

Brainstorm your answers to the following.

1. Given the coordinates of 3 points, how would you determine:
 - a. what type of triangle you have?
(equilateral, isosceles, or scalene)
 - b. if it is a right triangle?

2. Given the coordinates of 4 points, what is sufficient information to determine if the object is a:
 - a. parallelogram?
 - b. rectangle?
 - c. rhombus?
 - d. square?

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Classifying Geometric Figures

Oct 5/2011

We are going to analyze some geometric theorems.
To do this, we will use the following tools:

- slopes of parallel & perpendicular lines
- distance formula
- midpoint formula

NOTE:

When solving a problem involving a geometric figure, it is a good idea to start by drawing a diagram on a coordinate grid.

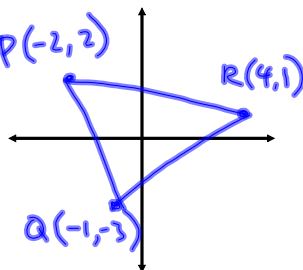
Grid - large

Ex.1. A triangle has vertices at P(-2, 2), Q(-1, -3), and R(4, 1).

a) Show that this is NOT a right triangle.

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

perpendicular
 ↓
 negative reciprocal



$$m_{PQ} = \frac{-3 - 2}{-1 - (-2)} = \frac{-5}{-1} = 5$$

$$m_{QR} = \frac{1 - (-3)}{4 - (-1)} = \frac{4}{5}$$

"since"
 \therefore no negative reciprocals

$$m_{PR} = \frac{1 - 2}{4 - (-2)} = \frac{-1}{6}$$

\therefore not a right triangle
 "therefore"

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Ex.1. A triangle has vertices at P(-2, 2), Q(-1, -3), and R(4, 1).

b) Show that the triangle is scalene.

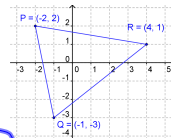
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\begin{aligned}
 d_{PQ} &= \sqrt{(-1 - (-2))^2 + (-3 - 2)^2} \\
 &= \sqrt{(1)^2 + (-5)^2} \\
 &= \sqrt{1 + 25} \\
 &= \sqrt{26}
 \end{aligned}$$

$$\begin{aligned}
 d_{QR} &= \sqrt{(4 - (-1))^2 + (1 - (-3))^2} \\
 &= \sqrt{(5)^2 + (4)^2} \\
 &= \sqrt{25 + 16} \\
 &= \sqrt{41}
 \end{aligned}$$

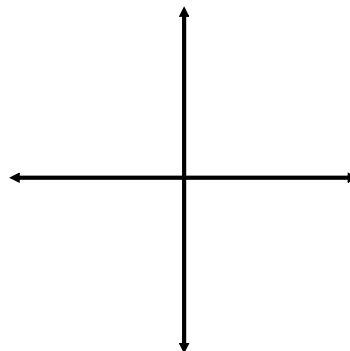
$$\begin{aligned}
 d_{PR} &= \sqrt{(4 - (-2))^2 + (1 - 2)^2} \\
 &= \sqrt{(6)^2 + (-1)^2} \\
 &= \sqrt{36 + 1} \\
 &= \sqrt{37}
 \end{aligned}$$

\therefore it is a scalene triangle



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Ex.2. Determine the type of quadrilateral described by the points $P(-2, -2)$, $Q(0, 4)$, $R(6, 3)$, and $S(8, -1)$.



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Assigned Work:

p.101-103 # 2, 5, 6b, 7, 8, 11, 12, 16d

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