CLASSIFYING FIGURES ON A COORDINATE GRID

Learning Goal

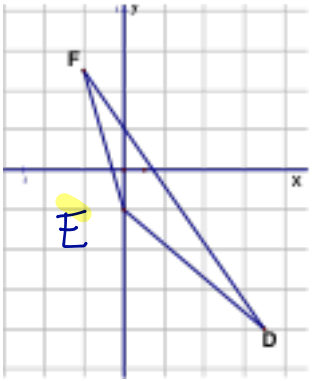
- Use properties of line segments to classify two-dimensional figures.

What type of triangle is it?

- Sketch the triangle.
- Use the **distance between two points formula** to find the lengths of all three sides. If ...
  - All sides are different ⇒ SCALENE
  - Two sides are the same ⇒ ISOSCELES
  - All sides are the same ⇒ EQUILATERAL
- Calculate the **slopes** of all 3 sides. If ...
  - Two sides are perpendicular (the slopes are negative reciprocals) ⇒ RIGHT TRIANGLE

Example 1

- Determine the type of triangle described by the set of vertices D(7, -8), E(0, -2), & F(-2, 5).



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

$= \sqrt{(0-(-2))^2+(-2-5)^2}$

$= \sqrt{2^2+(-7)^2}$

$= \sqrt{4+49}$

$d_{EF} = \sqrt{53}$

$m_{EF} = \frac{y_2-y_1}{x_2-x_1}$

$= -7/2$

$m_{EF} = -3.5$

$d_{FD} = \sqrt{(7-(-2))^2+(-8-5)^2}$

$= \sqrt{9^2+(-13)^2}$

$= \sqrt{81+169}$

$d_{FD} = \sqrt{250}$

$m_{FD} = -13/9 = -1.4$

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

$$= \sqrt{(7-0)^2 + (-8-(-2))^2}$$

$$= \sqrt{7^2 + (-6)^2}$$

$$= \sqrt{49 + 36}$$

$$d_{ED} = \sqrt{85}$$

$$m_{ED} = \frac{-6}{7}$$

$$m_{ED} = -0.86$$

$\therefore$ Scalene Triangle

What type of quadrilateral is it?

- Sketch the quadrilateral.
- Use the **distance between two points formula** to find the length of all four sides. If ...
  - All sides are the same ⇒ SQUARE or RHOMBUS
  - Opposite sides are the same ⇒ RECTANGLE or PARALLELOGRAM
- Calculate the **slopes** of all 4 sides. If ...
  - Two adjacent sides are perpendicular (the slopes are negative reciprocals) ⇒ Square or Rectangle

Example 2

- Determine the type of quadrilateral described by the set of vertices P(-5, 1), Q(3, 3), R(4, -1), & S(-4, -3). Give reasons for your answers.

$d_{SR} = \sqrt{8^2 + 2^2}$

$d_{SR} = \sqrt{68}$

$m_{SR} = 2/8$

$m_{SR} = 1/4$

$d_{PQ} = \sqrt{8^2 + 2^2}$

$= \sqrt{64 + 4}$

$d_{PQ} = \sqrt{68}$

$m_{PQ} = \frac{2}{8}$

$m_{PQ} = 1/4$

$d_{PS} = \sqrt{(1)^2 + (-4)^2}$

$d_{PS} = \sqrt{1 + 16}$

$d_{PS} = \sqrt{17}$

$m_{PS} = -4/1$

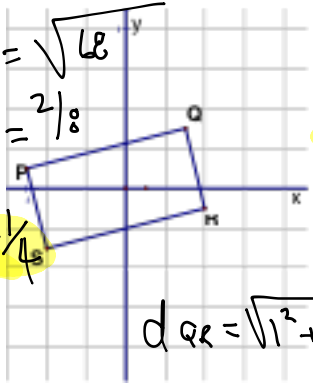
90°

$m_{QR} = -4/1$

$d_{QR} = \sqrt{1^2 + (-4)^2}$

$d_{QR} = \sqrt{17}$

∴ Rectangle opp sides = 4 x 90°



Reinforcement

- Pages 101 – 103
  - #1 – 5, 11