

Slope and Parallel Lines

Practice and Problem Solving: A/B

For Problems 2-6, Figure JKLM has as its vertices the points $J(4, 4)$, $K(2, 1)$, $L(-3, 2)$, and $M(-1, 5)$.

Find the slope of each side of JKLM.

2. \overline{JK}

$$\frac{4-1}{4-2} = \frac{3}{2}$$

3. \overline{KL}

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

4. \overline{LM}

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

5. \overline{MJ}

$$\frac{5-4}{-1-4} = -\frac{1}{5}$$

6. Is JKLM a parallelogram? Explain your reasoning.

yes, opposites sides have same slope, so they are parallel

Write the equation of the line that is parallel to the graph of the given equation and that passes through the given point.

11. $y = -6x + 4$; $(-2, 3)$

slope = -6

$$y - 3 = -6(x + 2)$$

12. $y = x$; $(7, -2)$

slope = 1

$$y + 2 = 1(x - 7)$$

13. Write an equation of the line passing through point $P(-1, -4)$ that is parallel to $y = -6x + 8$.

$$y + 4 = -6(x + 1)$$

slope = -6

14. Write an equation of the line passing through point $P(-1, 3)$ that is perpendicular to

$y = 4x - 7$.

$$y - 3 = -\frac{1}{4}(x + 1)$$

slope = $-\frac{1}{4}$

15. Quadrilateral ABCD has vertices $A(-1, 5)$, $B(4, 0)$, $C(1, -5)$, and $D(-5, 1)$. Calculate the slopes of the sides, and then use your results to explain whether ABCD is or is not a parallelogram.

$$\text{slope } AB = \frac{0-5}{4-(-1)} = -\frac{5}{5} = -1$$

$$\text{slope } CD = \frac{-5-1}{1-(-5)} = -\frac{6}{6} = -1$$

$$\text{slope } BC = \frac{-5-0}{1-4} = -\frac{5}{-3} = \frac{5}{3}$$

$$\text{slope } AD = \frac{5-1}{-1-(-5)} = \frac{4}{4} = 1$$

not a parallelogram

not parallel

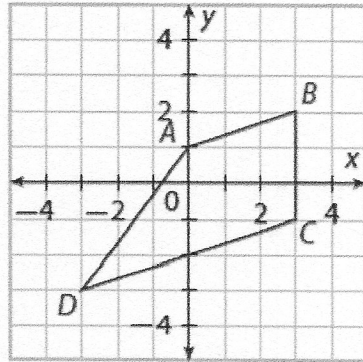
Show that each figure is the given type of quadrilateral.

2. Show that ABCD is a trapezoid.

$$\text{slope } AB = \frac{1}{3}$$

$$\text{slope } DC = \frac{2}{6} = \frac{1}{3}$$

parallel sides, so trap.

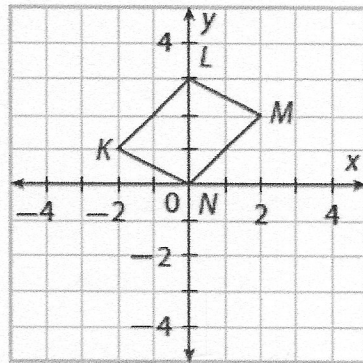


3. Show that KLMN is a parallelogram.

$$\text{slope } KL = \frac{2}{2} = 1 \quad \text{slope } LM = -\frac{1}{2}$$

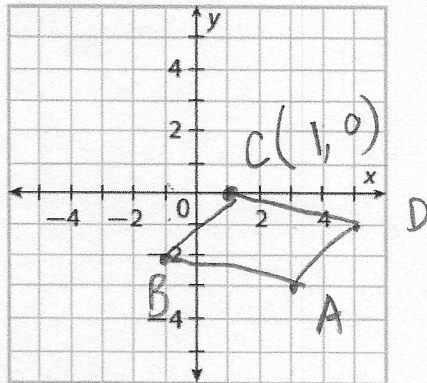
$$\text{slope } NM = \frac{2}{2} = 1 \quad \text{slope } KN = -\frac{1}{2}$$

both parallel, so parallelogram

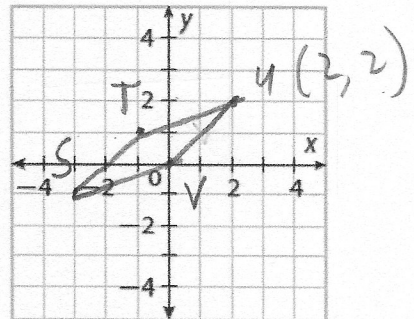


Find the coordinates of the missing vertex in each parallelogram. Use slopes to check your answer.

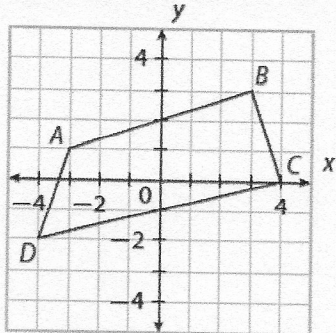
4. $\square ABCD$ with vertices $A(3, -3)$, $B(-1, -2)$, and $D(5, -1)$



5. $\square STUV$ with vertices $S(-3, -1)$, $T(-1, 1)$ and $V(0, 0)$



6. Show that quadrilateral $ABCD$ is *not* a trapezoid.

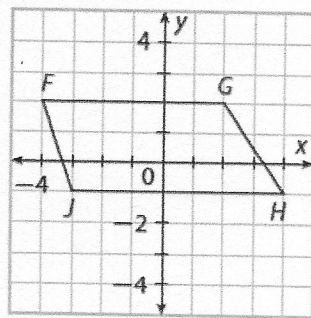


$$\text{slope } AB = \frac{2}{6} = \frac{1}{3}$$

$$\text{slope } DC = \frac{2}{8} = \frac{1}{4}$$

not parallel, so
not a trap.

7. Show that quadrilateral $FGHJ$ is a trapezoid, but is not a parallelogram.



$$\text{slope } FG = 0$$

$$\text{slope } FJ = \frac{-3}{1} = -3$$

$$\text{slope } JH = 0$$

$$\text{slope } GH = \frac{-3}{2}$$

↓
parallel

↓
not parallel

only 1 pair of parallel
sides, so trap.