Analytic Geometry - Geometry on a coordinate plane from an Algebraic Perspective.

Need

Dist Formula

$$D=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

Slope Formula

$$m=\frac{y_2-y_1}{x_2-x_1}$$

$m_1 \cdot m_2 = -1 \Leftrightarrow m_1 \perp m_2$

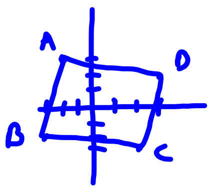
Midpt. Formula

$$\left(\frac{x_2+x_1}{2}, \frac{y_2+y_1}{2}\right)$$

$m_1 = m_2 \Leftrightarrow l_1 \parallel l_2$

#23 Is quad. a //ogram?

A $(-2,3)$, B $(-3,-2)$, C $(2,-3)$, D $(3,2)$



m of $\overline{AB} = \frac{-2-3}{-3-{}^-2} = \frac{-5}{-1} = 5$

m of $\overline{DC} : \frac{2-{}^-3}{3-2} = \frac{5}{1} = 5$

$\therefore \overline{AB} \parallel \overline{DC}$

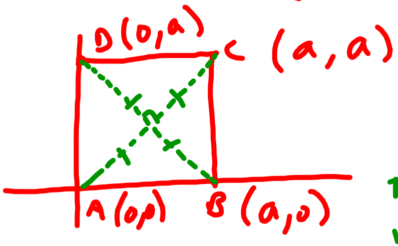
$\overline{AB} = \sqrt{(-2-3)^2+(-3-{}^-2)^2}$
$= \sqrt{25+1}$
$= \sqrt{26}$

$\overline{DC} = \sqrt{(2-{}^-3)^2+(3-2)^2}$
$= \sqrt{25+1}$
$= \sqrt{26}$

$\therefore \overline{AB} \cong \overline{DC}$

Since $\overline{AB} \parallel \overline{DC}$ + $\overline{AB} \cong \overline{DC}$, quad. ABCD is a parallelogram.

Prove: The diagonals of a square are $\perp$ bisectors of each other.



Let A, B, C, D be the vertices of a square.

The midpt of $\overline{AC} = \left(\frac{a}{2}, \frac{a}{2}\right)$

" " $\overline{BD} = \left(\frac{a}{2}, \frac{a}{2}\right)$

Since the midpts coincide, the diagonal bisect each other.

Slope of $\overline{AC} = \frac{a-0}{a-0} = 1$

Slope of $\overline{BD} = \frac{0-a}{a-0} = -1$

Since the slopes are (-) recip, $\overline{AC}$ + $\overline{BD}$ are $\perp$.