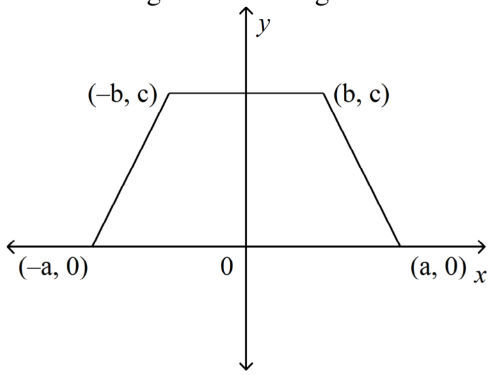
Name: ________________________ Class: ___________________ Date: __________ ID: A

# Coordinate Proofs

1. Find the lengths of the diagonals of this trapezoid.




2. In the coordinate plane, draw a square with sides $4q$ units long. Give coordinates for each vertex, and the coordinates of the point of intersection of the diagonals.

3. Prove using coordinate geometry: The midpoints of the sides of a rhombus determine a rectangle.

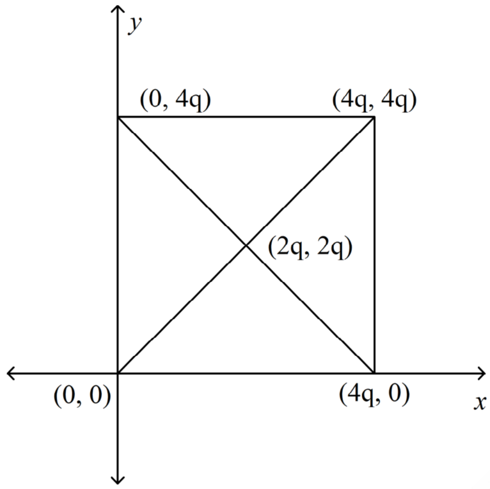
4. Prove using coordinate geometry: If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

5. Write a coordinate proof of the following theorem:
   If a parallelogram is a rectangle, then its diagonals are congruent.

6. If you want to prove that the diagonals of a parallelogram bisect each other using coordinate geometry, how would you place the parallelogram on the coordinate plane? Give the coordinates of the vertices for the placement you choose.

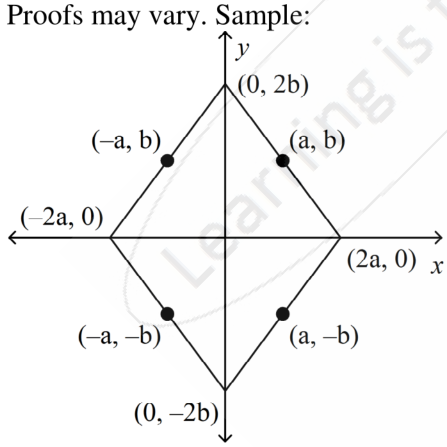
**Coordinate Proofs**
**Answer Section**

1. Each diagonal has length $\sqrt{(a+b)^2+c^2}$.




2.
3.

[4] Proofs may vary. Sample:

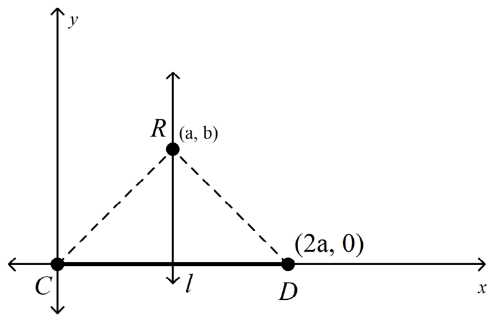



For rhombus in the coordinate plane, as shown, the quadrilateral determined by the midpoints ($a$, $b$), ($-a$, $b$), ($a$, $-b$), and ($-a$, $-b$) has one pair of opposite sides vertical (no slope) and the other pair horizontal (slope 0), so the quadrilateral is a parallelogram with perpendicular sides, or a rectangle.

[3] shows good setup and idea for proof, but has some small inaccuracies
[2] shows reasonable setup and idea for proof, but has significant math difficulties
[1] shows reasonable setup for proof

4.

[4] Proofs may vary. Sample:




Given: Line *l* is the perpendicular bisector of $\overline{CD}$.
Prove: Point *R*(*a*, *b*) is equidistant from points *C* and *D*.

By the Distance Formula,
$CR = \sqrt{(a-0)^2 + (b-0)^2} = \sqrt{a^2 + b^2}$

$DR = \sqrt{(a-2a)^2 + (b-0)^2} = \sqrt{a^2 + b^2}$

Because $CR = DR$, point *R* on the perpendicular bisector of the segment is equidistant from the endpoints of the segment.

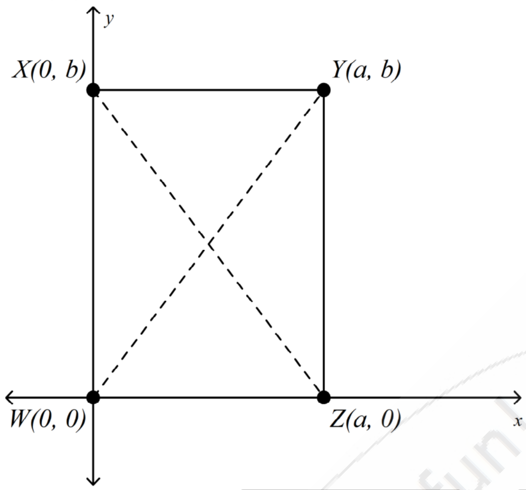
[3] shows good setup and idea for proof, but has some small inaccuracies

[2] shows reasonable setup and idea for proof, but has significant math difficulties

[1] shows reasonable setup for proof

5.
[4] Proofs may vary. Sample:

Answers may vary. Sample:
Given: $\overline{WY}$ and $\overline{XZ}$ are diagonals of rectangle *WXYZ*.
Prove: $\overline{WY} \cong \overline{XZ}$




Distance of $\overline{XZ} = \sqrt{(a-0)^2+(0-b)^2} = \sqrt{a^2+b^2}$

$\overline{WY} = \sqrt{(a-0)^2+(b-0)^2} = \sqrt{a^2+b^2}$

By the definition of congruency, diagonals $\overline{XZ}$ and $\overline{WY}$ of rectangle *WXYZ* are congruent.

[3] shows good setup and idea for proof, but has some small inaccuracies
[2] shows reasonable setup and idea for proof, but has significant math difficulties
[1] shows reasonable setup for proof

6. Answers may vary. Sample: