

Parents as Partners*For use with Chapter 9*

Chapter Overview One way you can help your student succeed in Chapter 9 is by discussing the lesson goals in the chart below. When a lesson is completed, ask your student the following questions. “What were the goals of the lesson? What new words and formulas did you learn? How can you apply the ideas of the lesson to your life?”

Lesson Title	Lesson Goals	Key Applications
9.1: Apply the Distance and Midpoint Formulas	Find the length and midpoint of a line segment.	<ul style="list-style-type: none"> • Asteroid Crater • Robots • Helicopter Rescue
9.2: Graph and Write Equations of Parabolas	Graph and write equations of parabolas that open left or right.	<ul style="list-style-type: none"> • Solar Energy • Biology • Radio Telescopes
9.3: Graph and Write Equations of Circles	Graph and write equations of circles.	<ul style="list-style-type: none"> • Cell Phones • Bats • Groundskeeping
9.4: Graph and Write Equations of Ellipses	Graph and write equations of ellipses.	<ul style="list-style-type: none"> • Lightning • Mars • Health Care
9.5: Graph and Write Equations of Hyperbolas	Graph and write equations of hyperbolas.	<ul style="list-style-type: none"> • Photography • Telescopes • Architecture
9.6: Translate and Classify Conic Sections	Translate conic sections.	<ul style="list-style-type: none"> • Physical Science • Ice Skating • Spacecraft
9.7: Solve Quadratic Systems	Solve quadratic systems.	<ul style="list-style-type: none"> • Navigation • Traffic Safety • Seismograph

Big Ideas for Chapter 9

In Chapter 9, you will apply the big ideas listed in the Chapter Opener (see page 613) and reviewed in the Chapter Summary (see page 668).

1. Writing equations of conic sections
2. Graphing equations of conic sections
3. Solving quadratic systems

Key Ideas Your student can demonstrate understanding of key concepts by working through the following exercises with you.

Lesson	Exercise
9.1	Find the distance between the two points $(-7, -2)$ and $(1, 2)$. Then find the midpoint of the line segment joining the two points, and the equation of the perpendicular bisector of the line segment joining the points.
9.2	Write the standard form of the equation of the parabola with the given focus and vertex at $(0, 0)$. (a) $(1, -3)$ (b) $(0, \frac{5}{2})$
9.3	Write the standard form of the equation of the circle with center at the origin that passes through the point $(-1, -2)$. Then write an equation of the line tangent to the circle at $(-1, -2)$.
9.4	Write the equation of the ellipse with the given characteristics and center at $(0, 0)$. (a) Vertex: $(-6, 0)$, Co-vertex: $(0, -4)$ (b) Vertex: $(11, 0)$, Focus: $(9, 0)$
9.5	Write an equation of the hyperbola with foci at $(0, -8)$ and $(0, 8)$ and co-vertices at $(0, -6)$ and $(0, 6)$.
9.6	Write an equation of the ellipse with foci at $(2, 3)$ and $(12, 3)$ and co-vertices at $(7, 6)$ and $(7, 0)$.
9.7	Solve the system using substitution: $y = -x + 6$; $(x - 2)^2 + (y - 2)^2 = 4$

Home Involvement Activity

Directions Tape graph paper to a piece of cardboard. On the graph paper draw an x -axis and a y -axis. Place two straight pins on the y -axis an equal distance from the origin. Cut a length of string longer than the distance between the pins and tie the ends to the pins. Now use the string as a guide to draw an ellipse. Write an equation for the resulting ellipse. Move the two pins closer together. Write an equation for the new ellipse. How does moving the foci change the shape of the ellipse? What will happen as the foci become closer?

Activity Sample Answer: Shortening the distance between the foci will result in a more rounded ellipse. As the foci approach each other, the ellipse will eventually approach a circle.

$$9.1: 2\sqrt{10}; (-3, 0); y = -2x - 6 \quad 9.2: (a) y^2 = -12x \quad (b) x^2 = 10y$$

$$9.3: x^2 + y^2 = 5; y = -\frac{2}{5}x - \frac{1}{5} \quad 9.4: (a) \frac{36}{x^2} + \frac{16}{y^2} = 1 \quad (b) \frac{121}{x^2} + \frac{40}{y^2} = 1$$

$$9.5: \frac{36}{x^2} - \frac{28}{y^2} = 1 \quad 9.6: \frac{34}{(x-7)^2} + \frac{9}{(y-3)^2} = 1 \quad 9.7: (4, 2), (2, 4)$$