

## Trigonometry Standards

- N.CN.B.4 Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
- N.CN.B.5 Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.
- N.VM.A.2 Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
- N.VM.A.3 Solve problems involving velocity and other quantities that can be represented by vectors.
- N.VM.B Add and subtract vectors. Multiply a vector by a scalar.
- F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F.IF.C.7.E Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- F.IF.C.7.F Graph polar equations expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.BF.B.3 Identify the effect on the graph of replacing  $f(x)$  by  $f(x)+k$ ,  $kf(x)$ ,  $f(kx)$ , and  $f(x+k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs.
- F.TF.A.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
- F.TF.A.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.
- F.TF.A.3\* Use special triangles to determine geometrically the values of sine, cosine, tangent for  $\pi/3$ ,  $\pi/4$ , and  $\pi/6$ , and use the unit circle to express the values of sine, cosine, and tangent for  $x$ ,  $\pi+x$ , and  $2\pi-x$  in terms of their values for  $x$ , where  $x$  is any real number.
- F.TF.B.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.
- F.TF.B.6 Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
- F.TF.B.7\* Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.
- F.TF.C\* Prove and apply trigonometric identities.
- G.SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G.SRT.C.8\* Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
- G.SRT.D.11 Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles.

**Note:** *Starred standards are flagged as “priority”—that is, the content covered by those standards is extremely important or foundational. Students who fail to “meet” or “exceed” all priority standards by the end of the term may not receive a grade higher than a C.*

## Precalculus Standards

- N.CN.B.4 Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.
- A.SSE.B.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.
- A.APR.D.6 Rewrite simple rational expressions in different forms, using inspection, long division, or, for the more complicated examples, a computer algebra system.
- A.REI.B\* Solve equations and inequalities in one variable.
- A.REI.D.11 Explain why the  $x$ -coordinate of the points where the graphs of the equations  $y = f(x)$  and  $y = g(x)$  intersect are the solutions of the equation  $f(x) = g(x)$ ; find the solutions approximately.
- F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F.IF.C.7.B Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- F.IF.C.7.D Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
- F.IF.C.7.E Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
- F.IF.C.7.F Graph polar equations expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.C.7.G Graph parametric equations expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F.IF.C.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- F.BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
- F.BF.B.3\* Identify the effect on the graph of replacing  $f(x)$  by  $f(x) + k$ ,  $kf(x)$ ,  $f(kx)$ , and  $f(x + k)$  for specific values of  $k$  (both positive and negative); find the value of  $k$  given the graphs.
- F.BF.B.5 Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.
- F.LE.A.4\* For exponential models, express as a logarithm the solution to  $ab^{ct} = d$  where  $a$ ,  $c$ , and  $d$  are numbers and the base  $b$  is 2, 10, or  $e$ ; evaluate the logarithm using technology.
- F.LE.A.5 Interpret the parameters in a linear or exponential function in terms of a context.
- G.GPE.A.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
- G.GPE.A.2 Derive the equation of a parabola given a focus and directrix.
- G.GPE.A.3 Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or differences of distances from the foci is constant.
- C.1.1A Express limits symbolically using correct notation, and interpret limits expressed symbolically.
- C.1.1B Estimate limits of functions.
- C.1.1C\* Determine limits of functions.

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