

Advanced Geometry Chapter 6 Review Part 2

Determine if the quadrilateral with the given vertices is a parallelogram, rectangle, rhombus, or square. Give all the names that apply. Show your work.

1. W(-2,2), X(1,5), Y(7,-1), Z(4,-4)

Diagonals are WY and XZ

Midpoint $\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}$

midpoint of WY $(\frac{-2+7}{2}, \frac{2+(-1)}{2})$
 $(\frac{5}{2}, \frac{1}{2})$

Midpoint of XZ $(\frac{1+4}{2}, \frac{5+(-4)}{2})$
 $(\frac{5}{2}, \frac{1}{2})$

midpoints are the same, so diagonals bisect each other
→ WXYZ is pgram

$(-2, 2)(7, -1)$

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

WY = $\sqrt{(7+2)^2 + (-1-2)^2}$

WY = $\sqrt{(9)^2 + (-3)^2}$

WY = $\sqrt{81+9} = \sqrt{90}$

XZ = $\sqrt{(4-1)^2 + (-4-5)^2}$

XZ = $\sqrt{(3)^2 + (-9)^2}$

XZ = $\sqrt{9+81} = \sqrt{90}$

Diagonals are \cong
→ WXYZ is a rectangle

$(1, 5)(4, -4)$

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

WY: $m = \frac{-1-2}{7+2} = \frac{-3}{9} = -\frac{1}{3}$

XZ: $m = \frac{-4-5}{4-1} = \frac{-9}{3} = -3$

Not perpendicular
→ Not rhombus

WXYZ is parallelogram and rectangle

2. M(-4,5), N(1,7), P(3,2), Q(-2,0)

midpoint

MP $(-4, 5)(3, 2)$
 $(\frac{-4+3}{2}, \frac{5+2}{2})$
 $(\frac{-1}{2}, \frac{7}{2})$

NQ $(1, 7)(-2, 0)$
 $(\frac{1+(-2)}{2}, \frac{7+0}{2})$
 $(\frac{-1}{2}, \frac{7}{2})$

Parallelogram

Distance

MP = $\sqrt{(3+4)^2 + (2-5)^2}$

MP = $\sqrt{49+9} = \sqrt{58}$

NQ = $\sqrt{(-2-1)^2 + (0-7)^2}$

NQ = $\sqrt{(-3)^2 + (-7)^2}$

NQ = $\sqrt{9+49} = \sqrt{58}$

Rectangle

Slope

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

$m = \frac{0-7}{-2-1} = \frac{-7}{-3} = \frac{7}{3}$

$\overline{MP} \perp \overline{NQ}$

Rhombus

MNPQ is a parallelogram, rectangle, rhombus, and square.