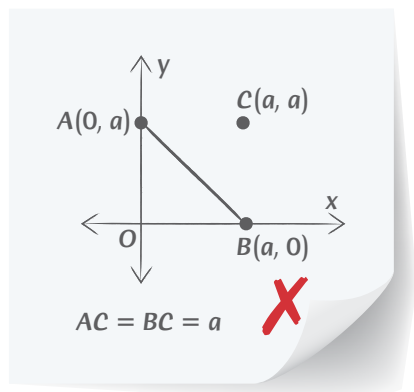


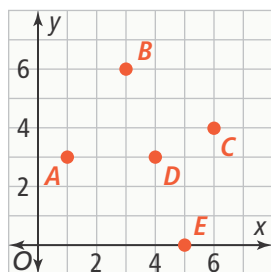


UNDERSTAND

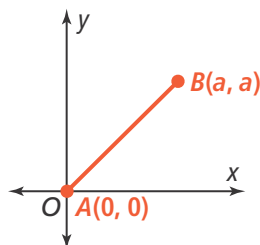
13. **Communicate Precisely** What coordinates would you use to describe an equilateral triangle in the coordinate plane? Explain.
14. **Error Analysis** Tonya drew a diagram to prove the Perpendicular Bisector Theorem using coordinate geometry. What coordinates should she use for point C ?



For Exercises 15 and 16, use the graph.



15. **Make Sense and Persevere** How would you plan a proof to show that $\triangle ABC$ is a right triangle?
16. **Make Sense and Persevere** Describe how you would prove points B , D , and E are collinear.
17. **Mathematical Connections** What is the equation of the line containing the perpendicular bisector of $\overline{AB}$?



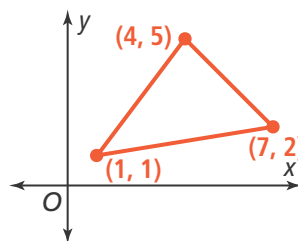
PRACTICE

For Exercises 18–21, write a plan for a coordinate proof. SEE EXAMPLE 1

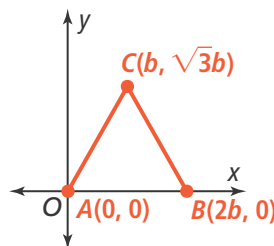
18. The diagonals of a parallelogram that is not a rectangle are not congruent.
19. The length of a diameter of a circle is twice that of its radius.
20. The diagonals of a parallelogram bisect each other.
21. The area of $\triangle XYZ$ is twice the area of $\triangle XWZ$, where W is the midpoint of $\overline{YZ}$.

For Exercises 22–25, plan and write a coordinate proof. SEE EXAMPLES 2 AND 3

22. The length of a diagonal of a rectangle is the square root of the sum of the squares of the lengths of two adjacent sides.
23. All right triangles with one acute angle measuring 30° are similar.
24. One and only one diagonal of a kite bisects the other.
25. The length of the median to the hypotenuse of a right triangle is half the length of the hypotenuse.
26. Find the centroid of the triangle by finding the point two thirds of the distance from the vertex on one median. SEE EXAMPLE 4

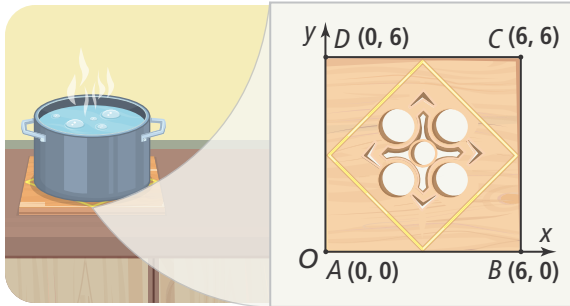


27. Show that the centroid and circumcenter of an equilateral triangle are the same point.

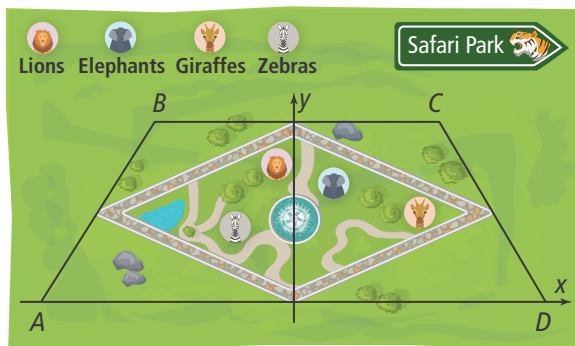


APPLY

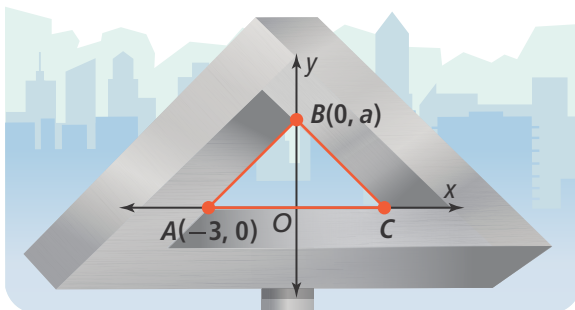
28. **Model With Mathematics** Each student in a woodworking class inlays brass wire along the lines connecting the midpoints of adjacent sides of a trivet. A trivet is six inches square. If the wire costs \$0.54 per inch, what is the cost of the wire for making 12 trivets?



29. **Make Sense and Persevere** The owner of an animal park wants a quadrilateral trail that connects the four sides of the isosceles trapezoid-shaped park, with all sides of the trail the same length. Deon says that if the trail connects the midpoint of each side to the midpoints of the adjacent sides, the trail will be a rhombus. Write a coordinate proof to show that Deon is correct.



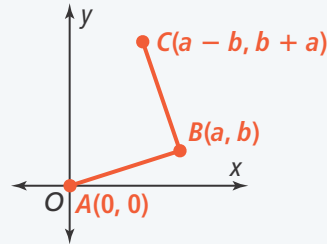
30. **Higher Order Thinking** The front of a sculpture is symmetric about the y -axis. Point A is located at $(-3, 0)$, and $\overline{AC}$ is the longest side of $\triangle ABC$. The perimeter of $\triangle ABC$ is 16. What is the value of a ?



ASSESSMENT PRACTICE

31. A coordinate proof requires a ? and then uses ? on the ? of the points in the diagram to complete the proof.

32. **SAT/ACT** Which statements are true?



I. $AB = BC$

II. $\overline{AB} \perp \overline{BC}$

III. $AC = 2a^2 + 2b^2$

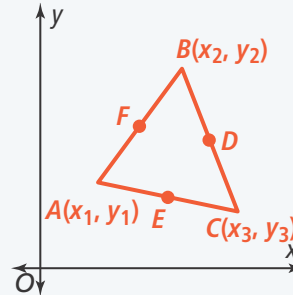
Ⓐ I only

Ⓒ I and II only

Ⓑ II only

Ⓓ I, II, and III

33. **Performance Task** Consider $\triangle ABC$ on the coordinate plane. Points D , E , and F are the midpoints of the sides.



Part A What are the coordinates of D , E , and F ?

Part B Prove that the coordinates of the point of concurrency of the medians is the average of the x and y coordinates of the vertices.

$$\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

Hint: Apply the Concurrency of Medians Theorem and find the point $\frac{2}{3}$ of the way from A to D .

Part C Explain why it does not make sense to place one of the coordinates at the origin for this proof.