

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre-Alg	Alg I	Geom	Alg II	MA	P & S	Pre-Cal	AP Cal
									I	E	M			MM	

District Objective

Determine the intersection of two lines algebraically and graphically.

PASS Process Standard
All

Quarter
I (32 days + 8 Rev/Tests)
No. Days
1

○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP

PASS Objective

The student will...

II. Functions and Relations (Algebra II)

B. Solve, analyze, and graph linear equations, inequalities and systems.

NCTM Standard
Pgs. 313-314

Text Correlation

Sec. 1.1, Pg. 1-7

Rating

1

Additional Resources

The Wave Lab Activity
<http://147.4.150.5/~matscw/RealWorld/index.htm>

Assessment

1. In the coordinate plane, the graphs of $ax + by + 3 = 0$ and $y = 0$ intersect if and only if which of the following conditions is met?

- (a) $a = 0$
- (b) $b = 0$
- (c) $a \neq 0$
- (d) $b \neq 0$
- (e) $a \neq 0$ and $b \neq 0$

2. Two straight lines are graphed in the standard ~~x y~~ coordinate plane below. What are the coordinates of their intersections?

- (a) $\frac{3}{4}i, \frac{3}{4}j$
- * (b) $1i, 1j$
- (c) $\frac{3}{2}i, \frac{3}{2}j$
- (d) $\frac{\sqrt{2}}{2}i, \frac{\sqrt{2}}{2}j$
- (e) $\sqrt{2}i, \sqrt{2}j$

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre-Alg	Alg I	Geom	Alg II	MA	P & S	Pre-Cal	AP Cal
										I	E	M		MM	
District Objective Find the length and midpoint of a given line segment.												PASS Process Standard All		Quarter I No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...												NCTM Standard Pgs. 313-314			
III. Coordinate Geometry (Geometry) B. Use Coordinate Geometry to find: 1. Distance between 2 points 2. Midpoint of a segment															
Text Correlation Sec. 1.1, Pgs. 1-7			Rating 1		Additional Resources http://1rg.com/algebra/practice/question2.htm http://www.tc.cc.va.us/VML/Mth03/Distance/Distance2/index.htm										
Assessment															
1. In the standard (x, y) coordinate plane, what is the distance between the points $(-1, -3)$ and $(4, 2)$?								2. Find the midpoint of the segment from $P(-2, 4)$ to $Q(4, -6)$?							
(a) $5\sqrt{2}$				(b) $\sqrt{10}$				(a) $(-2, 6)$				(b) $(-1, -2)$			
(c) $\sqrt{34}$				(d) 2				(c) $(-1, 3)$				(d) $(1, 2)$			
(e) 25								(e) $(1, -1)$							
3. Graph the quadrilateral $ABCD$ with vertices $A(-2, 2)$, $B(2, 4)$, $C(6, -2)$, and $D(0, -2)$. Determine the coordinates of the midpoint of each side of the quadrilateral. Graph the midpoints and connect them to form a polygon. What appears to be true about this polygon? RESPONSE: The polygon is a parallelogram with vertices $E(0, 3)$, $F(4, 1)$, $G(3, -2)$, and $H(-1, 0)$.															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I	E	E	M		MM	

District Objective

Calculate the slope of a line given 2 points on the line and use it to determine if 2 lines are perpendicular, parallel or neither.

PASS Process Standard
All

Quarter
I
No. Days
1

○ ITBS ○ CRT ○ EXPLORE ● **EOI** ○ PLAN ● **ACT** ○ AP

PASS Objective

The student will...

II. Functions and Relations (Algebra I)

D. Find the slope of a given line

F. Use slope to determine if lines are parallel, perpendicular, horizontal or vertical.

NCTM Standard
Pgs. 305-306

Text Correlation
Sec. 1.2, Pgs. 7-13

Rating
1

Additional Resources

http://mathaid.com/products/CollgAlgebra/full/contents_.html
<http://www.accessone.com/%7Ebbunge/Algebra/Algebra.html>

Assessment

1. In the standard xy coordinate plane, if the x -coordinate of each point on a line is 4 less than twice its y -coordinate, the slope of the line is:

- (a) -4 (b) -2 (c) $\frac{1}{2}$
(d) 2 (e) 4

2. In the standard xy coordinate plane, line l_1 has an equation of $x + 4y = 5$. If line l_2 is perpendicular to l_1 , what is the slope of l_2 ?

- (a) $-\frac{1}{4}$ (b) $\frac{4}{5}$ (c) 1
(d) $\frac{5}{4}$ (e) 4

3. What is the equation of a line which passes through the point $(-1, 2)$ and perpendicular to a line whose equation is given by $x - 3y + 2 = 0$?

- (a) $x - 3y + 1 = 0$ (b) $x - 3y = 0$
(c) $3x + y - 2 = 0$ (d) $3x + y - 1 = 0$
(e) $3x + y + 1 = 0$

4. In the xy coordinate plane, point A is plotted at $(1, 2)$. Point B is plotted at $(k, 3)$. The value of k is equal to the slope of the line connecting points A and B . What is the value of k ?

- (a) -3 (b) -1 (c) 0
(d) 1 (e) 3

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I					MM	
District Objective Determine the equation of a line and use it to model real-world situations.												PASS Process Standard All		Quarter I No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will... II. Functions and Relations (Algebra I) E. Write the equation of and graph linear relationships.														NCTM Standard Pgs. 303-305	
Text Correlation Sec. 1.3, Pgs. 14-25								Rating 1		Additional Resources Functions <u>Modeling Change</u> , Hughes-Hallet http://math.uww.edu/~mcfarlat/141/line1.htm http://math.rice.edu/~lanius/Algebra/hottub.html http://mecca.org/~halfacre/MATH/function.htm http://www.ies.co.jp/math/java/index.html					
Assessment 1. On weekends a TV repairman has an initial service charge of \$30 plus a charge of \$2.00 per minute. Find a linear equation giving the total charge, c , in terms of x , the number of minutes. (a) $c = 32x$ (b) $c = 30x + 2$ (c) $c = 30 + 2x$ (d) $c = 32x + 2$ (e) None of these 1 - ANSWER: c 2. Your salary was \$18,000 in 1983 and \$27,900 in 1992. If your salary follows a linear growth pattern, what will it be in 1995? (a) \$29,300 (b) \$29,900 (c) \$31,200 (d) \$37,200 (e) None of these 2 - ANSWER: c															

Pre-Calculus: Number Systems

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I/E/M			MM	

District Objective
Simplify expressions involving complex numbers.

PASS Process Standard
All

Quarter
I
No. Days
1

○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP

PASS Objective
The student will...
I. Number Systems/Algebraic Operations (Algebra II)
A. Define and perform operations on complex numbers

NCTM Standard
Pgs. 291-292

Text Correlation
Sec. 1.5, Pgs. 25-29

Rating
1

Additional Resources
<http://whyslopes.com/freeAccess/applet.html>

Assessment

1. In the complex number system, $i^2 = -1$. What does $(2+3i)(-1+7i)$ equal?

- (a) $-23+0i$ (b) $-23+11i$ (c) $0+11i$ (d) $0+30i$ (e) $19+11i$

2. $\frac{3+4i}{2+i}$ (where $i = \sqrt{-1}$) is the same as

- (a) $\frac{10}{3} + \frac{5}{3}i$ (b) $\frac{2}{3} + \frac{5}{3}i$ (c) $\frac{3}{2} + 2i$ (d) $2+i$ (e) $2-i$

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal		
											I	E/M		MM			
District Objective Solve quadratic equations.												PASS Process Standard All		Quarter I No. Days 2			
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP																	
PASS Objective The student will... II. Functions and Relations (Algebra II) D. Use the relationship between the x-intercepts of a quadratic function and the roots of a quadratic equation to solve problems.												NCTM Standard Pgs. 297-300					
Text Correlation Sec. 1.6, Pgs. 30-35						Rating 1		Additional Resources Non-Mathematical Definition of a Function Worksheet http://mathaid.com/products/Precalc/full/contents_.html http://mathscribe.com									
Assessment 1. What is the range of real values of n for which the equation $3x^2 + 4x - 2n = 0$ has only real solutions? (a) $n \geq -\frac{2}{3}$ (b) $n < -\frac{2}{3}$ (c) $n > \frac{2}{3}$ (d) $n = \frac{2}{3}$ (e) $n \leq \frac{2}{3}$ 2. Solve the equation $x^3 - 3x^2 + 4x - 12 = 0$. Give all real and imaginary roots.																	

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	

District Objective

Use the graphs of quadratic functions to model real-world situations.

PASS Process Standard
All

Quarter
I
No. Days
2

○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP

PASS Objective

The student will...

II. Functions and Relations (Algebra II)

- B. Solve, analyze and graph linear equations, inequalities, and systems.
- C. Solve quadratic equations by graphing
- D. Use the relationship between the x -intercepts of a quadratic function and the roots of a quadratic equation to solve problems.

NCTM Standard
Pgs. 300-305

Text Correlation
Sec. 1.7, Pgs. 37-48

Rating
1

Additional Resources
http://www.scs.k12.tn.us/STT99_WQ/STT99/Collierville_HS/brashers/Webquest-Quadratics.htm

Assessment

1. Congruent squares are cut from the corners of a 20 inch square piece of tin, and the edges are then turned up to make an open box. How large should the squares cut from the corners be in order to maximize the volume of the box?

2. Determine the distance across the base of a parabolic arch that measures 30 feet at its highest point if the roadway through the center of the arch is 48 feet wide and must have a minimum clearance of 15 feet?

1 - ANSWER:

$$x^2 = 4py$$

$$x^2 = 4 \left(\frac{144}{15} \right) y$$

$$24^2 = 4p(15)$$

$$x^2 = 1152$$

$$p = -\frac{144}{15}$$

$$x = 24\sqrt{2} \Rightarrow 2x = 48\sqrt{2} \approx 67.9 \text{ ft.}$$

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre-Alg	Alg I	Geom	Alg II	MA	P & S	Pre-Cal	AP Cal		
									I		E	M		MM			
District Objective Evaluate a function at a given point and determine if it is a zero of the function.												PASS Process Standard All		Quarter I No. Days 2			
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																	
PASS Objective The student will... II. Functions and Relations (Algebra II) D. Use the relationship between the x -intercepts of a quadratic function and the roots of a quadratic equation to solve problems.												NCTM Standard Pgs. 297-300					
Text Correlation Sec. 2.1, Pg. 53-61								Rating 1		Additional Resources http://www.exploremath.com/activities/index.cfm							
Assessment 1. If $f(x) = \frac{x^2+3}{x}$ evaluate $f \oplus i\sqrt{2} \cdot j$ 2. Find the quotient and the remainder when $-2x^4 - 3x^3 + 5x^2 + 7x + 3$ is divided by $x + 2$. 3. The number -2 is a zero of the polynomial $x^3 - 2x + k$ (which means that when $x = -2$, the polynomial has the value zero). What must be the value of the real number k ? (a) -12 (b) -4 (c) 0 (d) 4 (e) 12																	

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Determine an equation of a polynomial function for a given graph.												PASS Process Standard All		Quarter I No. Days 1	
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ● AP															
PASS Objective The student will...														NCTM Standard Pgs. 297-300	
Text Correlation Sec. 2.3, Pgs. 62-67				Rating 1		Additional Resources Graphing Calculator http://cut-the-not.com/Curriculum/Calculus/PolynomialGraph.html									

Assessment

The graph shown below could be the graph of which of the following functions?

- (a) $f(x) = x(x - 2)$
- (b) $f(x) = x^2(x - 2)$
- (c) $f(x) = x^3(x - 2)$
- (d) $f(x) = x^3(x + 2)$
- (e) $f(x) = x^2 - 2$

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		M	
District Objective Sketch the graph of a polynomial function given its equation.												PASS Process Standard All		Quarter I No. Days 3	
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ● AP															
PASS Objective The student will...												NCTM Standard Pgs. 297-300			
II. Functions and Relations (Algebra II) D. Use the relationship between the x -intercepts of a quadratic function and the roots of a quadratic equation to solve problems. E. Find and interpret the maximum and minimum value and the y -intercept of a quadratic function.															
Text Correlation Sec. 2.3, Pgs. 62-67				Rating 1		Additional Resources Graphing Calculator http://mathaid.com/products/Precalc/full/contents_.html http://147.4.150.5/~matscw/RealWorld/utlindex.html http://www2.academic.com/AcademicOnline/imath/useGrapher.htm 1									
Assessment Sketch the graph of $y = 4x^2 - 2x^4$.															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	

District Objective

Use technology to estimate the real roots and relative minimum/maximum values of a polynomial function.

PASS Process Standard
All

Quarter
I
No. Days
3

○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP

PASS Objective

The student will...

II. Functions and Relations

E. Find and interpret the maximum and minimum value and y -intercept of a quadratic function.

NCTM Standard
Pgs. 297-303

Text Correlation
Sec. 2.5, Pgs. 75-80

Rating
2

Additional Resources

Graphing Calculator; Crazy Carrot Calculations Activity Sheet

Functions Modeling Change, Hughes-Hallett

<http://147.4.150.5/~matscw/RealWorld/index.htm>

Assessment

Use a computer or graphing calculator to find the smallest positive root of

$-4x^4 + 8x^3 + 7x - 5 = 0$. (*Approximate the root to the nearest tenth*).

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I		E	M		MM	
District Objective Solve polynomial equations using a variety of methods.												PASS Process Standard All		Quarter I No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 297-300	
II. Functions and Relations C. Solve quadratic equations by <ol style="list-style-type: none"> 1. Graphing 2. Factoring 3. Completing the square 4. Quadratic Formula 															
Text Correlation Sec. 2.6, Pgs. 80-85								Rating 1		Additional Resources http://mss.math.vanderbilt.edu/~pscrooke/MSS/solvepoly.html					
Assessment															
<p>Solve the equations by whichever method seems easiest.</p> <p>1. $3x^2 - 5x - 12 = 0$</p> <p>2. $\sqrt{3x+7} = x + 1$</p> <p>3. $x^3 - 2x + 4 = 0$</p> <p>4. The function $f(x) = x^3 - 4x + 1$ has a zero located between</p> <p>I. -0.3 and -0.2</p> <p>II. 0.2 and 0.3</p> <p>III. 1.8 and 1.9</p> <p>(a) I only (b) II only</p> <p>(c) III only (d) I and II only</p> <p>(e) II and III only</p>															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	M		MM	
District Objective Determine a polynomial equation given its roots.												PASS Process Standard All		Quarter I No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 297-300		
Text Correlation Sec. 2.7, Pgs. 85-90				Rating 1		Additional Resources http://cut-the-knot.com/Curriculum/Calculus/PolynomialGraph.html									
Assessment															
1. Find a quadratic equation with integral coefficients and with the roots $\frac{1 \pm \sqrt{5}}{2}$. 2. Find a cubic equation with integral coefficients and with the roots 3 and $5 + i$.															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I		E	M		MM	
District Objective Solve and graph linear and polynomial inequalities.												PASS Process Standard All		Quarter I No. Days 3	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 300-303		
II. Functions and Relations (Algebra II) B. Solve, analyze and graph linear equations, inequalities, and systems.															
Text Correlation Sec. 3.1, 3.2 Pgs. 95-103				Rating 1		Additional Resources Graphing Calculator http://www.exploremath.com/lessonplans/index.cfm http://www2.academic.com/AcademicOnline/imath/UseGrapher.html									
Assessment															
<p>1. To work properly, an engine part's diameter cannot be over the specified diameter of 3 centimeters by more than .05 centimeters, nor can it be under the specified diameter by more than .05 centimeters. If x is the diameter of a part, which of the following algebraic statements specifies these restrictions on x ?</p> <p>(a) $x - 3 \geq .05$ (b) $3 - x \geq .05$ (c) $x - .05 \leq 3$ *(d) $3 - x \leq .05$ (e) $x \leq .05$</p> <p>2. Which graph below represents $y < x^4 - 11x^2 + 10$?</p> <p style="text-align: right;">(e) None of these</p>															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I	E	E	M		MM	
District Objective Graph the solution set for a system of inequalities.												PASS Process Standard All		Quarter I No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 300-303	
II. Functions and Relations (Algebra II) B. Solve, analyze and graph linear equations, inequalities, and systems.															
Text Correlation Sec. 3.3, Pgs. 104-108								Rating 1		Additional Resources Graphing Calculator http://www.exploremath.com/lessonplans/index.cfm					
Assessment															
Graph the solution set of each system of inequalities.															
1. $x \geq 0$ $2x + y \geq 4$								2. $y < x$ $y \geq x^2 - 1$							

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Use linear programming techniques to solve real-world applications.												PASS Process Standard All		Quarter I No. Days 2	
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP															
PASS Objective The student will... II. Functions and Relations (Algebra I) G. Collect and graph real data 4. Make predictions using a linear model													NCTM Standard Pgs. 303-305		
Text Correlation Sec. 3.4, Pgs. 108-114								Rating 1		Additional Resources Graphing Calculator http://www.exploremath.com/lessonplans/index.cfm					
Assessment A company manufactures packages of animal feed that contain at least 100 kg of a mixture of grain A and grain B. Grain A costs \$4 / kg and grain B costs \$6 / kg. Since too much of grain A is undesirable, no more than 40 kg is used in a package. On the other hand, government regulations require at least 75 kg of Grain B in a package. Let x = number of kilograms of grain A in a package. Let y = number of kilograms of grain B in a package. Assume $x \geq 0$ and $y \geq 0$. 1. Give three inequalities describing the constraints. 2. Graph the feasible region determined in question 1 3. Write an equation in terms of x and y for the company costs C . 4. What values of x and y should the company use to minimize the cost?															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal		
									I		E	M		MM			
District Objective Determine the domain, range, and zeros of a polynomial function.												PASS Process Standard All		Quarter II (33 days + 6 Rev/Test) No. Days 2			
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																	
PASS Objective The student will... II. Functions and Relations (Algebra II) H. Use functional notation and specify domain and range.												NCTM Standard Pgs. 297-300					
Text Correlation Sec. 4.2, Pgs. 119-124								Rating 1		Additional Resources Piecewise Functions Activity Sheet http://www.coolmath.com/func1.htm							
Assessment 1. If $f(x) = 1/x^2$ and $g(x) = \sqrt{x-3}$, find the domain of $f(g(x))$. (a) $\{x x \neq 0\}$ (b) $\{x x > 0\}$ (c) $\{x x > 3\}$ (d) $\{\text{all real numbers}\}$ (e) none of the above																	
2. If $f(x) = \sqrt{16-x^2}$ and $g(x) = x^2$, the range of $g(f(x))$ is (a) all real numbers (b) all real numbers \leq to 16 (c) all real numbers between 0 and 16 inclusive (d) all real numbers \leq to 4 (e) all real numbers between 0 and 4 inclusive																	
3. If -3 is a zero of the polynomial function $y=h(x)$, which of the following must be true? (a) $(0, 3)$ lies on the graph of h . (b) $h(0)=-3$ (c) $h(3)=h(-3)$ (d) $(x+3)$ is a factor of $h(x)$ (e) none of the above																	

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Evaluate and apply the composition of functions												PASS Process Standard All		Quarter II No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 297-300		
Text Correlation Sec. 4.2, Pgs. 124-130								Rating 1		Additional Resources http://library.thinkquest.org/2647/algebra/functype.htm					
Assessment															
<p>For problems 1-7, let $k(x) = x^2 + 2$ and $g(x) = x^2 + 3$.</p> <p>Find a possible formula for the function named.</p> <p>1. $h(x)$ if $h(k(x)) = (x^2 + 2)^3$. 2. $j(x)$ if $k(j(t)) = \left(\frac{1}{t}\right)^2 + 2$.</p> <p>3. $f(x)$ if $f(k(v)) = \frac{1}{v^2 + 2}$. 4. $m(x)$ if $m(k(\pi)) = \frac{1}{\sqrt{\pi^2 + 2}}$.</p> <p>5. $f(x)$ if $g(f(x)) = (x+1)^2 + 3$. 6. $h(x)$ if $h(g(x)) = \frac{1}{x^2 + 3} + 5x^2 + 15$.</p> <p>7. $j(x)$ if $j(x) = g(g(x))$.</p>															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal		
									I		E	M		MM			
District Objective Sketch the graph of a function in a given arbitrary window and classify the polynomial as even, odd or neither.												PASS Process Standard All		Quarter II No. Days 3			
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																	
PASS Objective The student will...													NCTM Standard Pgs. 297-300				
Text Correlation Sec. 4.3, 4.4, Pgs. 131-145								Rating 1		Additional Resources Graphing Calculator; Graphing with Excel Activity; http://library.thinkquest.org/2647/algebra/functype.htm							
Assessment 1. Are the following functions even, odd, or neither? Sketch each graph in the interval $[-5, 5, 1]$ <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">(a) $a(x) = \frac{1}{x}$</div> <div style="text-align: center;">(b) $b(x) = x$</div> <div style="text-align: center;">(c) $e(x) = x + 3$</div> <div style="text-align: center;">(d) $f(x) = \frac{-1}{(x-2)^2} + 1$</div> </div> 2. For each table, decide whether the function could be symmetric about the y -axis, across the origin, or neither. Sketch each graph in the interval $[-4, 4, 1]$																	

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal		
											I	E/M		MM			
District Objective Determine the inverse, if it exists, of a function and sketch its graph.												PASS Process Standard All		Quarter II No. Days 1			
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																	
PASS Objective The student will... II. Functions and relations (Algebra II) I. Find the inverse of a function and graph.													NCTM Standard Pgs. 297-300				
Text Correlation Sec. 4.5, Pgs. 146-150							Rating 1		Additional Resources Discovering Inverses Activity Sheet http://www.sosmath.com/algebra/invfunc/fnc1.html http://www.purplemath.com/modules/invrscn.htm http://integretechpub.com/examples/interactive/index.html								
Assessment 1. If $f(x) = 3^x$, which of the following statements is <i>not true</i> about $f^{-1}(x)$? (a) Its domain is the set of positive real numbers. (b) It has only one zero. (c) Its range is the set of positive real numbers. (d) It is one - to - one. (e) $f^{-1}(3) = 1$ 2. If f and g are inverse functions and $f(x) = 2x^3 - 1$, then $g(x) =$ (a) $\frac{\sqrt[3]{x+1}}{2}$ (b) $\frac{x+1}{6}$ (c) $\sqrt[3]{\frac{x+1}{2}}$ (d) $\sqrt[3]{2(x+1)}$ (e) $2x^3 - 1$																	

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I		E	M		MM	
District Objective Graph functions in a two-dimensional coordinate system and interpret such graphs.												PASS Process Standard		Quarter II No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 297-300		
Text Correlation Sec. 4.6, Pgs. 151-157			Rating 1		Additional Resources http://id.mind.net/~zona/mmts/functionInstitute/functionInstitute.htm <u>1</u>										
Assessment															
<p>1. The graph of $y = x^2 - 4$ is symmetric about:</p> <p>(a) the x-axis (b) the y-axis (c) the line $y = x$ (d) the origin (e) None of these</p> <p>2. The equation $y = P(x)$ is graphed in the standard (x, y) coordinate plane. If $P(x)$ is a 5th degree polynomial, which of the following CANNOT be the number of times the graph intersects (touches or crosses) the x-axis?</p> <p>*(a) 0 (b) 1 (c) 2 (d) 3 (e) 5</p> <p>3. If $f(x) = 7x - 4$ for all x, then the x-intercept of the line given by $y = f(x + 3)$ is</p> <p>(a) $-\frac{19}{7}$ (b) $-\frac{17}{7}$ (c) 0 (d) $\frac{3}{7}$ (e) $\frac{4}{7}$</p> <p>4. The equation $10w^2 + 17w - 20 = 0$ has what types of numbers as its two solutions?</p> <p>(a) Two negative real numbers *(b) One positive real number and one negative real number (c) Two positive real numbers (d) One negative real number and zero (e) One positive real number and zero</p> <p>5. Is the fundamental period of the sum of two periodic functions equal to the product of the fundamental periods of the two functions? Present examples or counterexamples. RESPONSE: No. Consider $f(x)$ with period 2 and $h(x)$ with period 4. The period of $f(x) + h(x)$ is 4, not 8.</p>															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Form functions of one variable from verbal descriptions and determine the maximum and minimum values of the function.												PASS Process Standard All		Quarter II No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...												NCTM Standard Pgs. 297-300			
Text Correlation Sec. 4.7, Pgs. 157-165								Rating 1		Additional Resources Graphing Calculator http://www.iit.edu/~smile/ma9601.htm ; http://www.exploremath.com/lessonplans/index.cfm					
Assessment A city decides to make a park by fencing off a section of riverfront property. Funds are allotted to provide 80 meters of fence. The area enclosed will be a rectangle, but only three sides will be enclosed by fence -- the other side will be bound by the river. What is the maximum area that can be enclosed in this way? SOLUTION: Two sides are perpendicular to the bank of the river and have equal length, which we call h . The other side is parallel to the bank of the river. Call its length b . Since the fence is 80 meters long, $2h + b = 80$ $b = 80 - 2h.$ The area of the park, A , is the product of the lengths of two adjacent sides, so $A = bh = (80 - 2h)h$ $= -2h^2 + 80h.$ The function $A = -2h^2 + 80h$ is quadratic. Since the coefficient of h^2 is negative, the parabola opens downward and we have a maximum at the vertex. The zeros of this quadratic function are $h = 0$ and $h = 40$, so the axis of symmetry, which is midway between the zeros, is $h = 20$. The vertex of a parabola occurs on its axis of symmetry. Thus substituting $h = 20$ gives the maximum area: $A = (80 - 2(20))(20) = (80 - 40)(20) = (40)(20) = 800 \text{ meter}^2$.															

Pre-Calculus: Relations and Functions

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
									I		E	M		MM	
District Objective Simplify problems involving integral and rational exponents.												PASS Process Standard All	Quarter II No. Days 3		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will... I. Number sense/Algebraic Operations (Algebra I) B. Apply the laws of exponents to perform operations on expressions with integral exponents.														NCTM Standard Pgs. 292-294	
Text Correlation Sec. 5.1, Pgs. 169-180								Rating 1		Additional Resources Scientific/Graphing Calculator http://ucsub.colorado.edu/~maybin/mtop/ms06/exp.html http://www.mathnotes.com/intermediate/aw_interchap7.html					
Assessment															
1. What is the value of $64^{\frac{1}{2}} + 64^{\frac{1}{3}}$? (a) 8 (b) 12 (c) $\frac{40}{3}$ (d) 24 (e) $\frac{88}{3}$								4. $\frac{-(32)^{-1}(5-4^0)}{2^{-4}} = ?$ (a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2 (e) $-\frac{5}{2}$							
2. If n is an integer, then $\frac{2^n}{2^{n+1} + 2^n} = ?$ (a) $\frac{1}{8}$ (b) $\frac{1}{5}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$ (e) $\frac{1}{2}$								5. If $a^{\frac{1}{2}}a^{\frac{1}{3}} = a^{\frac{5}{6}}a^t$ for all $a > 0$, then $t = ?$ (a) $-\frac{2}{3}$ (b) $-\frac{19}{30}$ (c) $-\frac{13}{30}$ (d) 0 (e) 1							
3. For all $x \neq 0$ and $y \neq 0$, $\frac{x^{\frac{1}{3}}y^{-\frac{2}{5}}}{x^{-\frac{2}{3}}y^{-\frac{3}{5}}} = ?$ (a) $xy^{\frac{1}{5}}$ (b) $\frac{1}{xy^{\frac{1}{5}}}$ (c) $\frac{x}{y^{\frac{1}{5}}}$ (d) $\frac{y^{\frac{1}{5}}}{x^{\frac{1}{3}}}$ (e) $\frac{1}{x^{\frac{1}{3}}y^{\frac{1}{5}}}$								6. $5^{-3}5^{-8} = ?$ (a) 5^{24} (b) 5^{-5} (c) 5^{-11} (d) 55 (e) $\sqrt[11]{5}$							

Pre-Calculus: Exponents

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Evaluate and apply logarithms.												PASS Process Standard All		Quarter II No. Days 3	
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP															
PASS Objective The student will... II. Functions and Relations (Algebra II) K. Use technology to interpret and graph exponential and logarithmic functions to solve problems.														NCTM Standard Pgs. 297-300	
Text Correlation Sec. 5.5, 5.6, Pgs. 191-203				Rating 1		Additional Resources Scientific/Graphing Calculator http://www.exploremath.com/lessonplans/index.cfm http://mathnotes.com/aw_intermediate.html									
Assessment 1. If $\log_2(1-x) + \log_2(2x+6) = 3$, then $x =$ (a) -1 (b) 1 (c) -3 (d) 0 (e) none of these 2. Show how you could calculate natural logarithms if your scientific calculator's key is not functioning, but the and keys are working. RESPONSE: Using the change - of - base formula, $\ln x = \log_e x = \frac{\log_{10} x}{\log_{10} e} = \frac{\log x}{\log e}$ This expression can be calculated using the and keys of any scientific calculator. 3. Solve $\log_4 x = 3$. (a) ± 64 (b) 64 (c) ± 81 (d) 12 (e) None of these															

Pre-Calculus: Exponents																			
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal				
											I	E/M		MM					
District Objective Solve exponential equations.												PASS Process Standard All		Quarter II No. Days 3					
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																			
PASS Objective The student will...														NCTM Standard Pgs. 297-300					
II. Functions and Relations (Algebra II) J. Use technology to apply the inverse relationship between exponential and logarithmic functions to solve problems. K. Use technology to interpret and graph exponential and logarithmic functions.																			
Text Correlation Sec. 5.7, Pgs. 203-207					Rating 1		Additional Resources Scientific/Graphing Calculator http://www.exploremath.com/lessonplans/index.cfm http://mathnotes.com/aw_intermediate.html												
Assessment																			
1. If $3^{4x} = 151$, then $x \approx$																			
(a) 4.57 (b) 1.14 (c) 1.51 (d) 18.27 (e) 1.27																			
2. Solve $\sqrt{128^x} = 32(64^x)$.																			
(a) 1 (b) 10 (c) 0 (d) -2 (e) None of these																			

Pre-Calculus: Analytic Geometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
										I	E/M			MM	
District Objective Determine the equations for defined circles, ellipses, hyperbolas and parabolas.											PASS Process Standard All		Quarter III (37 days + 8 days review/test) No. Days 5		
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP															
PASS Objective The student will... II. Functions and Relations (Algebra II) F. Identify, graph, and write the equation of the conic sections.													NCTM Standard Pgs. 310-314		
Text Correlation Sec. 6.2, 6.3, 6.4, 6.5, Pgs. 219-241					Rating 1		Additional Resources http://mste.uiuc.edu/dildine/sketches/parapaper.htm http://math.usask.ca/readin/exercises/cir_dir/adv.html http://forum.swarthmore.edu/sketchpad/ckcircleprint.html								
Assessment 1. In the standard (x, y) coordinate plane, the circle $(x - 5)^2 + (y + 2)^2 = 25$ is moved, without changing its radius, to be centered at $(2, 3)$. Which of the following is its new equation? (a) $x^2 + y^2 = 25$ (b) $(x - 7)^2 + (y - 1)^2 = 25$ (c) $(x - 3)^2 + (y - 2)^2 = 25$ (d) $(x - 3)^2 + (y + 5)^2 = 25$ (e) $(x - 2)^2 + (y - 3)^2 = 25$ 2. Geometrically interpret what happens to the graph of an ellipse with equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ as c approaches a and as c approaches 0. Draw a family of ellipses showing various values of c in the range between 0 and a . Use the equation $a^2 = b^2 + c^2$ to justify your hypotheses. RESPONSE: From the equation $a^2 = b^2 + c^2$ we see that $b^2 = a^2 - c^2$, so as c approaches a , b approaches 0. Geometrically, the graph of the ellipse approaches the graph of a line segment with endpoints $(-a, 0)$ and $(a, 0)$. As c approaches 0, b approaches a . Geometrically, the graph of the ellipse approaches the graph of a circle with equation $x^2 + y^2 = a^2$.															

Pre-Calculus: Analytical Geometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	M		MM	
District Objective Identify and graph circles, ellipses, hyperbolas, and parabolas.											PASS Process Standard		Quarter III No. Days 7		
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ● AP															
PASS Objective The student will... II. Functions and Relations (Algebra II) F. Identify, graph, and write the equations of the conic sections.													NCTM Standard		
Text Correlation Sec. 6.2, 6.3, 6.4, 6.5, Pgs. 219-241		Rating 1		Additional Resources http://mste.uiuc.edu/dildine/sketches/parapaper.htm http://www2.academic.com/AcademicOnline/imath/UseGrapher.html											
Assessment 1. Identify the graph of $\frac{(x-3)^2}{2} - \frac{(y+1)^2}{9} = 1$. 2. The circle graphed below passes through the point (0, 6) and has its center at (3, 6). What is the equation of the circle? (a) $(x+3)^2 + (y+6)^2 = 9$ (b) $(x+6)^2 + (y+3)^2 = 3$ (c) $(x-6)^2 + (y-3)^2 = 3$ (d) $(x-3)^2 + (y-6)^2 = 3$ (e) $(x-3)^2 + (y-6)^2 = 9$															

Pre-Calculus: Trigonometry

K	1	2	3	4	5	6	7	Pre-Alg	Alg I	Geom	Alg II	MA	P & S	Pre-Cal	AP Cal
										I		E/M		MM	

District Objective

Demonstrate an understanding of the basic trigonometric concepts relating to the unit circle, graphs, inverses, identities and equations.

PASS Process Standard
All

Quarter III
No. Days
5

○ ITBS ○ CRT ○ EXPLORE ○ EOI ○ PLAN ○ ACT ○ AP

PASS Objective

The student will...

IV. Angles and Triangles (Geometry)

C. Express the trigonometric functions as ratios and derive the relationship between sine, cosine and tangent ratios, and use to solve real-world problems.

NCTM Standard

Text Correlation
Ch. 7 & 8,
Pgs. 256-329

Rating
1

Additional Resources

Scientific/Graphing Calculator; Let's Make Waves Activity;
http://phywww1.ncssm.edu/goebel/imp/Trig/Unit_Cir.htm
<http://integretchpub.com/examples/interactive/index.html>
<http://illuminations.nctm.org/lessonplans/9-12/trigdrills/index.html>

Assessment

1. If $\sin \alpha = 12/13$, and $\cos \alpha = 5/13$, then $\tan \alpha = ?$
 (a) 15/12 (b) 7/13 (c) 12/5 (d) 17/13 (e) 60/13

2. Which of the following is equivalent to $\frac{1 - \cos^2 \theta}{\cos^2 \theta}$?
 (a) $\sec^2 \theta$ (b) $(\csc^2 \theta) - 1$ (c) $\tan^2 \theta$ (d) $\sin^2 \theta$ (e) $-\frac{1}{\sin^2 \theta}$

If $0 \leq x \leq \pi$, then the set of all satisfying $\sin 2x - \sqrt{2} \sin x = 0$ is

(a) $\frac{\pi}{4}, \pi$ (b) $\frac{\pi}{2}, \pi$ (c) $\frac{\pi}{2}, \frac{\pi}{4}$ (d) $\frac{\pi}{4}, \frac{\pi}{2}$ (e) $\frac{\pi}{4}, \pi$

4. Express $\cos(\arctan x)$ without trigonometric functions.

(a) $\sqrt{1+x^2}$ (b) $\frac{1}{\sqrt{1+x^2}}$ (c) $\frac{1}{x}$ (d) $\frac{x}{\sqrt{1-x^2}}$ (e) $\frac{1}{\sqrt{1-x^2}}$

5. The figure below shows 2 points, P and Q , on a unit circle. What is the distance, in coordinate units, from P to Q ?

(a) $\sqrt{(\cos \alpha - \cos \beta)^2 + (\sin \alpha - \sin \beta)^2}$
 (b) $\sqrt{2 + 2\cos \alpha \cos \beta + 2\sin \alpha \sin \beta}$
 (c) $2\sqrt{\cos \alpha \cos \beta + \sin \alpha \sin \beta}$
 (d) $2\sqrt{\cos \alpha \cos \beta - \sin \alpha \sin \beta}$
 (e) $2 \cos \alpha \sin \beta$

Pre-Calculus: Trigonometry																			
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal				
									I	E/M				MM					
District Objective Determine the length of the unknown sides and/or angles in a right triangle.												PASS Process Standard All		Quarter III No. Days 1					
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP																			
PASS Objective The student will... IV. Angles and Triangles (Geometry) B. Use the Pythagorean Theorem and its converse to find missing side lengths and to determine acute, right, and obtuse triangles.														NCTM Standard Pgs. 310-313					
Text Correlation Sec. 9.1, Pgs. 331-338								Rating 1		Additional Resources Scientific/Graphing Calculator http://phywww1.ncssm.edu/goebel/imp/index_f.html http://www.univie.ac.at/future.media/moe/galerie.html									

Assessment

A distress call from a camper is received by 2 ranger stations. Station #1 is 10 miles due west from Station #2. The rangers determine that the camper is located as shown in the diagram below. How many miles is the camper from Station #2?

- (a) $\frac{10}{\sin 43^\circ}$
- (b) $\frac{10}{\cos 43^\circ}$
- (c) $10 \sin 43^\circ$
- (d) $10 \cos 43^\circ$
- (e) $10 \tan 43^\circ$

Pre-Calculus: Trigonometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
								I	E	E	E	M		MM	
District Objective Calculate the area of a triangular region.												PASS Process Standard All		Quarter III No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will... II. Properties of 2- and 3-dimensional figures (Geometry) C. Compute length, perimeter/circumference, area, volume, and surface area of geometric objects with missing information and correctly identify the appropriate unit of measure.														NCTM Standard Pgs. 322-324	

Text Correlation Sec. 9.2, Pgs. 339-344	Rating 1	Additional Resources Scientific/Graphing Calculator http://www.acts.tinet.ie/areaoftriangle_673.html http://jwilson.coe.ugs.edu/emt725/Herson/Heron.html
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Assessment

What is the best approximation for the area of the triangle shown?

- (a) 6.00 cm²
- (b) 12.50 cm²
- (c) 11.74cm²
- (d) 8.82 cm²
- (e) 5.87 cm²

Pre-Calculus: Trigonometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	
District Objective Use the Law of Sines to find the unknown sides and angles of a triangle.												PASS Process Standard All		Quarter III No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 310-313	

Text Correlation Sec. 9.3, Pgs. 345-350	Rating 1	Additional Resources Scientific/Graphing Calculator; Ambiguous Trig!!! Activity; http://www.univie.ac.at/future.media/moe/galerie/galerie.htm http://www.mste.uiuc.edu/teacher/resource/heron.html
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Assessment

1. An aerial tram starts at a point one-half mile from the base of a mountain whose face has a 60° angle of elevation. (See Figure 7.22). The train ascends at an angle of 20° . What is the length of the cable from T to A ?

SOLUTION: The Law of Cosines will not help us here because we only know the length of one side of the triangle. We do however, know two angles in this diagram. Thus, we can use the Law of Sines. We have:

$$\frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\frac{\sin 40^\circ}{0.5} = \frac{\sin 120^\circ}{c}$$

so $c = 0.5 \frac{\sin 120^\circ}{\sin 40^\circ} \approx 0.6736$. Therefore, the cable from T to A is 0.6736 miles.

Pre-Calculus: Trigonometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	
District Objective Use the Law of Cosines to find the unknown sides and angles of a triangle.												PASS Process Standard All	Quarter III No. Days 1		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...												NCTM Standard Pgs. 310-313			

Text Correlation Sec. 9.4, Pgs. 350-354	Rating 1	Additional Resources Scientific/Graphing Calculator http://mathaid.com/products/Trigonometry/full/contents_.htm http://www.ies.co.jp/math/java/Trig/index.html
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Assessment

1. A person leaves her home and walks 5 miles due east and then 3 miles northeast. How far has she walked? How far away from home is she?

SOLUTION: One side of the triangle in Figure 7.19 is 5 miles long, while the second side is 3 miles long and forms an angle of 135° with the first. This is because when the person turns northeast, she turns through an angle of 45° . Thus, we know two sides of this triangle, 5 and 3, and the angle between them, which is 135° . The length of the third side, x , can be found by applying the Law of Cosines:

$$\begin{aligned} x^2 &= 5^2 + 3^2 - 2 \cdot 5 \cdot 3 \cos 135^\circ \\ &= 34 - 30 \left(-\frac{\sqrt{2}}{2} \right) \\ &= 55.2 \end{aligned}$$

Pre-Calculus: Trigonometry

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	
District Objective Apply trigonometry to solve real-world situations.												PASS Process Standard All		Quarter III No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 310-313	

Text Correlation Sec. 9.5, Pgs. 359-364	Rating 1	Additional Resources Scientific/Graphics Calculator; http://phywww1.ncssm.edu/goebel/imp/index_f.html
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Assessment

To estimate the width of an archeological mound, archeologists place two stakes on opposite ends of the widest point. They set a third stake 82 feet from one stake and 97 feet from the other stake. The angle formed is 125° . Find the width of the mound.

Pre-Calculus: Number Systems - Polar

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	
District Objective Make polar and rectangular conversions.												PASS Process Standard All		Quarter III No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...												NCTM Standard Pgs. 313-314			

Text Correlation Sec. 11.1, Pgs. 395-402	Rating 1	Additional Resources Scientific/Graphing Calculator; Won't You Be My Valentine? Activity; Making Spirals Activity; http://mathaid.com/products/Trigonometry/full/contents_.htm 1
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Assessment

- Convert the rectangular point (3, 4) to polar form.
- Convert (3, 30°) to rectangular form.
- Find a rectangular equation for the polar equation $r=4 \sin \theta$.

- (a) $x^2 + y^2 = 4$ (b) $x^2 + (y-2)^2 = 4$ (c) $x=4y^2$
 (d) $y=4x^2$ (e) None of these

- Find a polar equation (that expresses r as a function of θ) for the linear equation $y=mx+b$, where $b \neq 0$.

RESPONSE: Substitute $y=r \sin \theta$ and $x=r \cos \theta$ into the equation $y=mx+b$;
 $r \sin \theta=m(r \cos \theta)+b$; $r \sin \theta - rm \cos \theta=b$;
 $r(\sin \theta - m \cos \theta)=b$; $r=\frac{b}{\sin \theta - m \cos \theta}$.

Pre-Calculus: Number Systems - Polar

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Write complex numbers in polar form.												PASS Process Standard All		Quarter III No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input type="radio"/> AP															

PASS Objective The student will...	NCTM Standard Pgs. 291-292 Pgs. 313-314
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Text Correlation Sec. 11.2, Pgs. 403-407	Rating 1	Additional Resources Scientific/Graphing Calculator http://mathaid.com/products/Precalc/full/contents_.html http://www.exploremath.com/lessonplans/index.cfm
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Assessment

1. Express $z = -2i$ and $z = -2 + 3i$ using polar coordinates.

SOLUTION: for $z = -2i$, the distance of z from the origin is 2. Thus $r = 2$. Also, one value for θ is $\theta = 3\pi/2$. Thus, using polar coordinates,

$$z = -2i = 2 \cos(3\pi/2) + i 2(\sin 3\pi/2).$$

For $z = -2 + 3i$, we have $x = -2$, $y = 3$, so $r = \sqrt{(-2)^2 + 3^2} \approx 3.61$ and $\tan \theta = 3/(-2)$, so, for example, $\theta \approx 2.16$. Thus using polar coordinates,

$$z = -2 + 3i \approx 3.61 \cos(2.16) + i 3.61 \sin(2.16).$$

2. Consider the point with polar coordinates $r = 5$ and $\theta = 3\pi/4$. What complex number does this point represent?

SOLUTION: Since $x = r \cos \theta$ and $y = r \sin \theta$ we see that $x = 5 \cos 3\pi/4 = -5/\sqrt{2}$, and $y = 5 \sin 3\pi/4 = 5/\sqrt{2}$, so $z = -5/\sqrt{2} + i5/\sqrt{2}$.

Pre-Calculus: Number Systems - Polar

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	

District Objective Use DeMoivre's Theorem to evaluate powers of complex numbers.	PASS Process Standard All	Quarter III No. Days 1
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<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input type="radio"/> AP		
PASS Objective The student will...		NCTM Standard Pgs. 291-294
Text Correlation Sec. 11.3, Pgs. 407-410	Rating 1	Additional Resources Scientific/Graphing Calculator http://mathaid.com/products/Precalc/full/contents_.html
Assessment $z_1 = 3(\cos 100^\circ + i \sin 100^\circ)$ and $z_2 = 2(\cos 20^\circ + i \sin 20^\circ)$. (a) Give the polar form of $z_1 z_2$. (b) Give the rectangular form of $z_1 z_2$. (c) Give the polar form of $\frac{1}{z_1}$. (d) Give the rectangular form of z_2^6 .		

Pre-Calculus: Number Systems - Polar																
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal	
														I		
District Objective Find the roots of complex numbers.												PASS Process Standard All	Quarter III No. Days			

<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 291-294	
Text Correlation Sec. 11.4, Pgs. 412-415				Rating 1		Additional Resources Scientific/Graphing Calculator http://www.geom/umn.edu/~laurence/welcome.html http://www.mecca.org/~halfacre/MATH/plesson129.htm									
Assessment Which number is a square root of $3+4i$? (a) $-7+24i$ (b) $2-i$ (c) $5+5i$ (d) $-2-i$ (e) $-2+i$															
Pre-Calculus: Vectors															
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	

District Objective Perform the basic mathematical operations on vectors and graphically display the resultant vector.										PASS Process Standard All			Quarter III No. Days 2		
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ○ ACT ○ AP															
PASS Objective The student will...													NCTM Standard Pg. 294		
Text Correlation Sec. 12.1, 12.2, Pgs. 419-432					Rating 1		Additional Resources Rulers Protractors http://www.ies.co.jp/math/java/trig/index.html http://intergate.cccoe.k12.ca.us/javamath/precalc/vector.htm								
Assessment															
1. Given points $A(-2, 4)$ and $B(1, 1)$: Express \vec{AB} in component form.															
2. Given $u = (2, 3)$ and $v = (-1, 5)$:															
(a) Show on a vector diagram the vectors u , v , and $u + 2v$.															
(b) Evaluate $ u + 2v $.															
3. Find the coordinates of the point P that is $\frac{2}{3}$ of the way from A to B .															
Pre-Calculus: Vectors															
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I		E	

District Objective Use vector and parametric equations to describe motion in a plane.		PASS Process Standard All	Quarter III No. Days 3
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ○ ACT ○ AP			
PASS Objective The student will...			NCTM Standard Pgs. 300-303
Text Correlation Sec. 12.3, Pgs. 432-440	Rating 2	Additional Resources <u>Functions Modeling Change</u> , Hughes-Hallett Graphing Calculator http://phywww1.ncssm.edu/goebel/imp/index_f.html http://www.cmc-math.org/circle.html	

Assessment

- An object moves so that its position at time t is $(x, y) = (4, -3) + t(-3, 6)$.
 - Find the velocity of the object.
 - Find the speed of the object.
 - Find a Cartesian equation of the line along which the object moves.

2. Write vector equations for a spider and a fly such that the following requirements are met.

- The lines of travel meet but the spider does not meet the fly.
- The lines of travel meet and the spider does meet the fly.

RESPONSE: Answers will vary. Check that the students understand the dynamics of the situation by asking them to trace the paths of the spider and the fly simultaneously with their fingers. An example is given.

- Spider: $(x, y) = (0, 3) + t(2, -1)$
Fly: $(x, y) = (7, -3) + t(-2, 2)$

The paths cross but the spider does not meet the fly.

- Spider: $(x, y) = (3, 0) + t(2, -1)$
Fly: $(x, y) = (7, -3) + t(-2, 2)$

The spider meets the fly when $t = 1$ at the point $(5, -1)$.

Pre-Calculus: Vectors

K	1	2	3	4	5	6	7	Pre-Alg	Alg I	Geom	Alg II	MA	P & S	Pre-Cal	AP Cal
												I		E	

District Objective Apply the use of vectors to solve real-world applications.		PASS Process Standard All	Quarter III No. Days 3
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ○ ACT ○ AP			
PASS Objective The student will...			NCTM Standard Pgs. 291-294
Text Correlation Sec. 12.4, Pgs. 441-446	Rating 1	Additional Resources Scientific/Graphing Calculator http://glenbrook.k12.il.us/gbssci/phys/Class/vectors/u311f.html	

Assessment

- Which is traveling faster, a car whose velocity vector is $21\vec{i} + 35\vec{j}$, or a car whose vector is $40\vec{i}$, assuming that the units are the same for both directions?
- A truck is traveling due north at 30 km / hr toward a crossroad. On a perpendicular road a police car is traveling west toward the intersection at 40 km / hr. Both vehicles will reach the crossroad in exactly one hour. Find the vector currently representing the displacement of the truck with respect to the police car.
- A car is traveling at a speed of 50 km / hr. The positive y - axis is north and the positive x - axis is east. Resolve the car's velocity vector into two components if the car is traveling in each of the following directions:
(a) East (b) South (c) Southeast (d) Northwest
- Shortly after taking off, a plane is climbing northwest through still air at an airspeed of 200 km / hr, and rising at a rate of 300 m / min. Resolve into components its velocity vector in a coordinate system in which the x - axis points east, the y - axis points north, and the z - axis points up.

Pre-Calculus: Sequences and Series

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	

District Objective Identify an arithmetic or geometric sequence and find a formula for its n th term.								PASS Process Standard All			Quarter IV(35 days + 6 Rev/Test) No. Days 1				
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ● ACT ○ AP															
PASS Objective The student will... III. Data Analysis, Statistics and Probability (Algebra II) F. Identify arithmetic and geometric series and sequences.											NCTM Standard Pgs. 297-300				
Text Correlation Sec. 13.1, Pgs. 473-478			Rating 1		Additional Resources Graphing Calculator http://forum.swarthmore.edu/library/more_info.html?id=17459										
Assessment															
<p>1. Insert two terms between 2 and 4 to form an arithmetic sequence. Insert two terms between 2 and 4 to form a geometric sequence.</p> <p>RESPONSE: Using $t_n = t_1 + (n-1)d$ for an arithmetic sequence, $4 = 2 + 3d$, so $d = \frac{2}{3}$.</p> <p>The arithmetic sequence is 2, $2\frac{2}{3}$, $3\frac{1}{3}$, 4. Using $t_n = t_1 \cdot r^{(n-1)}$ for a geometric sequence, $4 = 2r^3$, so $r = 2^{1/3}$. The geometric sequence is 2^1, $2^{4/3}$, $2^{5/3}$, $2^{6/3}$, or 2, $2\sqrt[3]{2}$, $2\sqrt[3]{4}$, 4.</p> <p>2. Find a formula for the nth term of the geometric sequence with $a_1 = 4$ and $r = \frac{1}{3}$. (Assume that n begins with 1.)</p> <p>(a) $a_n = 4\left(\frac{1}{3}\right)^{n-1}$ * (b) $a_n = 4\left(\frac{1}{3}\right)^{n-1}$ (c) $a_n = 4\left(\frac{1}{3}\right)^n$ (d) $a_n = 4 + \left(\frac{1}{3}\right)^n$</p> <p>(e) None of these</p>															
Pre-Calculus: Sequences and Series															
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal

										I	E/M		MM	
District Objective Find the sum of n terms in an arithmetic or geometric series.											PASS Process Standard All		Quarter IV No. Days 1	
○ ITBS ○ CRT ○ EXPLORE ○ EOI ○ PLAN ● ACT ○ AP														
PASS Objective The student will... III. Data Analysis, Statistics, and Probabilities (Algebra II) F. Identify arithmetic and geometric series and sequences.											NCTM Standard Pgs. 297-300 Pgs. 322-324			
Text Correlation Sec. 13.3, Pgs. 486-492		Rating 1	Additional Resources Graphing Calculator; What's My Pattern?? Activity Sheet; http://www.ugrad.math.ubc.ca/coursedoc/math102/java/m102//demos/series.geom.html											
Assessment 1. Find the sum of all 3 - digit numbers divisible by 8. 2. Under ideal conditions, certain bacteria will subdivide into 4 parts during one hour. Each of these parts will subdivide into 4 parts during the next hour. If the process continues in this fashion, how many parts will there be after 10 hours?														
Pre-Calculus: Sequences and Series														

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Find the sum of an infinite geometric series.											PASS Process Standard All		Quarter IV No. Days 1		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 297-300 Pgs. 322-324		
Text Correlation Sec. 13.5, Pgs. 500-505		Rating 1		Additional Resources Scientific/Graphing Calculator; Famous Fractals: Sierpinski-Cantor-Koch Activity; http://www.ugrad.math.ubc.ca/coursedoc/math102/java/m102/demos/series/geom.htm											
Assessment															
1. Find the sum of the infinite geometric sequence: $-7, -\frac{7}{3}, -\frac{7}{9}, -\frac{7}{27}, \dots$															
(a) -5 (b) $-\frac{21}{4}$ (c) $-\frac{5}{2}$ *(d) $-\frac{21}{2}$ (e) None of these															
2. What is the sum of the infinite geometric series $\frac{3}{5} - \frac{3}{5 \cdot 2} + \frac{3}{5 \cdot 2^2} - \frac{3}{5 \cdot 2^3} + \dots$?															
(a) 1.2 (b) 0.4 (c) $3\bar{3}$ (d) $-3\bar{3}$ (e) 0.6															

Pre-Calculus: Sequences and Series

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
											I	E/M		MM	
District Objective Use sigma notations to express a series.												PASS Process Standard All		Quarter IV No. Days 1	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input checked="" type="radio"/> ACT <input type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 300-305	
Text Correlation Sec. 13.6, Pgs. 506-510								Rating 1		Additional Resources http://ww2.mcgill.ca/course/204204B01/applets/usage.html					
Assessment															
<p>1. Use sigma notation to write the sum of the first 20 positive odd numbers. Evaluate this sum. SOLUTION: The odd numbers form an arithmetic sequence: 1, 3, 5, 7, . . . with $a_1 = 1$ and $d = 2$. The i^{th} odd number is $a_i = 1 + (i - 1)2 = 2i - 1.$ The sum of the first 20 odd numbers is given by $\text{Sum} = \sum_{i=1}^{20} a_i = \sum_{i=1}^{20} (2i - 1).$ We evaluate the sum using $n = 20$, $a_1 = 1$, and $d = 2$: $\text{Sum} = \frac{1}{2} n (2a_1 + (n - 1) d) = \frac{1}{2} (20)(2(1) + (20 - 1)(2)) = 400.$</p> <p>2. The triangular pyramidal numbers are defined as the sum of n triangular numbers, i.e., $P_1 = t$, $P_2 = t_1 + t_2$, $P_3 = t_1 + t_2 + t_3$, . . . , $P_n = t_1 + t_2 + \dots + t_n$. Use sigma notation and properties of finite sums to find a general rule for this sequence.</p>															

Pre-Calculus: Limits

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal		
												I/E/M		MM			
District Objective Determine the limit, if it exists, of a polynomial or rational function.												PASS Process Standard All		Quarter IV No. Days 7			
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP																	
PASS Objective The student will...												NCTM Standard Pgs. 303-306 Pgs. 322-324					
Text Correlation Sec. 13.4, 19.1, Pgs. 493-499 Pgs. 717-725								Rating 1		Additional Resources Graphing Calculator; <u>Functions Modeling Change</u> , Hughes-Hallet; Iteration and Time Series Graphs Activity Sheets; http://www.math.odu.edu/cbii/calcanim/main.html							
Assessment																	
1. $\lim_{n \rightarrow \infty} \frac{3n^2 + 2n}{4n - n^2} =$				2. $\lim_{n \rightarrow \infty} \frac{2n^2 + n}{3n^2 + 9}$				$\lim_{n \rightarrow \infty} e^{-n}$				$\lim_{n \rightarrow \infty} \log \cos \frac{1}{n}$					
(a) $\frac{3}{4}$		(b) $\frac{1}{2}$		(c) $-\frac{5}{4}$		(d) -3		(e) does not exist									
3. Sketch the graph of a function f having these properties: $f(-10) = -1$, $f(-5) = 4$, $f(0) = 2$, $f(6) = -8$, $f(9) = 0$, $f(12) = 2$, $\lim_{x \rightarrow -\infty} f(x) = -\infty$, $\lim_{x \rightarrow 6^-} f(x) = \infty$, $\lim_{x \rightarrow 6^+} f(x) = 2$, $\lim_{x \rightarrow 12^-} f(x) = -2$, $\lim_{x \rightarrow 12^+} f(x) = 2$, and $\lim_{x \rightarrow \infty} f(x) = \infty$.																	

Pre-Calculus: Limits

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
												I/E/M		MM	
District Objective Sketch the graph of a rational function.												PASS Process Standard All		Quarter IV No. Days 3	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 297-300		
Text Correlation Sec. 19.2, Pgs. 726- 728			Rating 1		Additional Resources Graphing Calculator <u>Functions Modeling Change</u> , Hughes-Hallett; http://www.univie.ac.at/future.media/moe/galerie/fun2/fun2.html http://id.mind.net/~zona/mmts/functionInstitute/functionInstitute.html										
Assessment															
<p>1. Which of the following statements is <i>not</i> true about the graph of $f(x) = \frac{x^2 - x - 6}{x^2 - 5x + 6}$?</p> <p>(a) It has a vertical asymptote of $x = 3$.</p> <p>(b) It has a vertical asymptote of $x = 2$.</p> <p>(c) It has a horizontal asymptote of $y = 1$.</p> <p>(d) It has only one x-intercept.</p> <p>(e) It does not have a point of symmetry.</p> <p>2. Create a rational function having these properties: vertical asymptotes at $x = 4$ and $x = -1$, horizontal asymptote at $y = 5$, and zeros at -2 and 3.</p> <p>RESPONSE: $f(x) = \frac{5(x+2)(x-3)}{(x-4)(x+1)}$</p>															

Pre-Calculus: Limits

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														E	

District Objective
Use technology to approximate the area under a curve.

PASS Process Standard
All

Quarter IV
No. Days
2

ITBS CRT EXPLORE EOI PLAN ACT AP

PASS Objective
The student will...

NCTM Standard
Pgs. 322-324

Text Correlation
Sec. 19.3,
Pgs. 729-733

Rating
1

Additional Resources
Graphing Calculator;
http://integretechpub.com/examples/interactive/fig4_10.htm
http://integretechpub.com/examples/interactive/AVC_java.htm
<http://xanadu.math.utah.edu/java/ApproxArea.html>

Assessment

1. Approximate the area of the region using indicated number of rectangles of equal length.

$$f(x) = 16 - x^2$$

2. Complete the table showing the approximate area of the region in the graph using n rectangles of equal width

n	4	8	20	50
Approximate Area				

(a) $f(x) = -\frac{1}{2}x + 4$

(b) $f(x) = 9 - x^2$

Pre-Calculus: Derivatives															
K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Find the derivative of a function and use it to locate points where the tangent line is horizontal.												PASS Process Standard All		Quarter IV No. Days 10	
○ ITBS ○ CRT ○ EXPLORE ● EOI ○ PLAN ○ ACT ● AP															
PASS Objective The student will...													NCTM Standard Pgs. 305-306		
Text Correlation Sec. 20.1, Pgs. 757-763				Rating 2		Additional Resources Graphing Calculator; Functions Modeling Change, Hughes-Hallett; http://integretechpub.com/examples/interactive/TF_java.htm http://archives.math.utk.edu/visual_calculus/3/inverse.1/ http://www.ies.co.jp/math/java/calc/doukan/doukan.html http://school.discovery.com/homeworkhelp/webmath/derivatives.html http://www.math.odu.edu/cbii/calcanim/main.html									
Assessment															
1. Find the derivative of the function. Express the derivative without using fractional or negative exponents.															
(a) $f(x) = x^5 + 3x^4 + 2x^{-\frac{1}{2}}$								(b) $f(x) = \frac{1}{2x^4} + 3$							
2. If $f(x) = \frac{1}{\sqrt{x}}$, evaluate $f'(9)$.															
3. Find the derivative of $f(x) = x^3 + 3x^2$. Use the derivative to determine any points on the graph of f where the tangent line is horizontal. Verify your results by using a graphing utility to graph f .															
ANSWER: $f'(x) = 3x^2 + 6x$ $f'(0) = 0, f'(-2) = 0$															

Pre-Calculus: Derivatives

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Use the 1st Derivative Test to locate the relative extrema of a graph.												PASS Process Standard All	Quarter IV No. Days 2		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 305-306		
Text Correlation Sec. 20.2, Pgs. 764-768		Rating 1	Additional Resources Graphing Calculator; http://www2.academic.com/AcademicOnline/imath/UseGrapher.html http://147.4.150.5/~matscw/RealWorld/index.html http://www.univie.ac.at/future.media/moe/galerie.html												
Assessment 1. Given a function $f(x)$, $f'(x)$ is called the <i>first</i> derivative of $f(x)$, while the derivative of $f'(x)$ is called the <i>second</i> derivative of $f(x)$ and is denoted $f''(x)$. For each of the functions in Exercises 1-12 on page 768, find the second derivative. Then evaluate the second derivative at each point where the first derivative equals 0. Can you draw any conclusions? Present your findings to the class. RESPONSE: If $f'(a) = 0$ and $f''(a) > 0$, then $(a, f(a))$ is a local minimum point. If $f'(a) = 0$ and $f''(a) < 0$, then $(a, f(a))$ is a local maximum point. APPLICATION: Sketch the graph of a continuous function f having these properties: $f(-2) = f(0) = f(2) = 0$, $f'(-1) = f'(1) = 0$, $f'(0) = -1$, and $f'(-3) = f'(3) > 0$. RESPONSE:															

Pre-Calculus: Derivatives

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Sketch the graph of a function using derivatives.												PASS Process Standard All		Quarter IV No. Days 2	
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP															
PASS Objective The student will...												NCTM Standard Pgs. 305-306			
Text Correlation Sec. 20.2, Pgs. 764-769			Rating 1		Additional Resources Graphing Calculator; http://147.4.150.5/~matscw/RealWorld/index.html http://www.cut-the-knot.com/Curriculum/Calculus/CubicSpline.html										
Assessment In Exercises 1-3, let $f(x) = -x - x^{-1}$ <ol style="list-style-type: none"> 1. Graph $f(x)$. 2. Identify the coordinates of any local maximum points. (If none exist, say so.) 3. Identify the coordinates of any local minimum points. (If none exist, say so.) 															

Pre-Calculus: Derivatives

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Apply the use of derivatives to solve extreme value problems.												PASS Process Standard All	Quarter IV No. Days 2		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP															
PASS Objective The student will...													NCTM Standard Pgs. 305-306		
Text Correlation Sec. 20.3, Pgs. 769-774				Rating 1		Additional Resources http://mathforum.com/library/problems/sets/trigcalc_derivatives.html									
Assessment 1. The lower side of a rectangle lies on the x - axis and the upper two vertices are on the parabola $y = 6 - 2x^2$. Find the maximum possible area for such a rectangle. 2. Congruent squares are cut from the corners of a 20 inch piece of tin, and the edges are then turned up to make an open box. How large would the squares cut from the corners be in order to maximize the volume of the box?															

Pre-Calculus: Derivatives

K	1	2	3	4	5	6	7	Pre- Alg	Alg I	Geom	Alg II	MA	P & S	Pre- Cal	AP Cal
														I	
District Objective Apply the use of derivatives to find instantaneous velocities and accelerations.												PASS Process Standard All	Quarter IV No. Days 1		
<input type="radio"/> ITBS <input type="radio"/> CRT <input type="radio"/> EXPLORE <input checked="" type="radio"/> EOI <input type="radio"/> PLAN <input type="radio"/> ACT <input checked="" type="radio"/> AP															
PASS Objective The student will...														NCTM Standard Pgs. 305-306	
Text Correlation Sec. 20.4, Pgs. 774-781				Rating 1		Additional Resources http://members.nbc.com/Surendranath/Applets.html http://www.ramsey.k12.nj.us/webquest/projects/rhs/science/velocity/index.htm									
Assessment <ol style="list-style-type: none"> 1. When a ball is thrown upward from the top of a 20 m building, its height in meters above the ground t seconds later is given by the function $h(t) = 20 + 25t - 5t^2$. <ol style="list-style-type: none"> (a) What is the average velocity over the interval from $t = 0$ to $t = 2$ seconds? (b) What is the instantaneous velocity at $t = 2$? (c) What is the acceleration at $t = 2$? (d) For what values of t is the ball rising? 2. In Exercises a - e, determine whether the following are <i>always</i>, <i>sometimes</i>, or <i>never</i> true. <ol style="list-style-type: none"> (a) If $f(x)$ is a constant function, then $f'(x) = 0$ for all x. (b) If $f'(c) = 0$ for some real number c, then the function has a local maximum or minimum. (c) If $f'(x) < 0$ for all x in some interval, then the graph of $f(x)$ rises as x increases in the interval. (d) The average velocity of a moving object for (time) $t > 0$ is positive. (e) If the velocity of a moving object is greater than 0, then its acceleration is greater than zero. 															

