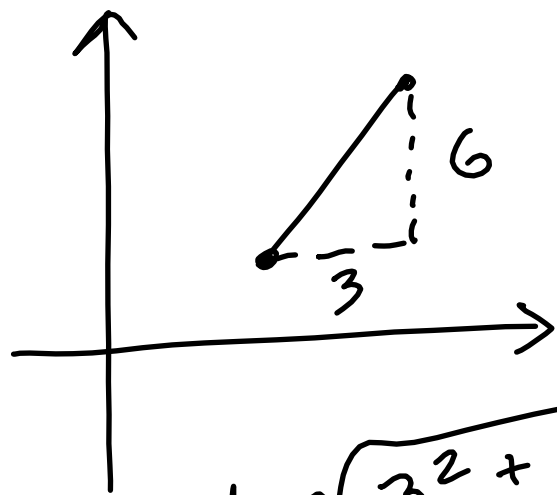


Polygons in Coordinate Plane

- Distance

EX $\rightarrow (3, 2), (6, 8)$



$$\begin{aligned}d &= \sqrt{3^2 + 6^2} \\&= \sqrt{9 + 36} = \sqrt{45} \\&= \sqrt{9} \cdot \sqrt{5} \\&= \mathbf{3\sqrt{5}}\end{aligned}$$

EX $\rightarrow (4, 5), (6, 7)$

$$\begin{aligned}d &= \sqrt{2^2 + 2^2} \\&= \sqrt{4 + 4} \\&= \sqrt{8} \\&= \sqrt{4} \cdot \sqrt{2} \\&= \mathbf{2\sqrt{2}}\end{aligned}$$

EX $\rightarrow (9, 8), (4, 7)$

$$\begin{aligned}d &= \sqrt{5^2 + 1^2} \\&= \sqrt{25 + 1} \\&= \mathbf{\sqrt{26}}\end{aligned}$$

EX $\rightarrow (11, 4), (-7, 1)$

$$\begin{aligned}d &= \sqrt{18^2 + 3^2} \\&= \sqrt{324 + 9} \\&= \sqrt{333} \\&= \sqrt{9} \cdot \sqrt{37} \\&= \mathbf{3\sqrt{37}}\end{aligned}$$

$$\underline{EX} \rightarrow (7, 3), (2, 1)$$

$$\begin{aligned}d &= \sqrt{5^2 + 2^2} \\ &= \sqrt{25 + 4} \\ &= \sqrt{29}\end{aligned}$$

$$\underline{EX} \rightarrow (5, 8), (-4, -10)$$

$$\begin{aligned}d &= \sqrt{9^2 + 18^2} \\ &= \sqrt{81 + 324} \\ &= \sqrt{405} \\ &= \sqrt{9} \cdot \sqrt{45} \\ &= \sqrt{9} \cdot \sqrt{9} \cdot \sqrt{5} \\ &= 3 \cdot 3 \cdot \sqrt{5} \\ &= 9\sqrt{5}\end{aligned}$$

$$\underline{EX} \rightarrow (-4, -2), (5, 2)$$

$$\begin{aligned}d &= \sqrt{9^2 + 4^2} \\ &= \sqrt{81 + 16} \\ &= \sqrt{97}\end{aligned}$$

- Slope

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

EX $\rightarrow (4, 6), (8, 9)$

$$m = \frac{9 - 6}{8 - 4} = \frac{3}{4}$$

EX $\rightarrow (12, 9), (6, 4)$

$$m = \frac{4 - 9}{6 - 12} = \frac{-5}{-6} = \frac{5}{6}$$

EX $\rightarrow (-4, 2), (4, 10)$

$$m = \frac{10 - 2}{4 - (-4)} = \frac{8}{8} = 1$$



- Parallel lines \rightarrow slopes are equal

- Perpendicular lines \rightarrow slopes are opposite reciprocals ("flopposites")

EX \rightarrow A(2,3), B(5,7)

$$m = \frac{7-3}{5-2} = \frac{4}{3}$$

C(0,2), D(6,10)

$$m = \frac{10-2}{6-0} = \frac{8}{6} = \frac{4}{3}$$

PARALLEL

EX A(3,10), B(4,15)

$$m = \frac{15-10}{4-3} = \frac{5}{1}$$

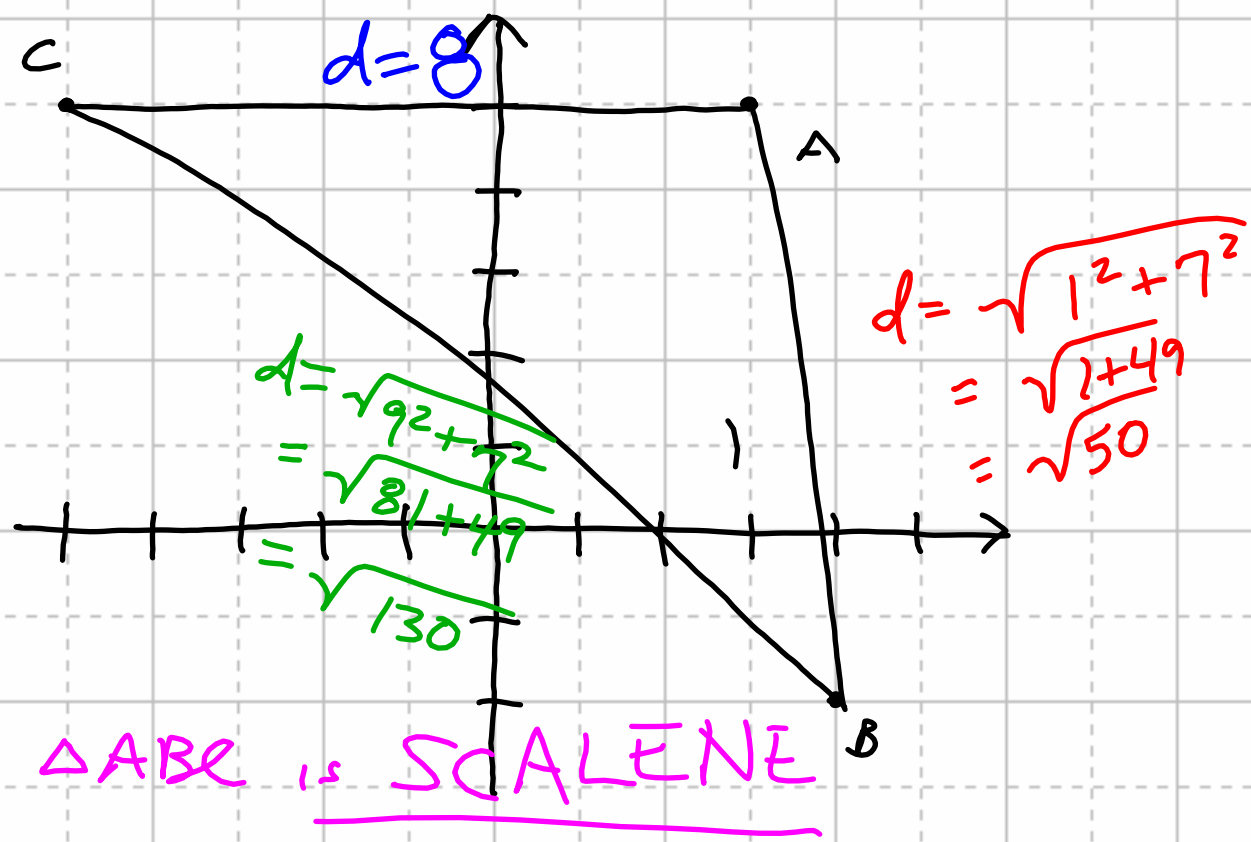
C(-1,3), D(9,1)

$$m = \frac{1-3}{9-(-1)} = \frac{-2}{10} = -\frac{1}{5}$$

PERPENDICULAR

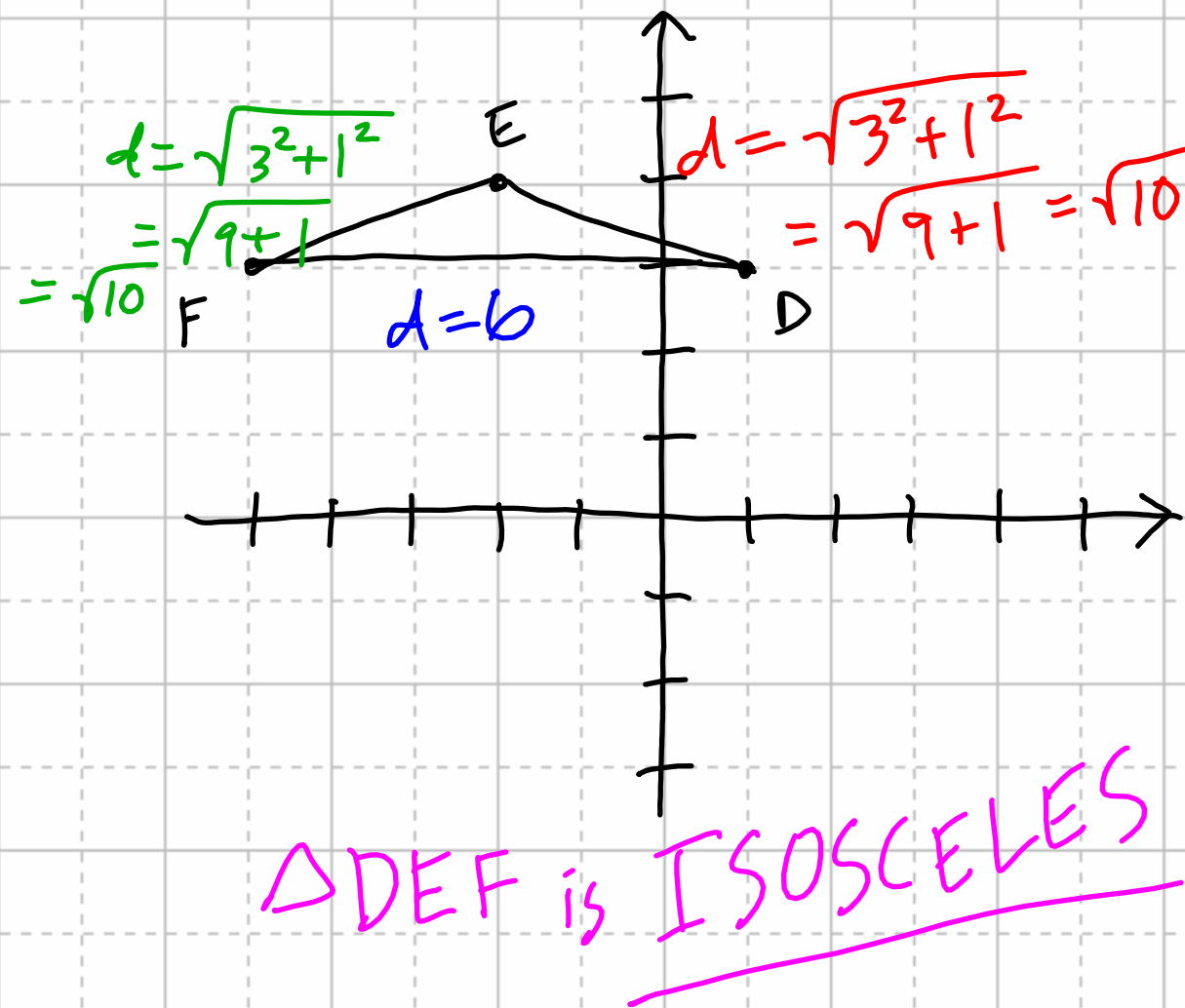
EX → What type of triangle is formed by the following points?

$$A(3,5), B(4,-2), C(-5,5)$$



EX → What type of triangle is formed by the following points?

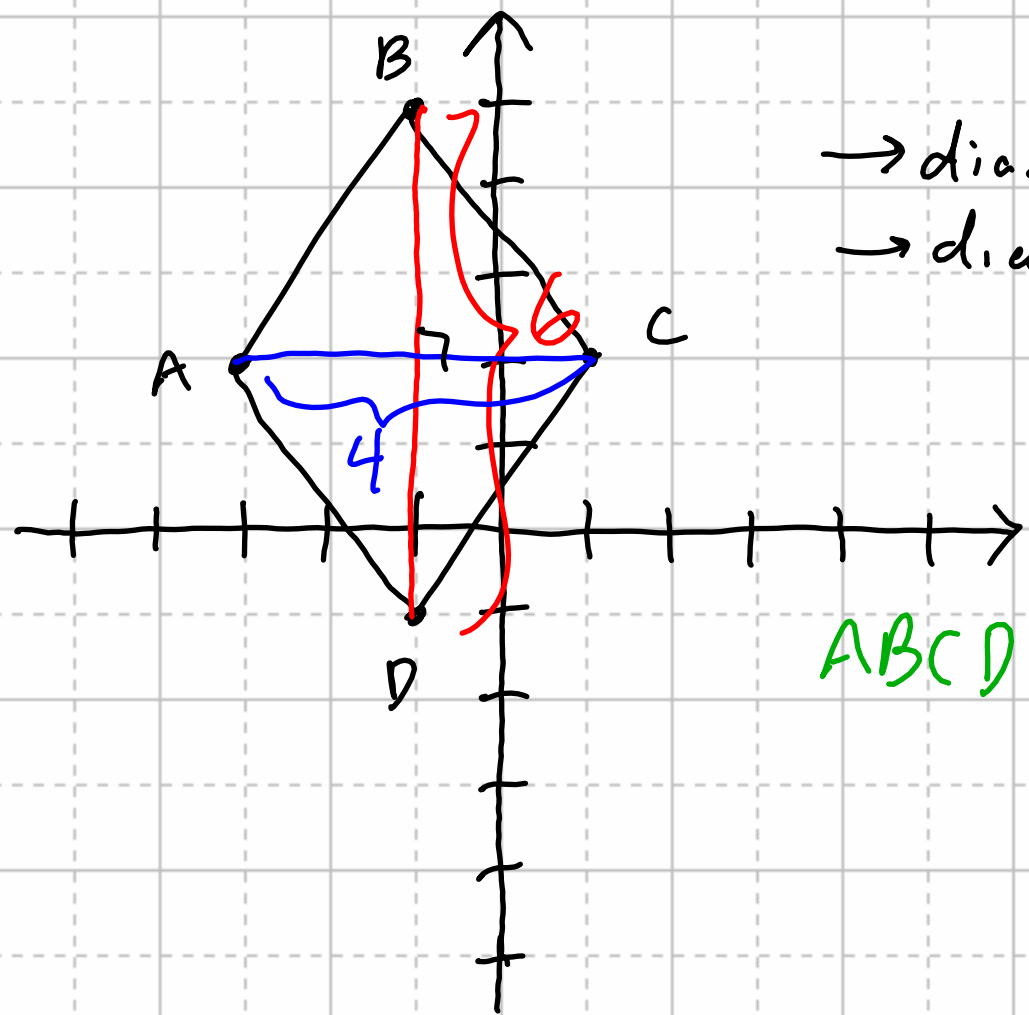
$$D(1,3), E(-2,4), F(-5,3)$$



HW: p. 403 → 5-7, 17-20

EX \Rightarrow What type of quadrilateral is formed by the following coordinates?

$A(-3, 2), B(-1, 5), C(1, 2), D(-1, -1)$



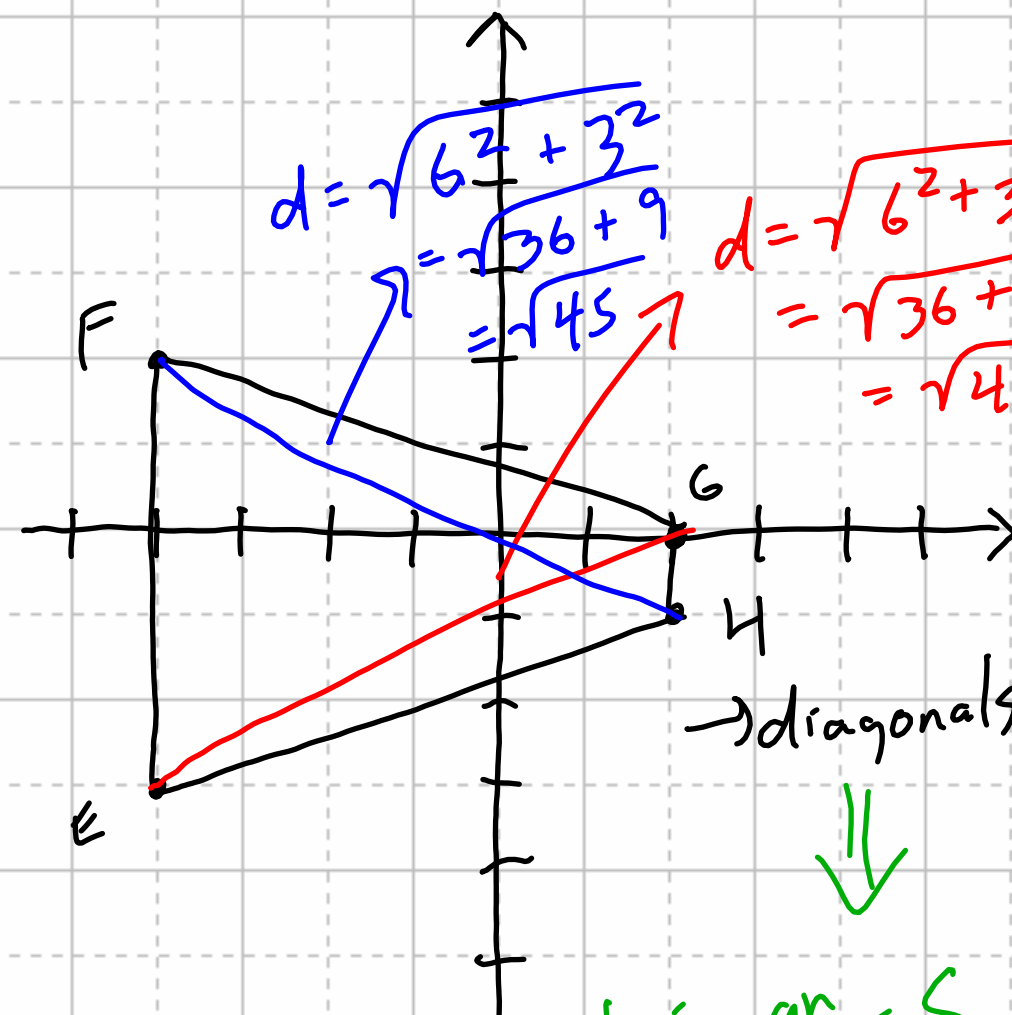
\rightarrow diagonals \neq
 \rightarrow diagonals \perp



ABCD is a RHOMBUS

EX \rightarrow What type of quadrilateral is formed by the following coordinates?

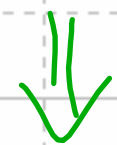
$E(-4, -3), F(-4, 2), G(2, 0), H(2, -1)$



$d = \sqrt{6^2 + 3^2}$
 $= \sqrt{36 + 9}$
 $= \sqrt{45}$

$d = \sqrt{6^2 + 3^2}$
 $= \sqrt{36 + 9}$
 $= \sqrt{45}$

\rightarrow diagonals \cong



EFGH is an ISOSCELES TRAPEZOID

HW: p. 403 → 8-32 mult. 8, 45-47