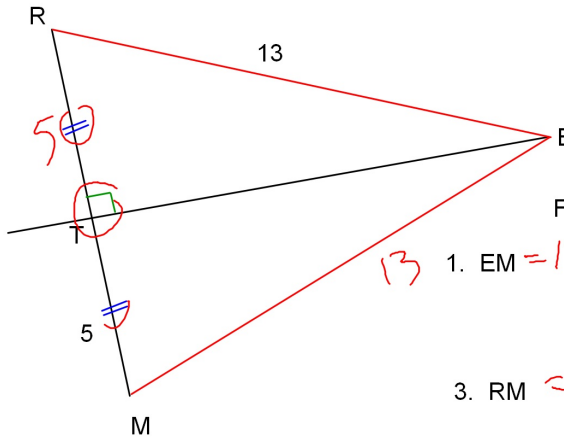
Theorem 5-2 **Perpendicular Bisector Theorem**

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

Theorem 5-3 **Converse of the Perpendicular Bisector Theorem**

If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.



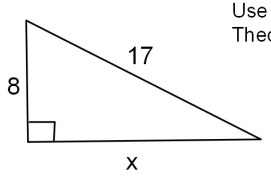
Find the following:

1. EM = 13
2. RT = 5
3. RM = 16

What kind of triangle is ΔREM? Isosceles

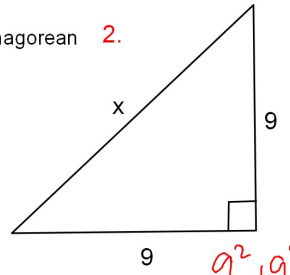
Find the value of x in each diagram.

1.



Use the Pythagorean Theorem.

2.



$\sqrt{x^2} = \sqrt{225}$

$x = 15$

$Leg^2 + Leg^2 = hypot^2$

$8^2 + x^2 = 17^2$

$64 + x^2 = 289$

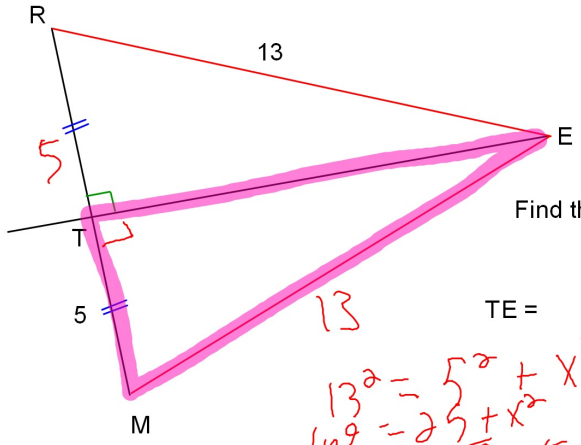
$x^2 = 225$

$9^2 + 9^2 = x^2$

$81 + 81 = x^2$

$\sqrt{162} = \sqrt{x^2}$

$12.7 = x$



Find the following:

TE =

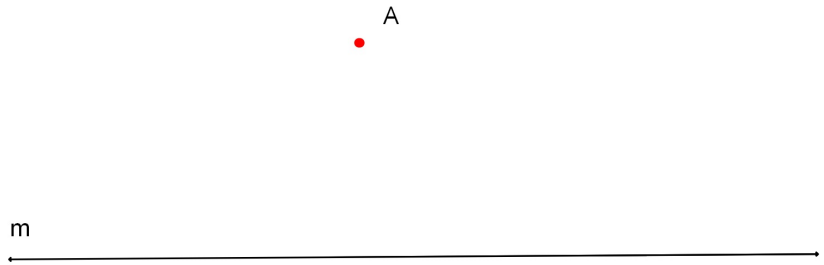
$13^2 = 5^2 + x^2$

$169 = 25 + x^2$

$\sqrt{144} = \sqrt{x^2}$ $x = 12$

TE = 12

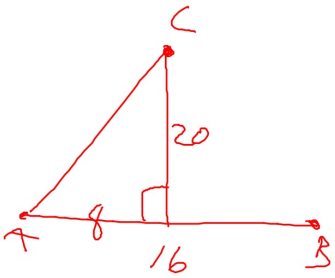
How would you measure the distance from Pt A to the line m?



The distance from a point to a line is the PERPENDICULAR distance.

Segment $\overline{AB}$ is 16 units long. Point C is placed 20 units from $\overline{AB}$ and on the perpendicular bisector of $\overline{AB}$.

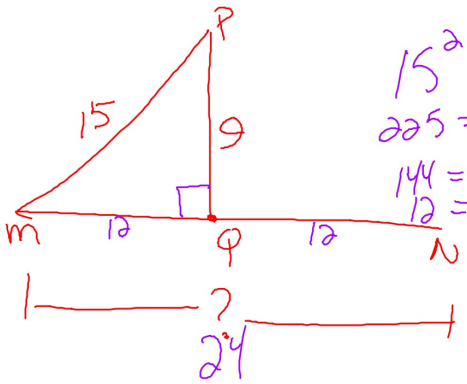
Find the length of $\overline{AC}$.



$x^2 = 20^2 + 8^2$

$x = 21.5$

$\overline{PQ}$ is the perpendicular bisector of $\overline{MN}$. Q is the point of intersection of $\overline{PQ}$ and $\overline{MN}$. If PQ = 9 and PM = 15 find the length of MN.



$15^2 = 9^2 + x^2$

$225 = 81 + x^2$

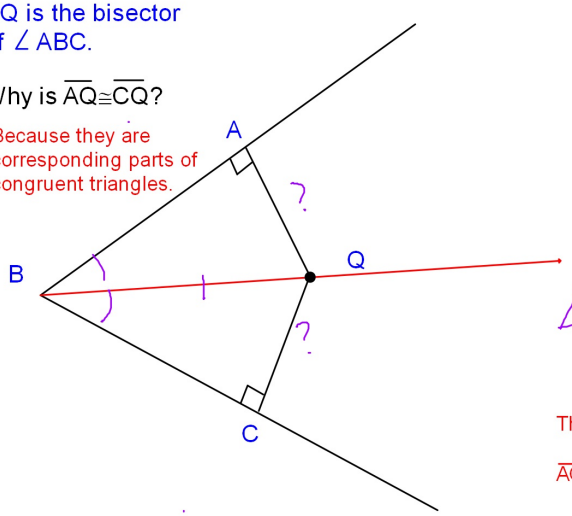
$144 = x^2$

$12 = x$

$\overrightarrow{BQ}$ is the bisector of $\angle ABC$.

Why is $\overline{AQ} \cong \overline{CQ}$?

Because they are corresponding parts of congruent triangles.



SSS
SAS
ASA
AAS
HL

$\triangle ABQ \cong \triangle CBQ$

AAS

Therefore,

$\overline{AQ} \cong \overline{CQ}$ by CPCTC

Theorem 5-4 **Angle Bisector Theorem**

If a point is on the bisector of an angle, then the point is equidistant from the sides of the angle.

Theorem 5-5 **Converse of the Angle Bisector Theorem**

If a point in the interior of an angle is equidistant from the sides of the angle, then the point is on the angle bisector.