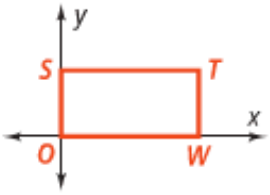
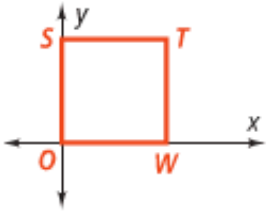
Algebra What are the coordinates of the vertices of each figure? See Problem 1.

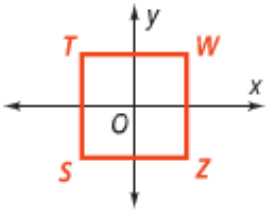
7. rectangle with base b and height h



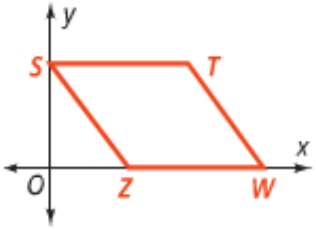
8. square with sides of length a



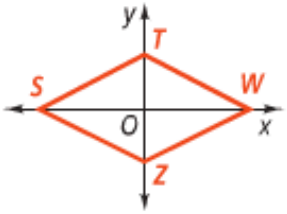
9. square centered at the origin, with side length b



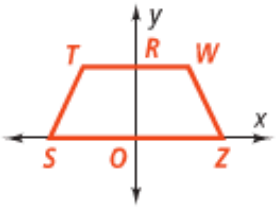
10. parallelogram where S is a units from the origin and Z is b units from the origin



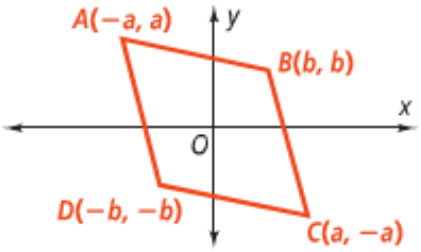
11. rhombus centered at the origin, with $SW = 2r$ and $TZ = 2t$



12. isosceles trapezoid with base centered at the origin, with base $2a$ and $OR = c$



13. The diagram below shows a parallelogram. Without using the Distance Formula, determine whether the parallelogram is a rhombus. How do you know? See Problem 2.



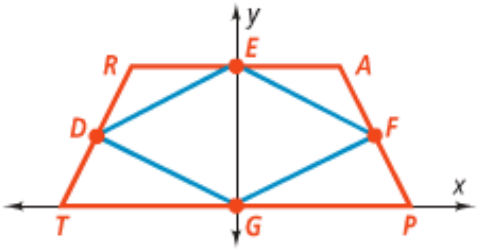
14. Plan a coordinate proof to show that the midpoints of the sides of an isosceles trapezoid form a rhombus. See Problem 3.

a. Name the coordinates of isosceles trapezoid $TRAP$ at the right, with bottom base length $4a$, top base length $4b$, and $EG = 2c$. The y-axis bisects the bases.

b. Write the *Given* and *Prove* statements.

c. How will you find the coordinates of the midpoints of each side?

d. How will you determine whether $DEFG$ is a rhombus?

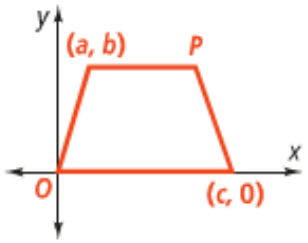


15. Open-Ended Place a general quadrilateral in the coordinate plane.

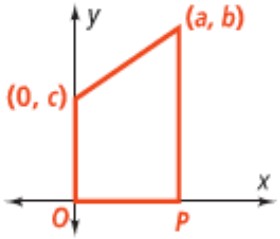
16. Reasoning A rectangle $LMNP$ is centered at the origin with $M(r, -s)$. What are the coordinates of P?

Give the coordinates for point P without using any new variables.

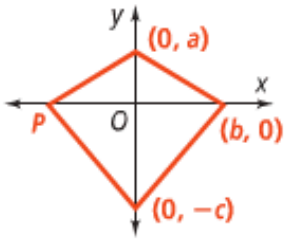
17. isosceles trapezoid



18. trapezoid with a right ∠



19. kite

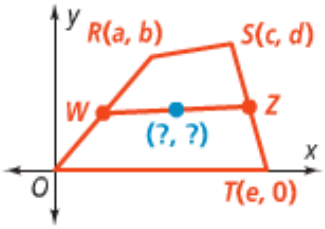


20. **a.** Draw a square whose diagonals of length $2b$ lie on the x- and y-axes.
b. Give the coordinates of the vertices of the square.
c. Compute the length of a side of the square.
d. Find the slopes of two adjacent sides of the square.
e. **Writing** Do the slopes show that the sides are perpendicular? Explain.

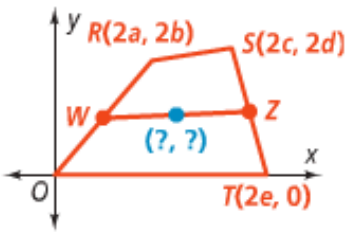
21. Make two drawings of an isosceles triangle with base length $2b$ and height $2c$.
a. In one drawing, place the base on the x-axis with a vertex at the origin.
b. In the second, place the base on the x-axis with its midpoint at the origin.
c. Find the lengths of the legs of the triangle as placed in part (a).
d. Find the lengths of the legs of the triangle as placed in part (b).
e. How do the results of parts (c) and (d) compare?

22. W and Z are the midpoints of $\overline{OR}$ and $\overline{ST}$, respectively. In parts (a)–(c), find the coordinates of W and Z.

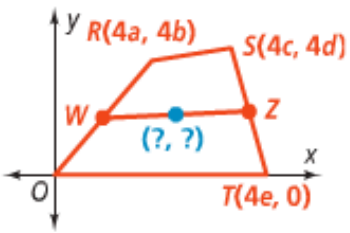
a.



b.



c.



d. You are to plan a coordinate proof involving the midpoint of $\overline{WZ}$. Which of the figures (a)–(c) would you prefer to use? Explain.