Green Dot Public Schools

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Trigonometry/Pre-Calculus 2011-2012 Benchmark Blueprint

Green Dot Public Schools

		Assessments			
Algebra II		**1**	**2**	**3**	**4**
5.0	Students demonstrate knowledge of how real and complex numbers are related both arithmetically and graphically. In particular, they can plot complex numbers as points in the plane.	3			
6.0	Students add, subtract, multiply, and divide complex numbers.	3			
8.0	Students solve and graph quadratic equations by factoring, completing the square, or using the quadratic formula. Students apply these techniques in solving word problems. They also solve quadratic equations in the complex number system.	4			
9.0	Students demonstrate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as *a, b,* and *c* vary in the equation $y = a(x - b)^2 + c$.	3			
10.0	Students graph quadratic functions and determine the maxima, minima, and zeros of the function.	3			
12.0	Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.		3		
14.0	Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values.		3		
24.0	Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.	3			
Trigonometry					
3.0	Students know the identity $\cos^2(x) + \sin^2(x) = 1$		5		
4.0	Students graph functions of the form $f(t) = A \sin(Bt + C)$ or $f(t) = A \cos(Bt + C)$ and interpret A, B, and C in terms of amplitude, frequency, period, and phase shift.		3		
9.0	Students compute, by hand, the values of the trigonometric functions and the inverse trigonometric functions at various standard points.		5		
10.0	Students demonstrate an understanding of the addition formulas for sines and cosines and their proofs and use those formulas to prove and/or simplify other trigonometric identities.		3		
11.0	Students demonstrate an understanding of half-angle and double-angle formulas for sines and cosines and can use those formulas to prove and/or simplify other trigonometric identities.		3		
13.0	Students know the law of sines and the law of cosines and apply those laws to problems.			5	
14.0	Students determine the area of a triangle, given one angle and the two adjacent sides.			3	
15.0	Students are familiar with polar coordinates. In particular, they can determine polar coordinates of a point given in rectangular coordinates and vice versa.				3

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		Assessments			
Trigonometry (continued)		**1**	**2**	**3**	**4**
16.0	Students represent equations given in rectangular coordinates in terms of polar coordinates.				3
17.0	Students are familiar with complex numbers. They can represent a complex number in polar form and know how to multiply complex numbers in their polar form.			3	3
18.0	Students know DeMoivre's theorem, and can give nth roots of a complex number given in polar form.			5	
Mathematical Analysis					
1.0	Students are familiar with, and can apply, polar coordinates and vectors in the plane. In particular, they can translate between polar and rectangular coordinates and can interpret polar coordinates and vectors graphically.				3
2.0	Students are adept at the arithmetic of complex numbers. They can use the trigonometric form of complex numbers and understand that a function of a complex variable can be viewed as a function of two real variables. They know the proof of DeMoivre's theorem.			3	
3.0	Students can give proofs of various formulas by using the technique of mathematical induction.				3
4.0	Students know the statement of, and can apply, the fundamental theorem of algebra.	3			
5.1	Students can take a quadratic equation in two variables; put it in standard form by completing the square and using rotations and translations, if necessary; determine what type of conic section the equation represents; and determine its geometric components (foci, asymptotes, and so forth).				3
5.2	Students can take a geometric description of a conic section---for example, the locus of points whose sum of its distances from (1, 0) and (-1, 0) is 6---and derive a quadratic equation representing it.				3
6.0	Students find the roots and poles of a rational function and can graph the function and locate its asymptotes.	3			
8.0	Students are familiar with the notion of the limit of a sequence and the limit of a function as the independent variable approaches a number or infinity. They determine whether certain sequences converge or diverge.				4
Linear Algebra					
7.0	Students demonstrate understanding of the geometric interpretation of vectors and vector addition (via parallelograms) for vectors in the plane and in three dimensional space.			3	
12.0	Students compute the scalar (dot) product of two vectors in n-dimensional space, and know that perpendicular vectors have zero dot product.			3	
	Total Number of Items	**25**	**25**	**25**	**25**

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