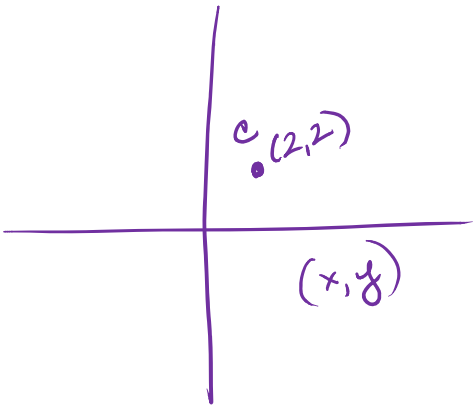
Geo H
Coordinate geometry and quadrilaterals

1. Rectangle COLD has vertices C (2, 2), O (10, 10), L (16, 4), and D (x, y). Solve for x and y.



O (10,10)

L (16,4)

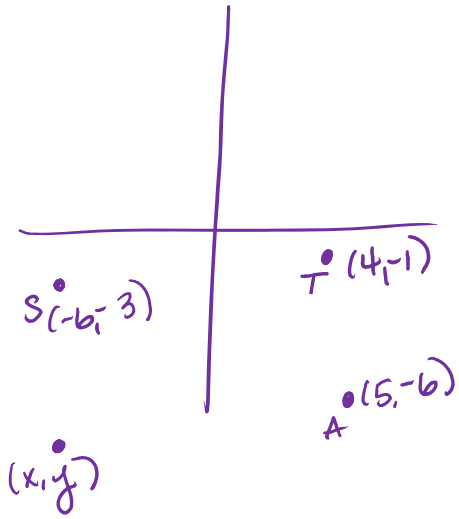
$\frac{y-2}{x-2} = \frac{-6}{6} = -1$ $\quad y-2 = -x+2$ $\quad x+y=4$

$\frac{y-4}{x-16} = \frac{8}{8} = 1$ $\quad y-4 = x-16$ $\quad 12 = x-y$

$2x = 16$
$x = 8$ $\quad y = -4$

$(8, -4)$

2. Rectangle STAR has vertices S(-6, -3), T(4, -1), A(5, -6), R(x, y). Solve for x and y.



$\frac{y+6}{x-5} = \frac{2}{10}$ $\quad 2x-10 = 10y+60$ $\quad 2x-10y = 70$

$\frac{y+3}{x+6} = \frac{-5}{1}$ $\quad y+3 = -5x-30$ $\quad 5x+y = -33$

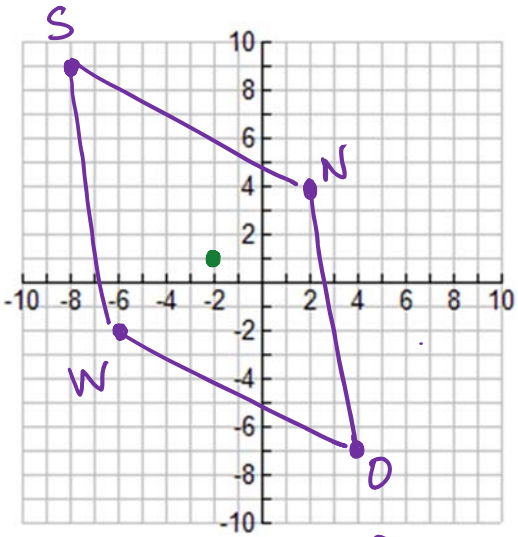
$50x+10y = -330$

$52x = -260$
$x = -5$ $\quad y = -8$

$(-5, -8)$

3. What is the most specific name for a quadrilateral with vertices (-8, 9), (4, -7), (2, 4), and (-6, -2)? Please justify your argument with algebra.

S O N W



$m_{\overline{SN}} = \frac{4-9}{2-8} = \frac{-5}{10} = \frac{-1}{2}$

$m_{\overline{WO}} = \frac{-2+7}{-6-4} = \frac{5}{-10} = \frac{-1}{2}$

$m_{\overline{NO}} = \frac{4--7}{2-4} = \frac{11}{-2}$

$m_{\overline{SW}} = \frac{9--2}{-8+6} = \frac{11}{-2}$

- Not ⊥ sides
- opp sides ||
- diagonals ⊥
- diagonals bisect

$m_{\overline{SO}} = \frac{9+7}{-8-4} = \frac{16}{-12} = \frac{-4}{3}$

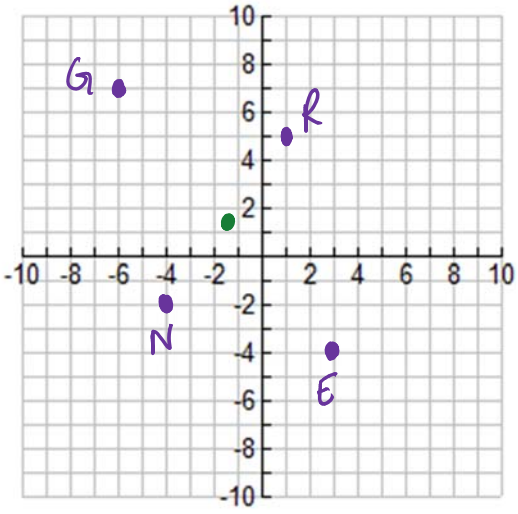
$m_{\overline{WN}} = \frac{-2-4}{-6-2} = \frac{-6}{-8} = \frac{3}{4}$

$\text{midpt}_{\overline{WN}} = (-2, 1)$ $\text{midpt}_{\overline{SO}} = (-2, 1)$

Rhombus!

4. What is the most specific name for the quadrilateral with vertices (-6,7), (1,5), (3,-4), and (-4, -2)? Please justify your argument with algebra.

G R E N



$m_{\overline{GR}} = \frac{5-7}{1--6} = \frac{2}{7}$

$m_{\overline{NE}} = \frac{-2-4}{-4-3} = \frac{2}{-7}$

$m_{\overline{RE}} = \frac{-4-5}{3-1} = \frac{-9}{2}$

$m_{\overline{GN}} = \frac{-2-7}{-4--6} = \frac{-9}{2}$

$m_{\overline{GE}} = \frac{-4-7}{3+6} = \frac{-11}{9}$

$m_{\overline{NR}} = \frac{-2-5}{-4-1} = \frac{+7}{+5}$

$\text{midpt } \overline{GE} = (-3/2, 3/2)$

$\text{midpt } \overline{NR} = (-3/2, 3/2)$

parallelogram
diagonals bisect
opp sides ||