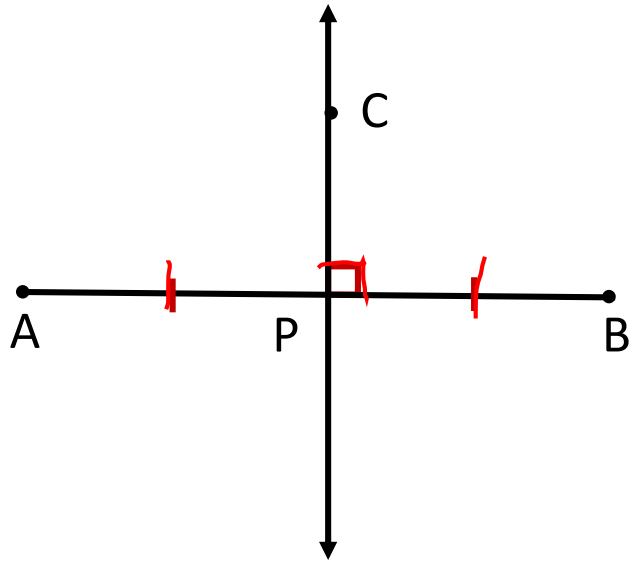
Perpendicular and Angle Bisectors

Lesson 6.1

Perpendicular Bisector	Angle Bisector
Converse of Perpendicular Bisector	Angle Bisector Examples
Perpendicular Bisector Examples	Equations of Perpendicular Bisectors

Perpendicular Bisectors

A perpendicular bisector of a line segment is a line that is perpendicular to the segment at its midpoint.

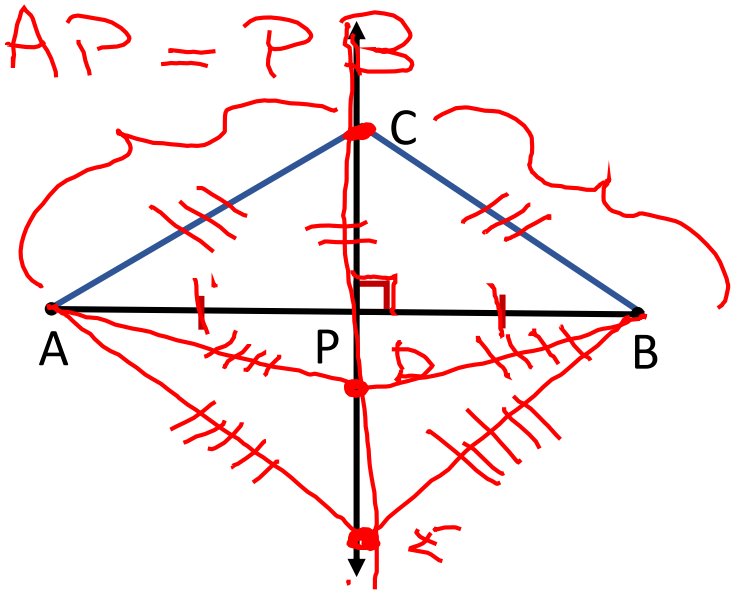


Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

If C lies on the ⊥ bisector of $\overline{AB}$ then

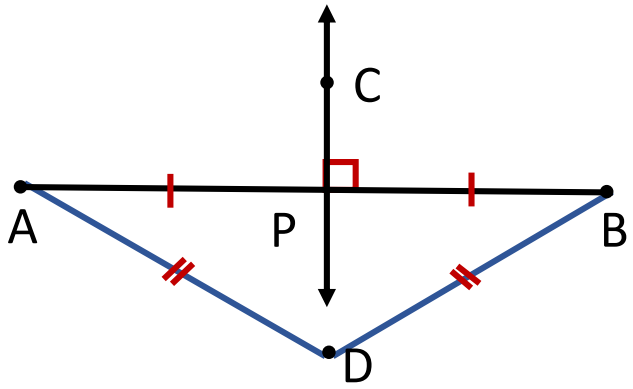
AC = CB.



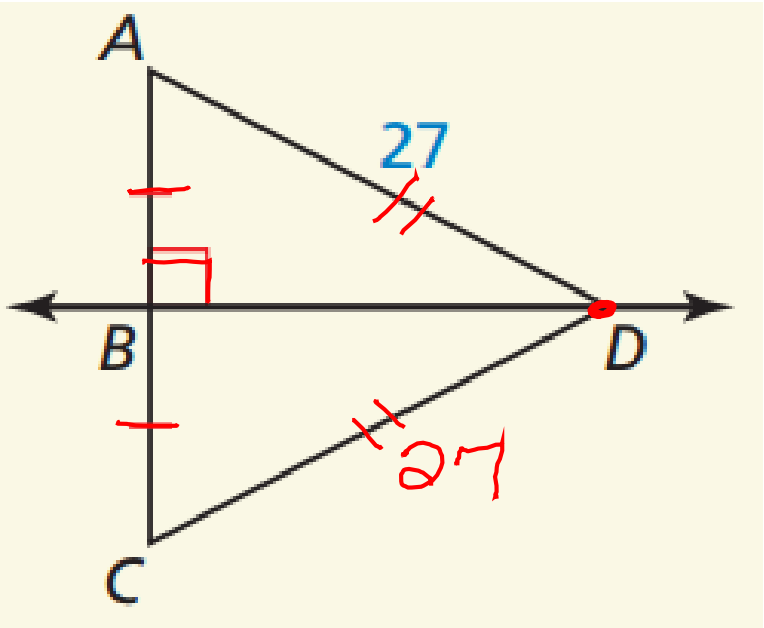
Converse of the Perpendicular Bisector Theorem

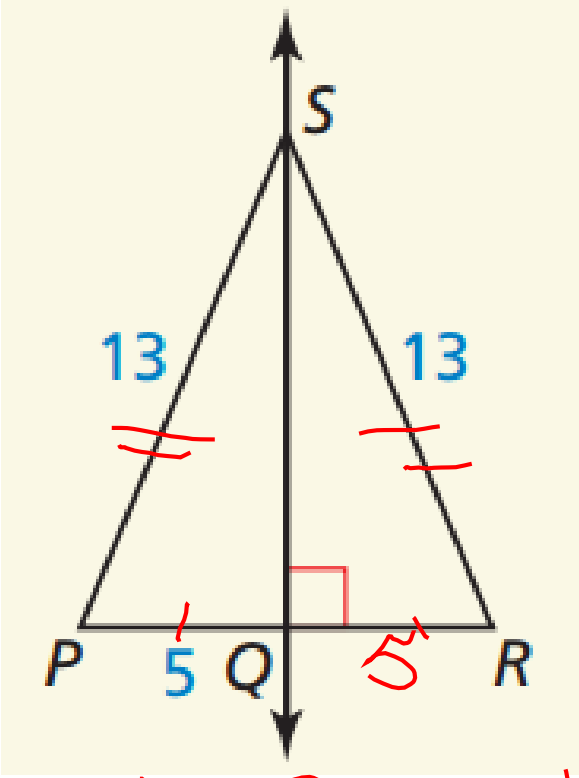
In a plane, if a point is equidistant from the endpoints of the segment then it lies on the perpendicular bisector of the segment.

If DA = DB then point D lies on the $\perp$ bisector of $\overline{AB}$.



Find CD, PR, and GH.



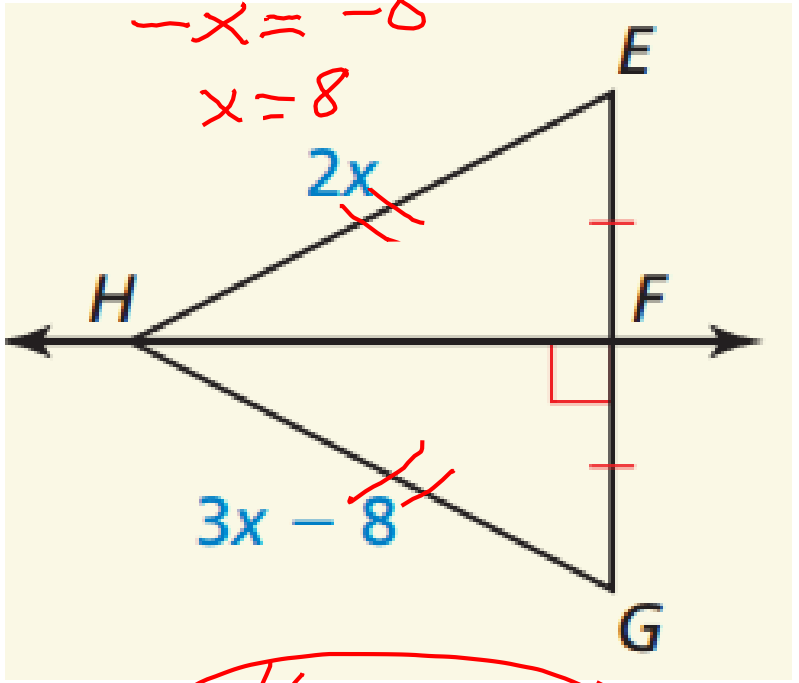


$2x = 3x - 8$

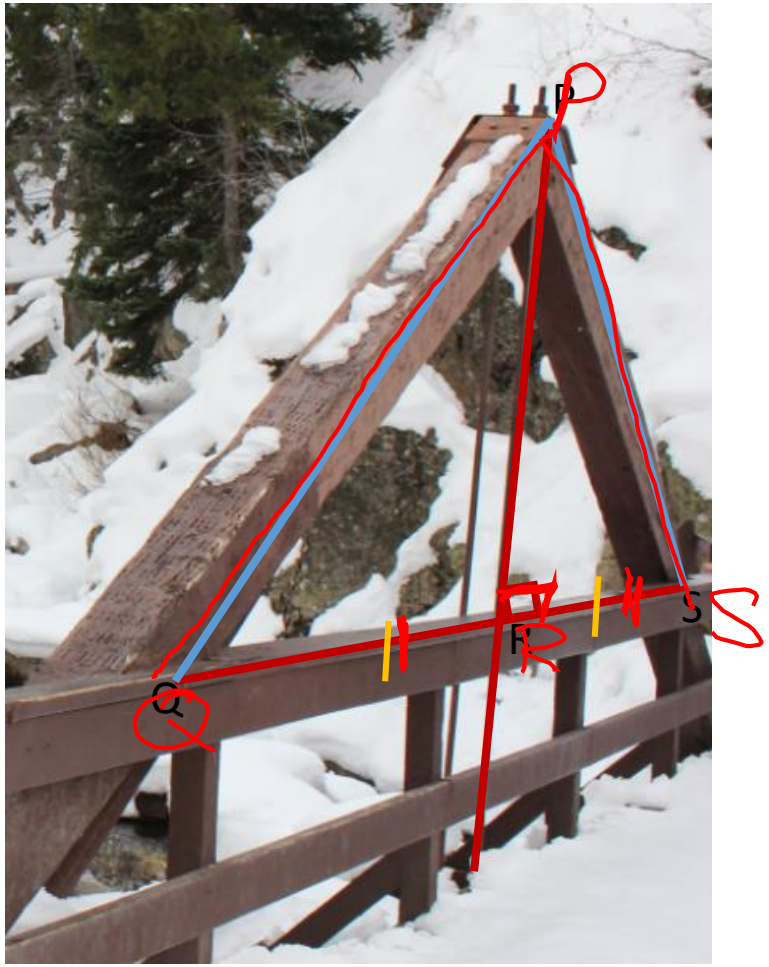
$-3x \quad -3x$

$-x = -8$

$x = 8$



What can you conclude?

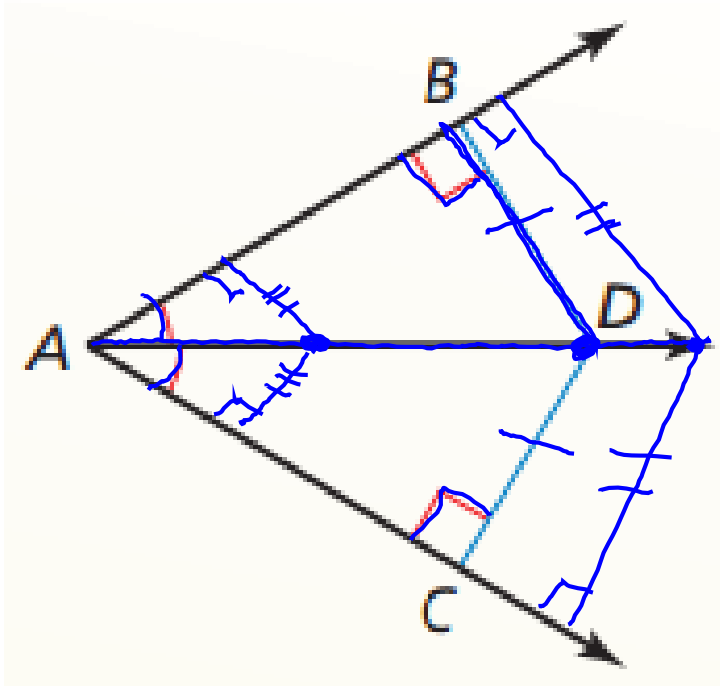


PQ = PS

Angle Bisector Theorem

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

If $\overrightarrow{AD}$ bisects $\angle$BAC and $\overline{DC} \perp \overline{AB}$ and $\overline{DC} \perp \overline{AC}$, then DB = DC.

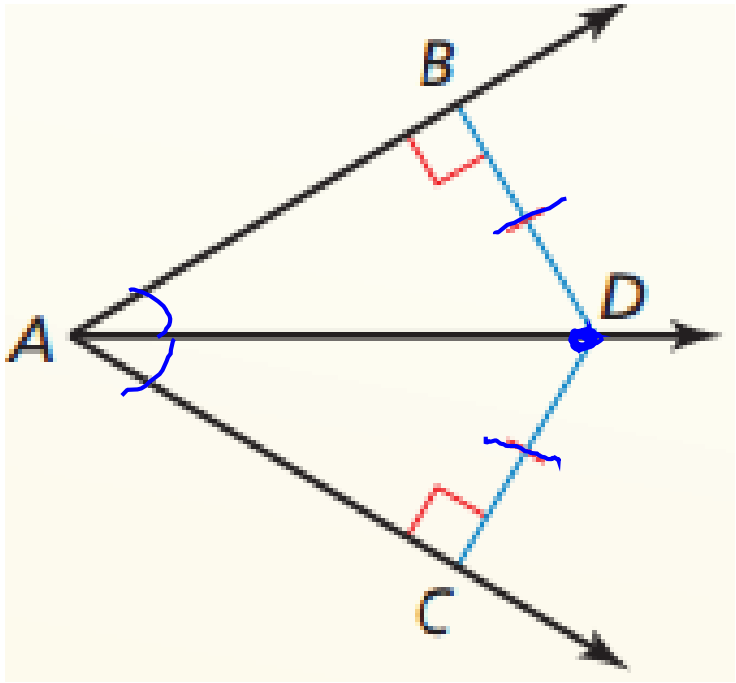


Converse of the Angle Bisector Theorem

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

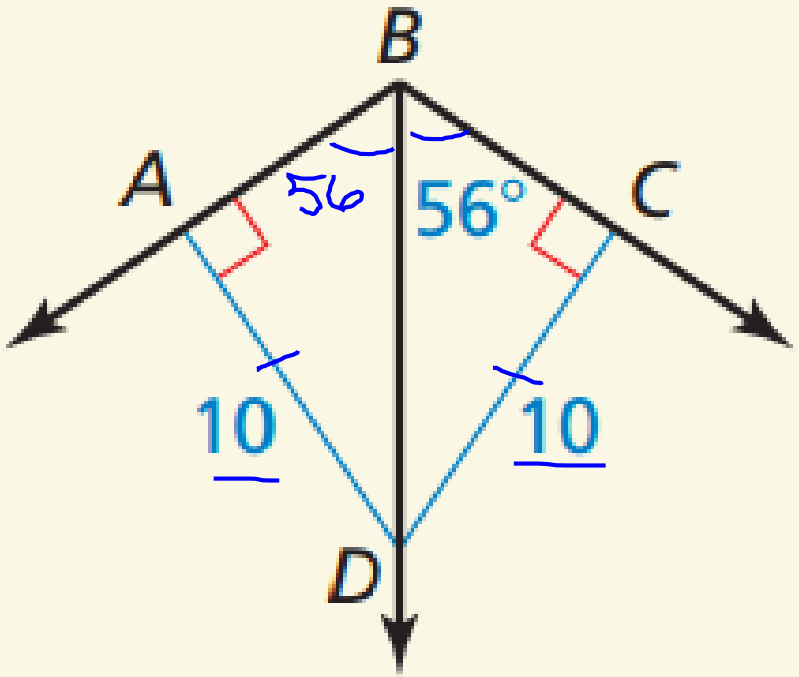
If $\overline{DC} \perp \overline{AB}$ and $\overline{DC} \perp \overline{AC}$, and DB = DC

then $\overrightarrow{AD}$ bisects $\angle$BAC.

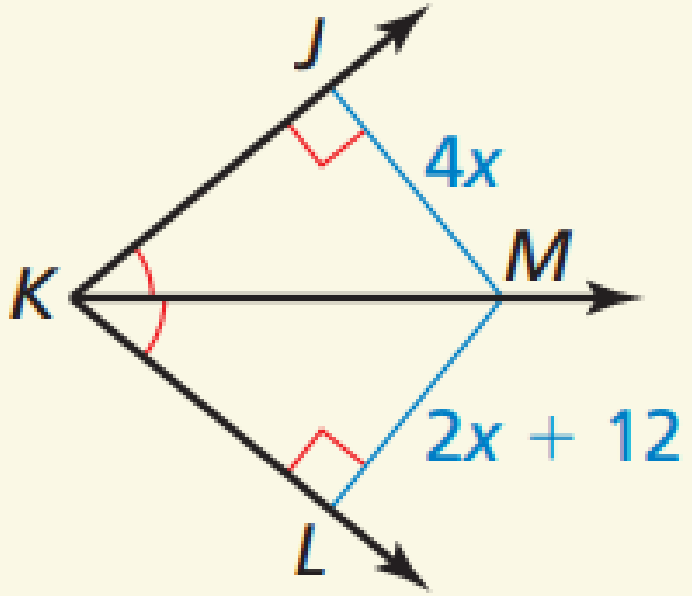


Find each measure.

$m\angle ABC$ $2(56) = 112^\circ$



JM



A parachutist lands at point P in TD Ameritrade Park. If the parachutist wants to leave the field, which is closer the first or the third base line? neither.
On ∠ bisector

Write the equation of the perpendicular bisector of the segment with endpoints D(5, -1) and E(-11, 3).

1) Find midpoint $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ $\left(\frac{5-11}{2}, \frac{-1+3}{2}\right)$ $(-3, 1)$

2) find neg reciprocal of slope + new slope $\frac{4}{1}$

$m = 4 \quad (-3, 1)$

$y = mx + b$

$1 = 4(-3) + b$

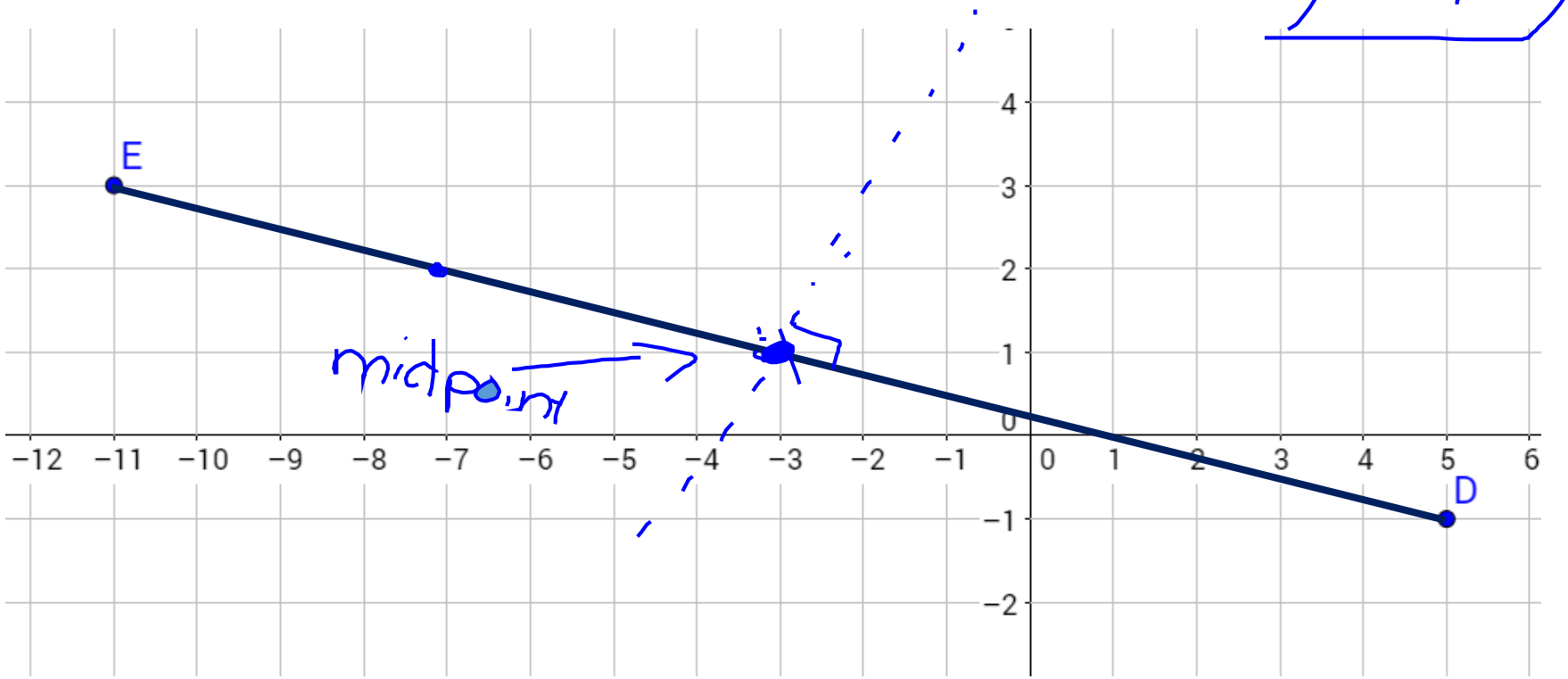
$y = 4(x+3) + 1$

$y = 4x + 12 + 1$

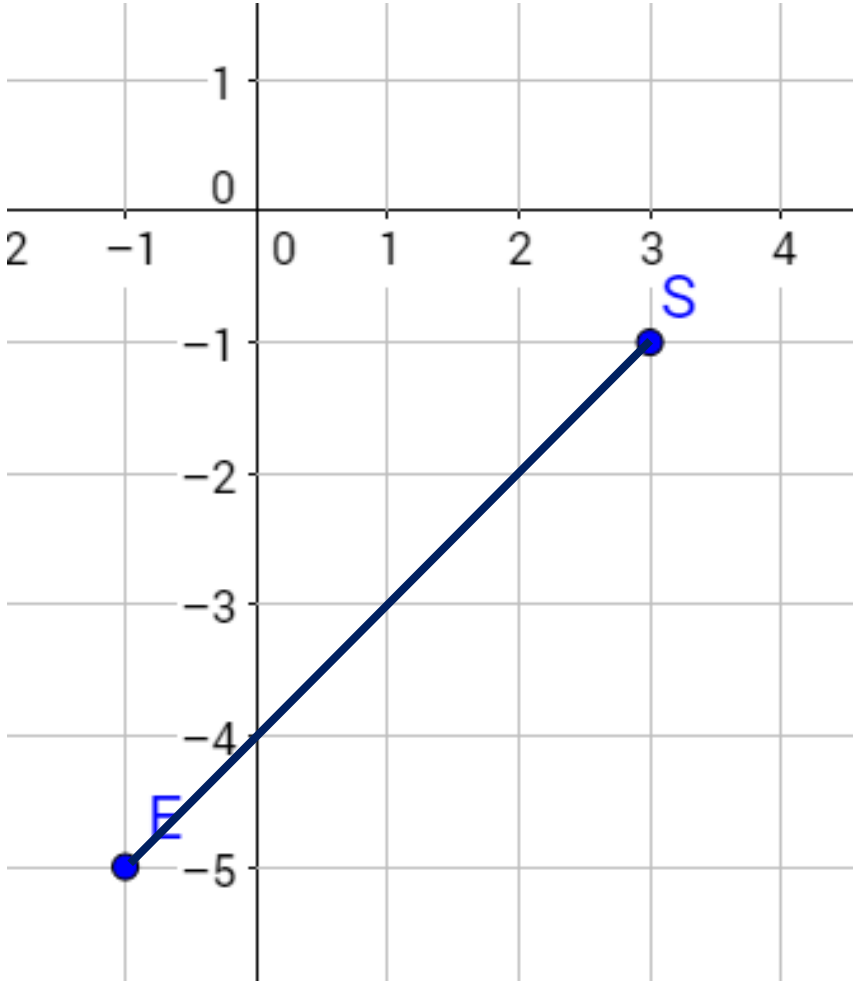
$y = 4x + 13$

$\frac{3+1}{-11-5} \quad \frac{4}{-16}$

$-\frac{1}{4} = m$



Write an equation of the perpendicular bisector of the segment with endpoints (-1, -5) and (3, -1).



Lesson 6.1 p. 306; 4-22 even, 39-44