

Parent Guide for Student Success

For use with Chapter 14

Chapter Overview One way that you can help your student succeed in Chapter 14 is by discussing the lesson goals in the chart below. When a lesson is completed, ask your student to interpret the lesson goals for you and to explain how the mathematics of the lesson relates to one of the key applications listed in the chart.

<i>Lesson Title</i>	<i>Lesson Goals</i>	<i>Key Applications</i>
14.1: Graphing Sine, Cosine, and Tangent Functions	Graph sine, cosine, and tangent functions.	<ul style="list-style-type: none"> • Music • Boating • Spring Motion
14.2: Translations and Reflections of Trigonometric Graphs	Graph translations and reflections of sine, cosine, and tangent graphs.	<ul style="list-style-type: none"> • Ferris Wheel • Blood Pressure • Animal Populations
14.3: Verifying Trigonometric Identities	Use trigonometric identities to simplify trigonometric expressions, to verify other identities, and to solve real-life problems.	<ul style="list-style-type: none"> • Physical Fitness • Shadow of a Sundial • Carousel
14.4: Solving Trigonometric Equations	Solve a trigonometric equation, including real-life equations.	<ul style="list-style-type: none"> • Meteorology • Ocean Tides • Position of the Sun
14.5: Modeling with Trigonometric Functions	Model data with a sine or cosine function. Use technology to write a trigonometric model.	<ul style="list-style-type: none"> • Temperature • Steamships • Sewing Machines
14.6: Using Sum and Difference Formulas	Evaluate trigonometric functions of the sum or difference of two angles. Use sum and difference formulas to solve real-life problems.	<ul style="list-style-type: none"> • Automotive Engineering • Sound Waves • Aerial Photography
14.7: Using Double- and Half-Angle Formulas	Evaluate expressions using double- and half-angle formulas. Use double- and half-angle formulas to solve real-life problems.	<ul style="list-style-type: none"> • Sports • Inca Dwelling • Optics

Study Strategy

Multiple Methods is the study strategy featured in Chapter 14 (see page 830). Encourage your student to consider a variety of methods when solving a problem or checking a solution. This can build understanding and help to catch errors. Two important methods in Algebra 2 are graphing and solving an equation.

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

Lesson	Exercise
14.1	Find the amplitude and period of the graph of the function $y = -4 \sin 6\pi x$.
14.2	You are riding a Ferris wheel. Your height h (in feet) above the ground at any time t (in seconds) can be modeled by the following equation: $h = 35 \sin\left(\frac{\pi}{16}t - \frac{\pi}{2}\right) + 40$. Find your height after 8 seconds and find your maximum and minimum height over a period of 144 seconds.
14.3	Simplify the expression $\frac{\tan x}{\cos\left(\frac{\pi}{2} - x\right)}$.
14.4	Find the general solution of the equation $2 \cos x - \sqrt{2} = 0$.
14.5	In Camden, North Carolina, around 1895, windmills were used to mill the corn used for bread. The windmills were about 40 ft high with wind sails (blades) about 20 ft in length. Suppose enough wind was present to make the blades turn 5 revolutions per minute and that the blades cleared the ground by about 3 ft. Model the movement of the tip of one blade with a trigonometric function of the form $y = a \sin bt$ where $t =$ time in seconds. Assume that the blade points straight down to begin with.
14.6	Find the exact value of $\sin 105^\circ$.
14.7	Simplify $\frac{\tan \frac{\theta}{2} - \tan \frac{\theta}{2} \cos^2 \theta}{\sin \theta}$.

Home Involvement Activity

You Will Need: bicycle, yardstick, watch with a second hand

Directions: Time how long it takes your student to ride a bicycle through 5 cycles. Define the start of a cycle as when the right pedal is at its highest position and the left pedal is at its lowest position. Define the end of a cycle as when the pedals return to the same positions. Divide the total time by 5 to find the average time per cycle. Measure the height of a pedal in the highest position and in the lowest position. Use the data to write a function of the form $y = a \cos bx$ for the height of the right pedal over time. Graph the function. At what times are the pedals at the same height?

14.1: $4, \frac{3}{1}$ 14.2: 40 ft; 75 ft, 5 ft 14.3: $\sec x$ 14.4: $x = \frac{4}{\pi} + 2n\pi$ and $x = \frac{4}{7\pi} + 2n\pi$, where n is an integer 14.5: $y = 20 \sin \frac{6}{\pi}t + 23$ 14.6: $\frac{4}{\sqrt{6} + \sqrt{2}}$ 14.7: $1 - \cos \theta$

Answers