$$

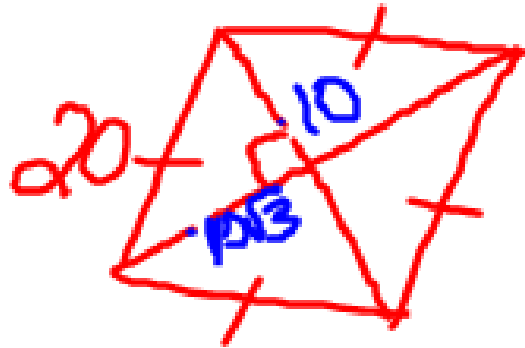
$$m = \left(\frac{1}{6}\right)$$

2. In rhombus $HJKI$, $m\angle H$ is 120° . Does the diagonal \overline{HJ} divide the rhombus into two equilateral triangles? Justify your answer.

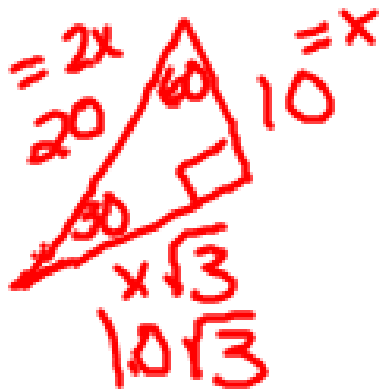


yes

3. The size of the acute angle of a rhombus is half the size of its obtuse angle. The side length of the rhombus is equal to 20 feet. Find the lengths of the diagonals of the rhombus.

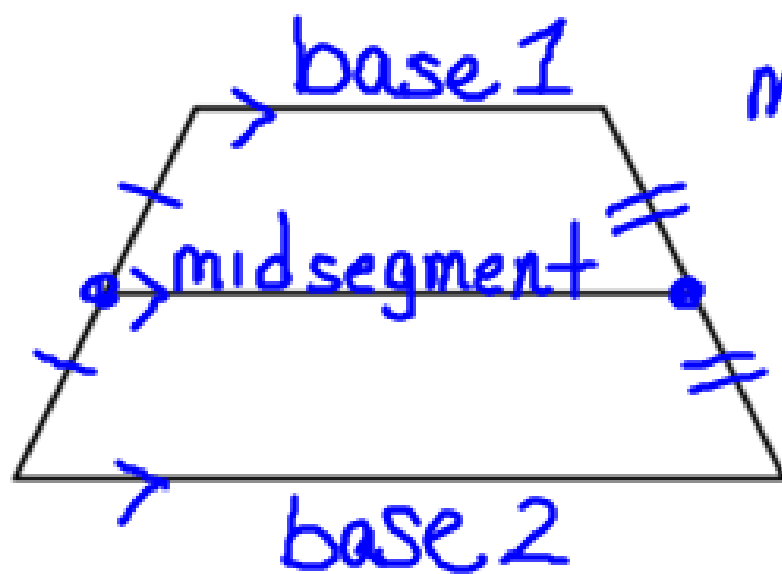


20, $20\sqrt{3}$



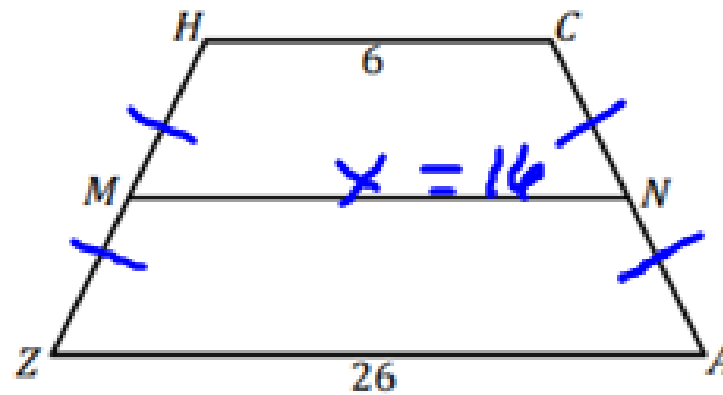
The midsegment of a Trapezoid

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



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

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

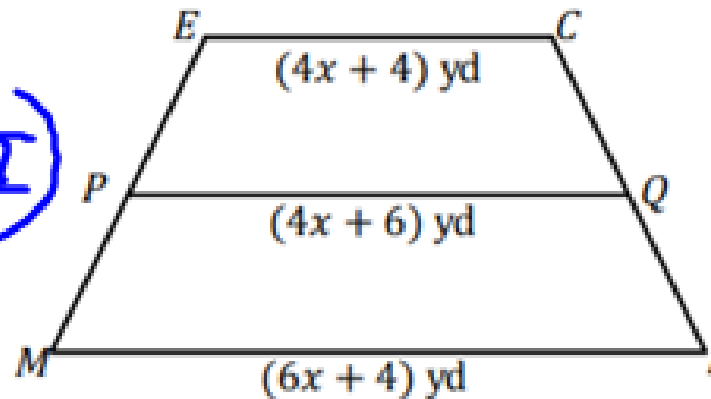


Determine the length of \overline{MN} .

$$\frac{6+26}{2} = 16$$

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

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



$$\begin{aligned} EC &= 4(2) + 4 \\ &= 12 \end{aligned}$$

$$\begin{aligned} PQ &= 4(2) + 6 \\ &= 14 \end{aligned}$$

$$\begin{aligned} MI &= 6(2) + 4 \\ &= 16 \end{aligned}$$

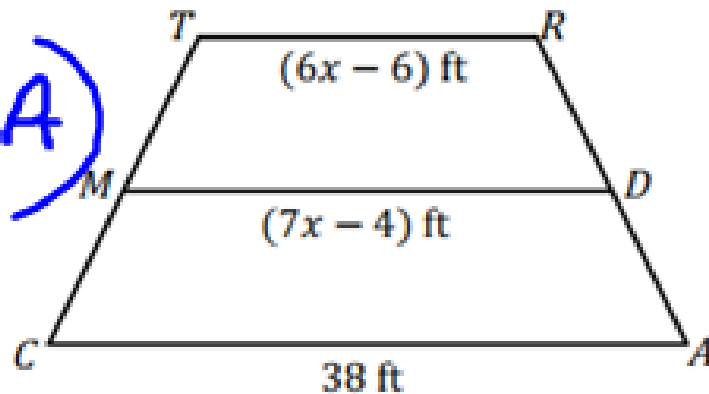
Determine the lengths of \overline{MI} , \overline{PQ} , and \overline{EC} .

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

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

$$\begin{array}{r} 4x + 6 = 5x + 4 \\ -4x \qquad -4x \\ \hline 6 = x + 4 \\ -4 \qquad -4 \\ \hline 2 = x \end{array}$$

$CART$ 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} .

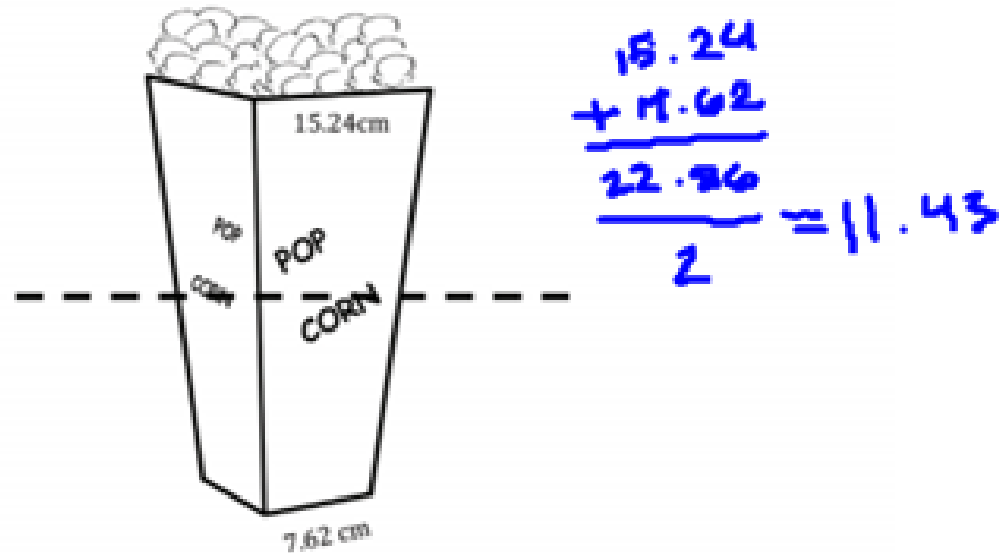
$$7x - 4 = \frac{1}{2}(6x - 6 + 38)$$

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

$$7x - 4 = 3x + 16$$

$$\begin{array}{r} 7x - 4 \\ - 3x \\ \hline 4x - 4 = 16 \\ + 4 \quad + 4 \\ \hline 4x = 20 \\ x = 5 \end{array}$$

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?



11.43 centimeters