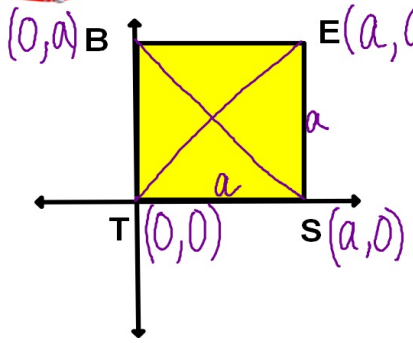
13-9 Coordinate Proofs

Dec 14

Steps:

1. **Label all coordinates.**
2. **Show neat, detailed work to prove statement.**
   - **use distance formula to prove lengths of segments equal**
   - **use slope to prove segments parallel or perpendicular**
   - **use midpoint formula to find midpoints**

ex. 1 **Prove that the diagonals of a square are perpendicular.**



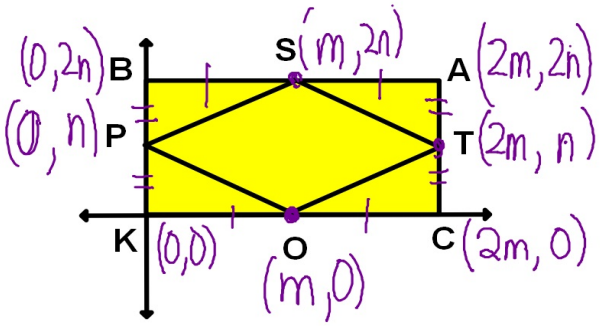
Given: Square BEST

Prove: $\overline{TE} \perp \overline{BS}$

slope $\overline{TE} = \frac{a-0}{a-0} = \frac{a}{a} = 1$

slope $\overline{BS} = \frac{a-0}{0-a} = \frac{a}{-a} = -1$

ex. 2 **Prove that the quadrilateral formed by joining, in order, the midpoints of the sides of a rectangle, is a rhombus.**



Given: rect. BACK
midpts S, T, O, P

Prove: STOP is a rhombus

$ST = \sqrt{(2m-m)^2+(n-2n)^2} = \sqrt{m^2+n^2}$

$TO = \sqrt{(2m-m)^2+(n-0)^2} = \sqrt{m^2+n^2}$

$OP = \sqrt{(m-0)^2+(0-n)^2} = \sqrt{m^2+n^2}$

$PS = \sqrt{(m-0)^2+(2n-n)^2} = \sqrt{m^2+n^2}$