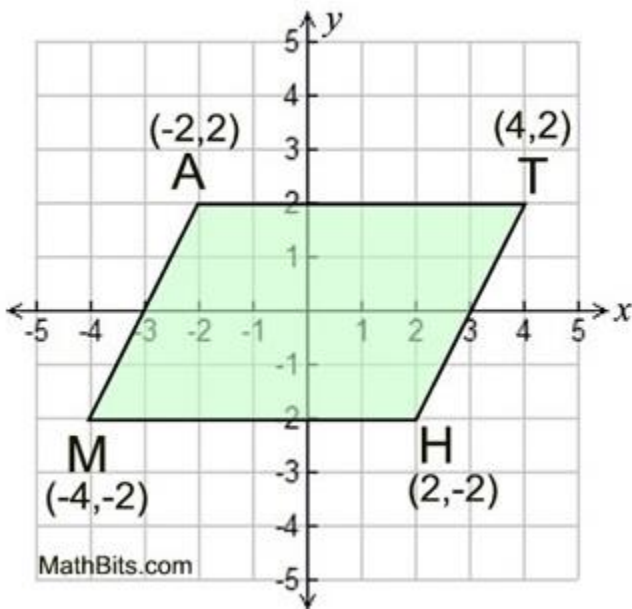


Do Now!

List the 5 properties of a parallelogram:

-
-
-
-
-

Great! Now that we remember the 5 **unique** properties of a parallelogram, let's examine some qualities of a parallelogram on the **coordinate plane**:



1. What is the **slope** of:

- AT?
- MH?
- AM?
- TH?

2. What is the **distance** between:

- AT?
- MH?
- AM?
- TH?

3. What is the **midpoint** of:

- MT?
- AH?

Proving a Quadrilateral is a Parallelogram on the Coordinate Plane

Method 1:

Show both pairs of opposite sides are parallel by showing they have equal _____.

Method 2:

Show both pairs of opposite sides are congruent by using the _____.

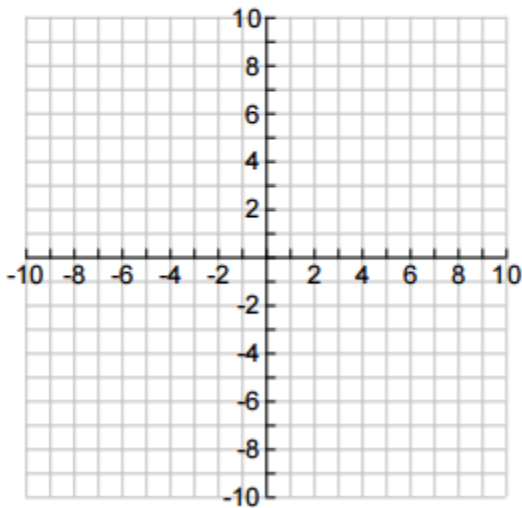
Method 3:

Show one pair of sides is both _____ and _____.

Method 4:

Show that the diagonals bisect each other by showing the _____ of the diagonals are the same.

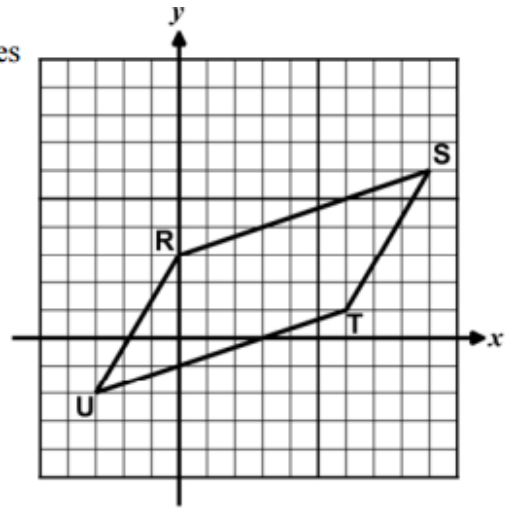
1. Prove that the quadrilateral with the coordinates $L(-2,3)$, $M(4,3)$, $N(2,-2)$ and $O(-4,-2)$ is a parallelogram.



Now you try! You can choose any method that you would like.

Exercise #2: On the diagram, quadrilateral $RSTU$ is shown with vertices $R(0, 3)$, $S(9, 6)$, $T(6, 1)$ and $U(-3, -2)$.

(a) Prove that $RSTU$ is a parallelogram using coordinate geometry.

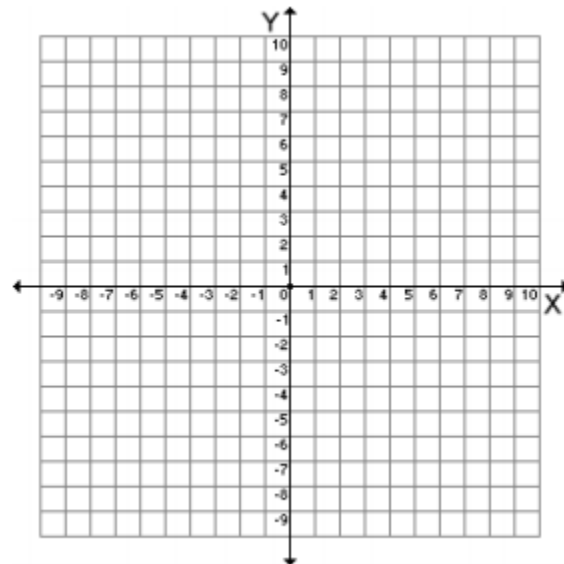


(b) Show that $\overline{RU} \cong \overline{ST}$ using coordinate geometry.

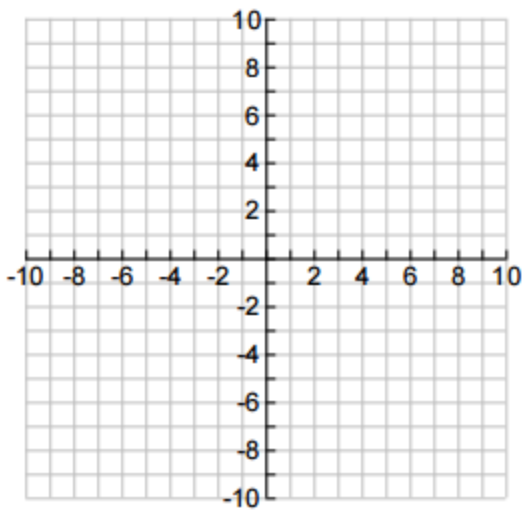
Homework!

1.

The vertices of quadrilateral $JOHN$ are $J(-3, 1)$, $O(3, 3)$, $H(5, 7)$, and $N(-1, 5)$. Use coordinate geometry to prove that quadrilateral $JOHN$ is a parallelogram.



2. Prove that the quadrilateral with the coordinates $P(1,1)$, $Q(2,4)$, $R(5,6)$ and $S(4,3)$ is a parallelogram.



3.

Parallelogram $ABCD$ has coordinates of $A(7, 1)$, $B(-2, -3)$, and $C(0, 3)$. What must be the coordinates of point D ? Explain how you found your answer.

