# **Algebra 2 Unit Test Guide**

## Trigonometry Unit Test

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| **Item** | **Lesson Coverage** | **Objective** | **Mathematical Practice Standard** | **Lesson Page** | **Assessment Item** |
| 1 | Lesson 2: The Unit Circle | In this section, you will establish the unit circle as centered at the origin with radius of one and equation x2 + y2 = 1. | Make sense of problems and persevere in solving them. | p. 2-5 | A right triangle has vertices at the origin, on the unit circle, and on the *x*-axis inside the unit circle. What is the hypotenuse of the triangle?The radius is \_\_\_\_\_.**Answer: 1** |
| 2 | Lesson 2: The Unit Circle | In this section, you will use special triangles to show that any point (x,y) on the unit circle satisfies the equation of the unit circle. | Construct viable arguments and critique the reasoning of others. | p. 7-13 | A special right triangle drawn in Quadrant I intersects the unit circle at point (𝑥,𝑦) where $y=\frac{\sqrt{2}}{2}$. What is the value of x in point (𝑥,𝑦)? Use the equation of the unit circle to determine the missing coordinate.**Answer:** $\frac{\sqrt{2}}{2}$ |
| 3 | Lesson 3: The Sine Function | In this section, you will use the unit circle to establish sine as a function of the angle (θ) of rotation of a ray formed by the positive *x*-axis. | Make sense of problems and persevere in solving them. | p. 2-6 | Using the unit circle, calculate the value of sin240°.**Answer:** $- \frac{\sqrt{3}}{2}$ |
| 4 | Lesson 3: The Sine Function | In this section, you will use special triangles on the unit circle to determine the values of the sine function for 30, 45, 60, and 90 degrees. | Reason abstractly and quantitatively. | p. 8-13 | Use the image to answer the question.What is 𝜃 in radians when sinθ=$\frac{\sqrt{2}}{2}$?**Answer:** $\frac{π}{4}$ |
| 5 | Lesson 3: The Sine Function | In this section, you will connect the sine value of an angle to the *y*-coordinate of the point of intersection of the terminal ray and the unit circle. | Reason abstractly and quantitatively. | p. 15-18 | Use the image to answer the question.Point P on the unit circle is given. What is the sine of the angle formed by a terminal ray that intersects the unit circle at this point? **Answer:** $\frac{8}{17}$ |
| 6 | Lesson 4: The Cosine Function | In this section, you will establish cosine as a function of the angle θ of rotation of a ray formed by the positive *x*-axis. | Make sense of problems and persevere in solving them. | p. 2-6 | A ray on the positive x-axis is rotated −450°. What is the cosine of the angle formed by this rotation?**Answer: 0** |
| 7 | Lesson 4: The Cosine Function | In this section, you will use special triangles on the unit circle to determine the values of the cosine function for 30°, 45°, 60°, and 90°. | Make sense of problems and persevere in solving them. | p. 8-13 | Use the image to answer the question.Which of the following uses the special triangles on the unit circle to determine in degrees when cosθ=$\frac{\sqrt{3}}{2}$? You may assume that 0°≤θ≤180°.**Answer: 30°** |
| 8 | Lesson 4: The Cosine Function | In this section, you will connect the cosine value of an angle to the *x*-coordinate of the point of intersection of the terminal ray and the unit circle. | Make sense of problems and persevere in solving them. | p. 15-20 | Given that cosθ=$\frac{\sqrt{2}}{2}$ of a triangle on the unit circle what is the sine ratio of the same triangle?**Answer:** $$sin\theta =\frac{\sqrt{2}}{2}$$ |
| 9 | Lesson 5: Degrees & Radians | In this section, you will use the unit circle to establish the radian as a second unit of angle measure. | Make sense of problems and persevere in solving them. | p. 2-7 | Write 60° in radian measure.60° is equivalent to $\frac{π}{}$​ radians.Answer: $\frac{π}{3}$​ |
| 10 | Lesson 5: Degrees & Radians | In this section, you will use the formula for the circumference of a circle to convert angle measures between degrees and radians. | Attend to precision. | p. 9-13 | Convert $\frac{13π}{6}$ radians to degrees.**Answer: 390 degrees** |
| 11 | Lesson 5: Degrees & Radians | In this section, you will write statements equating sine measures in degrees and radians and cosine measures in degrees and radians to each other. | Attend to precision. | p. 15-19 | Complete the equivalence statement below. For the first response enter a degree value. For the second response enter an exact value in simplest form.sin \_\_\_° = sin$\frac{π}{2} $= \_\_\_.**Answer: 90; 1** |
| 12 | Lesson 6: Properties of the Sine & Cosine Functions | In this section, you will use patterns to evaluate the sine and cosine functions for commonly used angles. | Look for and express regularity in repeated reasoning. | p. 2-8 | What is sin90°? Provide the exact answer.**Answer: 1** |
| 13 | Lesson 6: Properties of the Sine & Cosine Functions | In this section, you will establish that the domain of the sine and cosine functions contain all real numbers. | Make sense of problems and persevere in solving them. | p. 10-14 | Given f(𝑥)=sin 𝑥, evaluate the function at $x=\frac{13π}{2}$.**Answer: 1** |
| 14 | Lesson 6: Properties of the Sine & Cosine Functions | In this section, you will establish the ranges of both the sine and cosine functions are [-1,1]. | Make sense of problems and persevere in solving them. | p. 16-21 | Which of the following has the greatest value?**Answer: sin** $\frac{π}{2}$ |
| 15 | Lesson 7: The Tangent Function | In this section, you will establish tangent as a function of the angle of rotation in the unit circle. | Make sense of problems and persevere in solving them. | p. 2-6 | Which of the following is the correct ratio for tan($\frac{7π}{6}$)?**Answer: tan(**$\frac{7π}{6}$**) =** $\frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}}=\frac{\sqrt{3}}{3}$ |
| 16 | Lesson 7: The Tangent Function | In this section, you will use special triangles on the unit circle to determine the values of the tangent function for 30, 45, 60, and 90 degrees. | Make sense of problems and persevere in solving them. | p. 8-12 | Use the image to answer the question.Find tanθ in this unit circle.**Answer:** $\sqrt{3}$ |
| 17 | Lesson 7: The Tangent Function | In this section, you will connect the tangent value of an angle to the quotient of the *y*-coordinate and *x*-coordinate of the point where the terminal side of the angle and the unit circle intersect. | Make sense of problems and persevere in solving them. | p. 14-18 | Use the image to answer the question.Find tan($\frac{11π}{6}$).**Answer:** **tan(**$\frac{11π}{6}$**) =** $\frac{y}{x}=\frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}}=-\frac{\sqrt{3}}{3}$ |
| 18 | Lesson 8: Angles & Quadrants | In this section, you will determine signs of the sine, cosine, and tangent functions based on their quadrant. | Make sense of problems and persevere in solving them. | p. 2-5 | Determine the sign of tan$(\frac{7π}{6})$ and the quadrant in which it lies.**Answer: tan**$(\frac{7π}{6})$**is positive and lies in Quadrant III.** |
| 19 | Lesson 8: Angles & Quadrants | In this section, you will determine what quadrant the angle is in given sine, cosine, or tangent function values. | Make sense of problems and persevere in solving them. | p. 7-11 | In which quadrant would 𝜃 be if $sinθ=\frac{1}{2}$ and $tanθ>0$? Use a digit for your response rather than a Roman numeral.Quadrant \_\_\_\_**Answer: 1** |
| 20 | Lesson 9: A Pythagorean Identity | In this section, you will use the unit circle to prove the Pythagorean identity sin2θ + cos2θ = 1. | Construct viable arguments and critique the reasoning of others. | p. 2-8 | If $sinθ=\frac{1}{6}$ and $\frac{π}{2}<θ<π$ find $cos θ$.**Answer:** $-\frac{\sqrt{35}}{6}$ |
| 21 | Lesson 9: A Pythagorean Identity | In this section, you will find the cosine, sine, or tangent of an angle based on the sine or cosine and the quadrant of the angle. | Make sense of problems and persevere in solving them. | p. 10-14 | Georgina is told that an angle has a sine of $\frac{\sqrt{5}}{5}$ and is in Quadrant II. Use the Pythagorean identity $sin^{2}(θ)+cos^{2}(θ)=1$, the trigonometric identity $tanθ=\frac{sinθ}{cosθ}$, and the quadrant to find the tangent. **Answer:** $-\frac{1}{2}$$-\frac{1}{2}$ |
| 22 | Lesson 5: Degrees & Radians | In this section, you will write statements equating sine measures in degrees and radians and cosine measures in degrees and radians to each other. | Attend to precision. | p. 15-19 | Show that the sine or cosine value of an angle measuring 48° is equivalent to the sine or cosine value of that same angle measured in radians and state the value of the function.**Answer:** $$48°×\frac{π}{180°}=\frac{4π}{15}rad$$$$sin 48°=sin\frac{4π}{15}≈0.74$$**Or** $$cos 48°=cos \frac{4π}{15}≈0.67$$ |
| 23 | Lesson 8: Angles & Quadrants | In this section, you will determine what quadrant the angle is in given sine, cosine, or tangent function values. | Make sense of problems and persevere in solving them. | p. 7-11 | In 1–2 sentences, describe how to determine the sign for tanθ in each quadrant of the coordinate plane.**Answer: The student should note that tanθ is a ratio of sinθ and cosθ, so it is positive in quadrants where cosθ and sinθ have the same sign and negative in quadrants where their signs are opposites.** |
| 24 | Lesson 9: A Pythagorean Identity | In this section, you will find the cosine, sine, or tangent of an angle based on the sine or cosine and the quadrant of the angle. | Make sense of problems and persevere in solving them. | p. 10-14 | In 1–2 sentences, describe why there is always a positive and negative solution when solving using the Pythagorean Identity.**Answer: Students should note that they must take the square root of either sine or cosine to solve for theta (θ). Whenever the square root of a positive value is taken, the answer will include both a positive and a negative solution, since a positive number multiplied by itself and a negative number multiplied by itself both yield a positive number.** |