

30186 T3 MW 10:30 am – 12:10 pm E 225

**INSTRUCTOR:** Dr. Kelly Molkenthin (pronounced “molk-in-tine”)  
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Office Hours: Monday 12:15 – 1:15 pm  
Tuesday 12:30 – 1:30 pm  
Wednesday 12:15 – 1:15 pm  
Thursday 12:30 – 1:30 pm  
and by appointment.

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**REQUIRED MATERIAL:**

The text is *Precalculus, 1<sup>st</sup> Edition*. Coburn & Herdlick. McGraw Hill 2012. ISBN #9780073519531  
You can purchase a hardcover or paperback book with ALEKS 360 access code or just the electronic access kit (which includes ebook). You are required to purchase the access code for **ALEKS 360**.

- Options:**
- 1) Combo package; Includes copy of text, ALEX **360** (includes ebook). This gives access for a full year to ALEKS.
  - or 2) ALEKS **360** 52 wk access code (includes ebook). This gives access for a full year to ALEKS.
  - or 3) ALEKS **360** 18 wk access code (includes ebook). This gives access for Fall term only to ALEKS.

**CALCULATORS:** Graphing calculators will be needed for many homework problems and it is required that you bring one to **every class**. Cell phones may **not** be used as calculators.

**COMPUTERS:** In this course, students will use an online program titled **ALEKS 360**. This program can be used on any computer or tablet with internet access. An access code for **ALEKS 360** is required. If you did not purchase a book which has an access code bundled with it, you will have to purchase an access code separately. One may be purchased at the TRCC bookstore or online at [www.aleks.com](http://www.aleks.com).

What is ALEKS?

Assessment and **LE**arning in **K**nowledge **S**paces is a Web-based, artificially intelligent assessment and learning system. ALEKS uses adaptive questioning to quickly and accurately determine exactly what a student knows and doesn't know in a course. ALEKS then instructs the student on the topics they are most ready to learn. As a student works through a course, ALEKS periodically reassesses the student to ensure that topics learned are also retained. ALEKS courses are very complete in their topic coverage. A student who shows a high level of mastery of an ALEKS course will be successful in the actual course they are taking.

**Course Code: 4ADVC-D9KNV**

<b>GRADING:</b>	3 Exams:	300 points (100 each)
	Final Exam:	150 points
	ALEKS:	300 points
	Attendance & Participation	50 points
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	Total:	800 points

Your final grade is the total number of points you have received divided by the total possible number of points. Final grades will be determined using the scale below:

<b>A</b> → 93% and above	<b>A-</b> → 90 - 92%	
<b>B+</b> → 87 - 89%	<b>B</b> → 83 - 86%	<b>B-</b> → 80 - 82%
<b>C+</b> → 77 - 79%	<b>C</b> → 73 - 76%	<b>C-</b> → 70 - 72%
<b>D+</b> → 67 - 69%	<b>D</b> → 63 - 66%	<b>D-</b> → 60 - 62%

**EXTRA CREDIT:** There will be **no** “extra credit” assignments for this course.

**EXAMS:** You will have three in class exams. Exams are scheduled for the following dates:

- ◆ **Exam 1:** Wednesday, 9/28/16
- ◆ **Exam 2:** Wednesday, 10/26/16
- ◆ **Exam 3:** Wednesday, 11/30/16
- ◆ **Final Exam:** Wednesday, 12/14/16

This may change (but hopefully not), depending on how we are doing. Make-ups for exams will be given only in **EXTREME** circumstances (to be determined by instructor: “vacations” or dentist/doctor appointments are NOT valid reasons to miss an exam, for example) AND if arrangements are made **PRIOR** to the missed exam. Any make-up must be completed by 10:30 am prior to the next class meeting day. No exam will be administered prior to the date/time of the scheduled exam. **No calls/no shows will receive a grade of 0 (zero)** on any exam. Your final exam is a cumulative **2 hour** final exam. You will need to sign up for a 2 hour block on Wednesday, 12/14, for your final exam. Please plan accordingly.

**ALEKS:** A five hour per week minimum level of student participation is required. This will account for 75 of the 300 ALEKS grade points. The five hour participation requirement is waived on a weekly basis **ONLY** if all current prerequisites have been completed, as well as current topic objectives (topic objectives will be determined at the end of each class meeting). In ALEKS students are expected to complete nine intermediate objectives displayed in four objective pies. Completion of each objective pie by its specified due date is worth a total of 200 grade points. Course mastery in ALEKS is worth 25 grade points.

- ◆ Time Goal #1 – due Tuesday 9/6, 11:59 pm
- ◆ Time Goal #2 – due Tuesday 9/13, 11:59 pm
- ◆ Time Goal #3 – due Tuesday 9/20, 11:59 pm

◆ Time Goal #4 – due Tuesday 9/27, 11:59 pm

◆ **Objective Pie #1: due Tuesday 9/27, 11:59 pm**

**Exam #1 – Wednesday 9/28, 10:30 am**

◆ Time Goal #5 – due Tuesday 10/4, 11:59 pm

◆ Time Goal #6 – due Tuesday, 10/11, 11:59 pm

◆ Time Goal #7– due Tuesday 10/18, 11:59 pm

◆ Time Goal #8 – due Tuesday 10/25, 11:59 pm

◆ **Objective Pie #2: due Tuesday 10/25, 11:59 pm**

**Exam #2 – Wednesday 10/26, 10:30 am**

◆ Time Goal #9 – due Tuesday 11/1, 11:59 pm

◆ Time Goal #10 – due Tuesday 11/8, 11:59 pm

◆ Time Goal #11 – due Tuesday 11/15, 11:59 pm

◆ Time Goal #12 – due Tuesday 11/22, 11:59 pm

◆ Time Goal #13 – due Tuesday 11/29, 11:59 pm

◆ **Objective Pie #3: due Tuesday 11/29, 11:59 pm**

**Exam #3 – Wednesday 11/30, 10:30 am**

◆ Time Goal #14 – due Tuesday 12/6, 11:59 pm

◆ Time Goal #15 – due Tuesday 12/13, 11:59 pm

◆ **Objective Pie #4: due Tuesday 12/13, 11:59 pm**

◆ **Course Mastery Pie: due Tuesday 12/14, noon**

**\*\*2 hour\*\* Final Exam – Wednesday 12/14**

**ATTENDANCE & PARTICIPATION:** All students start the semester will 50 “bonus” Attendance/Participation points. Points will be deducted for unexcused absences, late arrivals, early departures, cell phone/tablet/computer use during class time and other distracting classroom behavior (determined by instructor). Attendance is required and will be taken for each class. An absence is excused **ONLY** for valid reasons (to be determined by the instructor) and if notification is given **PRIOR** to a missed class (via email, phone message – **not** word of mouth from another student). Oversleeping, “colds” and “vacations” are examples that are **not** valid reasons for an absence.

**\*\*All absences reported by phone or reported to instructor in person must be followed up with an email, or they will be considered unexcused.** Do your best to not miss ANY classes!! Students are allowed a maximum of 2 excused absences per semester, excused absences will not affect your attendance and participation grade. Unexcused absences *will* lower your attendance and participation grade.

**\*\*\*Also, if you miss a class it is **YOUR** responsibility to get the class notes from another student (refer to your class list) and **BE PREPARED** for the next class meeting (this includes taking a scheduled test).\*\*\***

**Note:** Class BEGINS at 10:30 am. It is expected that you will be in your seat and ready to go at 10:30 am. Students arriving after 10:30 am will lose attendance points for that class. Excessive “lateness” will not be tolerated, it is disruptive to both the instructor and the class. Excessive lateness will result in classroom doors being locked at 10:30 am. Also, students leaving class prior to the scheduled end time will lose attendance points for that class unless arrangements have been made with the instructor prior to the class in which the student needs to leave early.

**CLASS CANCELLATION:** In the unlikely event that a class needs to be canceled by the instructor, a notice will be placed on the classroom door prior to the start of class. If time permits, you will be notified by the instructor via email as soon as possible prior to the canceled class.

For college cancellations, pay attention to the radio & TV announcements, call the college's main phone number, 860-215-9000, or visit the college's home page, [www.trcc.commnet.edu](http://www.trcc.commnet.edu). Please: DO NOT email or call your instructor regarding school closings!

It is also suggested all students register for **The MyCommnet Alert Notification System**. This system is used to deliver important information to students, faculty, and staff regarding weather-related class cancellations. The system delivers both email messages, and text messages over cellular phones to those individuals who are registered. To register, log on to your MyCommnet account at [http://my.commnet.edu/](http://my.commnet.edu) and follow the link to MyCommnet Alert.

**STUDENT EMAIL:** When registering for ALEKS, please use an email you check most frequently. If the instructor needs to email the entire class, it will be done through ALEKS (which, in turn, gets automatically forwarded to the email you used to registered for ALEKS).

**HOMEWORK: Keep a separate notebook for your text homework.** Homework will be assigned on a regular basis. It is expected that you complete your homework by the next class meeting. **BE SURE TO CHECK YOUR ANSWERS IN THE BACK OF THE TEXT.** If you check the problem in the back of the text and it is not correct, re-do the problem. If you are struggling with the assignment, you need to seek out help either from your instructor or the tutor center ASAP! Our expectation is that you are spending 2-3 hours of reading and doing homework for this class for every "academic" hour we meet in class. We meet 4 "academic" hours per week, therefore you should expect to spend **at least 8 - 12 hours per week** working on material for this class outside of our class meetings, every week!

**\*NOTE:** Class time is reserved for presentation of material. Homework questions will be answered before or after class, or during meetings outside of class time.

**RETENTION OF PAPERS:** Students are expected to retain all graded work until final grades are received.

**COMMUNICATION:** Verbal communication with the instructor regarding missed classes, test make-ups, special accommodations, etc. **must** be followed up with an email ([kmolkenthin@trcc.commnet.edu](mailto:kmolkenthin@trcc.commnet.edu)) as soon as possible. This is essential!

**ACADEMIC DISHONESTY:** Academic integrity is essential in all aspects of college coursework and learning. I have zero tolerance for academic dishonesty. It is expected that **YOU** complete all your assigned ALEKS work. Communication or collaboration of ANY sort is **ABSOLUTEY PROHIBITED** during any exam. Academic Misconduct is punishable in a number of ways, including a score of a zero on the assignment where the cheating took place, a grade of an F in the course and/or possible censure on your permanent record. All cases of academic dishonesty will be referred to the Academic Dean. Do not let yourself come under the suspicion of academic dishonesty.

**COURSE OBJECTIVES:** This course prepares students for the study of Calculus I. Topics include, but are not limited to: polynomial and rational functions and their graphs, quadratic functions, operations on radical expressions, exponential and logarithmic functions, trigonometric functions and their graphs, trigonometric equations and identities, sequences and series, conic sections and systems of linear and nonlinear equations.

**COURSE OUTCOMES:** After successful completion of the course, the student should be able to:

- 1) Evaluate a function at any given value of  $x$
- 2) Find the domain and range of a function
- 3) Graph functions using tables, transformations
- 4) Graph piece-wise functions
- 5) Determine whether the function is even, odd, or neither
- 6) Identify the local max, min for some functions, intervals of increase/decrease.
- 7) Model with functions.
- 8) Combine functions, find compositions, inverses.
- 9) Graph polynomials, find their zeroes, the  $x$ - intercepts, analyze their end behavior. Factor Theorem.
- 10) Graph rational functions, find the asymptotes.
- 11) Perform the operations with complex numbers.
- 12) Find trigonometric form of a complex number.
- 13) Evaluate, graph exponential and logarithmic functions.
- 14) Solve exponential and logarithmic equations, model with exponential and logarithmic equations.
- 15) Find the angle measure in radian, degree.
- 16) Find all trigonometric ratios in a right triangle.
- 17) Find the values of trigonometric functions from the information given.
- 18) Solve a right triangle.
- 19) Solve a triangle using the Law of Sines, the Law of Cosines.
- 20) Find trigonometric functions of real numbers using unit circle approach.
- 21) Graph the trigonometric functions.
- 22) Use the trigonometric identities, addition, subtraction, double, half-angle formula.
- 23) Evaluate inverse trigonometric functions.
- 24) Solve trigonometric equations.
- 25) Understand properties of basic conic sections
- 26) Solve nonlinear systems of equations and inequalities
- 27) Use sequence notation to write the terms of sequences
- 28) Use factorial notation.
- 29) Use summation notation to write sums.
- 30) Model the real-life problems with arithmetic, geometric sequences.

**ACCOMMODATIONS:** Students with learning disabilities should contact the Learning Specialist, Matt Liscum, at 860-215-9265 or via email at [mliscum@trcc.commnet.edu](mailto:mliscum@trcc.commnet.edu) as soon as possible to ensure timely accommodations. Students with physical disabilities should contact Elizabeth Willcox at 860-215-9289 or via email at [ewillcox@trcc.commnet.edu](mailto:ewillcox@trcc.commnet.edu) to facilitate accommodations. All testing accommodations **MUST** be discussed with the instructor in a timely manner, that is, *at least* one to two class meetings **prior** to any scheduled test for which accommodations are needed.

**CELL PHONE POLICY:** All cell phones must be turned OFF or MUTED before entering the classroom and properly placed in a bag or pocket (not left on a desk). Any cell phone use is rude and inappropriate, and will not be tolerated. Students found using cell phones in any way in class will lose their attendance points for that class period. Cell phones may NOT be used for calculators in class. All cell phones must be completely out of sight, especially for all exams. Any visible cell phone during an exam will result in a 0 for that exam.

**ACCEPTANCE POLICY:** After reading this syllabus, choosing to stay registered for this course exemplifies your acceptance of the syllabus and all policies and consequences outlined in the syllabus. If you do not agree with any of the terms in the syllabus, you are free to withdraw.

**\*\*The key to success in this course is to attend every class and do all the homework when it is assigned. Ask questions when you have them, either in class or in my office. You will find it much easier to learn the new topics if you consistently keep up with the course material and homework problems!\*\***

\*\*\*The instructor has the right to change/modify this syllabus at any time with proper notification to the class\*\*\*

## **COURSE CONTENT - MAT\* K186, Fall 2016**

\*Review of Functions/Inverse Functions (transformations, domains, ranges, exponential and logarithmic functions, composition of functions and inverse functions)

### **Chapter 6: An Introduction to Trigonometric Functions**

- 6.1) Angle Measure, Special Triangles, and Special Angles
- 6.2) Unit Circle and the Trigonometry of Real Numbers
- 6.3) Graphs of Sine and Cosine Functions
- 6.4) Graphs of the Cosecant, Secant, Tangent, and Cotangent Functions
- 6.5) Transformations and Applications of Trigonometric Graphs
- 6.6) The Trigonometry of Right Triangles
- 6.7) Trigonometry and the Coordinate Plane
- 6.8) Trigonometric Equation Models

### **Chapter 7: Trigonometric Identities, Inverses, and Equations**

- 7.1) Fundamental Identities and Families of Identities
- 7.2) More on Verifying Identities
- 7.3) The Sum and Difference Identity
- 7.4) The Double-Angle, Half-Angle and Product-to-Sum Identities
- 7.5) The Inverse Trig Functions and Their Applications
- 7.6) Solving Basic Trig Equations
- 7.7) General Trig Equations and Applications

### **Chapter 8: Applications of Trigonometry**

- 8.1) Oblique Triangles and the Law of Sines
- 8.2) The Law of Cosines; the Area of a Triangle
- 8.5) Complex Numbers in Trigonometric Form
- 8.6) De Moivre's Theorem and the Theorem on  $n$ th Roots

### **Chapter 10: Analytic Geometry and the Conic Sections**

- 10.1) A Brief Introduction to Analytic Geometry
- 10.2) The Circle and Ellipse
- 10.3) The Hyperbola
- 10.4) The Analytic Parabola
- 10.5) Nonlinear Systems of Equations and Inequalities

### **Chapter 11: Additional Topics in Algebra** (time permitting)

- 11.1) Sequences and Series
- 11.2) Arithmetic Sequences
- 11.3) Geometric Sequences
- 11.4) Mathematical Induction

# ALEKS<sup>®</sup> Course Syllabus

## Dates:

## Objectives:

08/29/2016 - 09/27/2016	Ch.1-Relations, Functions, and Graphs (29 topics)
08/29/2016 - 09/27/2016	Ch.2-More on Functions (26 topics)
08/29/2016 - 09/27/2016	Ch.3-Quadratic Functions and Operations on Functions (23 topics)
08/29/2016 - 09/27/2016	Ch.5-Exponential and Logarithmic Functions (39 topics)
09/28/2016 - 10/25/2016	Ch.6-An Introduction to Trigonometric Functions (46 topics)
10/26/2016 - 11/29/2016	Ch.7-Trigonometric Identities, Inverses, and Equations (33 topics)
10/26/2016 - 11/29/2016	Ch.8-Applications of Trigonometry (20 topics)
11/30/2016 - 12/13/2016	Ch.10-Analytical Geometry and the Conic Sections (30 topics)
11/30/2016 - 12/13/2016	Ch.11-Additional Topics in Algebra (21 topics)

## **Ch.1-Relations, Functions, and Graphs (29 topics, due on 09/27/2016)**

### Section 1.1 (6 topics)

- Identifying solutions to a linear equation in two variables
- Graphing a parabola of the form  $y = ax^2$
- Graphing a parabola of the form  $y = ax^2 + c$
- Distance between two points in the plane: Exact answers
- Midpoint of a line segment in the plane
- Domain and range from ordered pairs

### Section 1.2 (6 topics)

- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts given the graph of a line on a grid
- Finding x- and y-intercepts of a line given the equation: Basic
- Finding x- and y-intercepts of a line given the equation: Advanced
- Writing the equations of vertical and horizontal lines through a given point

### Section 1.3 (15 topics)

- Identifying functions from relations
- Vertical line test
- Evaluating a rational function: Problem type 1
- Evaluating a rational function: Problem type 2
- Table for a square root function
- Evaluating functions: Absolute value, rational, radical
- Domain of a square root function: Basic
- Domain of a square root function: Advanced
- Finding the domain of a fractional function involving radicals
- Finding an output of a function from its graph
- Finding inputs and outputs of a function from its graph
- Domain and range from the graph of a discrete relation
- Domain and range from the graph of a continuous function
- Domain of a rational function: Interval notation
- Domain of a rational function: Excluded values

### Section 1.4 (3 topics\*)

- Finding x- and y-intercepts of a line given the equation: Basic
- Finding x- and y-intercepts of a line given the equation: Advanced
- Finding where a function is increasing, decreasing, or constant given the graph

### Chapter 1 Supplementary Topics (1 topic)

- Domain and range from the graph of a piecewise function

(\*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

## **Ch.2-More on Functions (26 topics, due on 09/27/2016)**

### Section 2.1 (5 topics)

- Finding intercepts of a nonlinear function given its graph
- Domain and range from the graph of a continuous function
- Finding where a function is increasing, decreasing, or constant given the graph
- Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
- Finding values and intervals where the graph of a function is zero, positive, or negative

### Section 2.2 (14 topics)

- Graphing a function of the form  $f(x) = ax^2$
- Graphing a function of the form  $f(x) = ax^2 + c$
- Graphing a parabola of the form  $y = (x-h)^2 + k$
- Graphing a square root function: Problem type 1
- How the leading coefficient affects the shape of a parabola
- Translating the graph of an absolute value function: Two steps
- How the leading coefficient affects the graph of an absolute value function
- Finding the vertex, x-intercepts, and axis of symmetry from the graph of a parabola
- Domain and range from the graph of a quadratic function
- Translating the graph of an absolute value function: One step
- Translating the graph of a function: One step
- Translating the graph of a parabola: Two steps
- Transforming the graph of a function by reflecting over an axis
- Transforming the graph of a function using more than one transformation

### Section 2.5 (4 topics)

- Evaluating a piecewise-defined function
- Graphing a piecewise-defined function: Problem type 1
- Graphing a piecewise-defined function: Problem type 2
- Graphing a piecewise-defined function: Problem type 3

### Chapter 2 Supplementary Topics (3 topics)

- Graphing a square root function: Problem type 2
- Matching parent graphs with their equations
- Writing an equation for a function after a vertical and horizontal translation



### **Ch.3-Quadratic Functions and Operations on Functions (23 topics, due on 09/27/2016)**

#### Section 3.2 (5 topics)

- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Solving a quadratic equation with complex roots

#### Section 3.3 (5 topics)

- Finding the vertex, x-intercepts, and axis of symmetry from the graph of a parabola
- Graphing a parabola of the form  $y = x^2 + bx + c$
- Graphing a parabola of the form  $y = ax^2 + bx + c$ : Integer coefficients
- Finding the x-intercept(s) and the vertex of a parabola
- Finding the maximum or minimum of a quadratic function

#### Section 3.4 (2 topics)

- Finding the average rate of change of a function
- Finding the average rate of change of a function given its graph

#### Section 3.5 (3 topics)

- Sum, difference, and product of two functions
- Quotient of two functions: Basic
- Combining functions: Advanced

#### Section 3.6 (7 topics)

- Finding a difference quotient for a linear or quadratic function
- Composition of two functions: Basic
- Expressing a function as a composition of two functions
- Composition of two functions: Domain and range
- Composition of a function with itself
- Introduction to the composition of two functions
- Composition of two rational functions

#### Chapter 3 Supplementary Topics (1 topic)

- Finding a difference quotient for a rational function

### **Ch.5-Exponential and Logarithmic Functions (39 topics, due on 09/27/2016)**

#### Section 5.1 (5 topics)

- Horizontal line test
- Determining whether two functions are inverses of each other
- Inverse functions: Linear, discrete
- Inverse functions: Rational
- Inverse functions: Quadratic, square root

## Section 5.2 (11 topics)

- Table for an exponential function
- The graph, domain, and range of an exponential function
- Graphing an exponential function and its asymptote:  $f(x) = a(e)^{x-b} + c$
- Evaluating an exponential function that models a real-world situation
- Finding a final amount in a word problem on exponential growth or decay
- Solving an exponential equation by finding common bases: Linear exponents
- Transforming the graph of a natural exponential function
- Graphing an exponential function:  $f(x)=b^x$
- Graphing an exponential function:  $f(x) = a(b)^x$
- Graphing an exponential function:  $f(x)=b^{-x}$  or  $f(x)=-b^{ax}$
- Finding domain and range from the graph of an exponential function

## Section 5.3 (6 topics)

- Translating the graph of a logarithmic function
- Graphing a logarithmic function: Basic
- The graph, domain, and range of a logarithmic function
- Converting between logarithmic and exponential equations
- Converting between natural logarithmic and exponential equations
- Evaluating logarithmic expressions

## Section 5.4 (7 topics)

- Solving an equation of the form  $\log_b a = c$
- Expanding a logarithmic expression: Problem type 1
- Writing an expression as a single logarithm
- Change of base for logarithms: Problem type 1
- Solving an exponential equation by using natural logarithms: Decimal answers
- Solving a multi-step equation involving a single logarithm: Problem type 1
- Basic properties of logarithms

## Section 5.5 (4 topics)

- Evaluating an exponential function with base e that models a real-world situation
- Solving a multi-step equation involving natural logarithms
- Solving an equation involving logarithms on both sides: Problem type 2
- Solving an equation involving logarithms on both sides: Problem type 1

## Section 5.6 (5 topics\*)

- Finding a final amount in a word problem on exponential growth or decay
- Finding the rate or time in a word problem on continuous exponential growth or decay
- Finding the time given an exponential function with base e that models a real-world situation
- Finding half-life or doubling time
- Writing and evaluating a function modeling continuous exponential growth or decay given doubling time or half-life

## Chapter 5 Supplementary Topics (2 topics)

- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs

(\*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

## Ch.6-An Introduction to Trigonometric Functions (46 topics, due on 10/25/2016)

### Section 6.1 (7 topics)

- Converting degrees-minutes-seconds to decimal degrees
- Converting a decimal degree to degrees-minutes-seconds
- Converting between degree and radian measure: Problem type 1
- Converting between degree and radian measure: Problem type 2
- Coterminal angles
- Arc length and central angle measure
- Area of a sector of a circle

### Section 6.2 (8 topics)

- Sketching an angle in standard position
- Finding coordinates on the unit circle for special angles
- Finding a point on the unit circle given one coordinate
- Trigonometric functions and special angles: Problem type 1
- Trigonometric functions and special angles: Problem type 2
- Trigonometric functions and special angles: Problem type 3
- Reference angles: Problem type 1
- Reference angles: Problem type 2

### Section 6.3 (5 topics)

- Sketching the graph of  $y = a \sin(bx)$  or  $y = a \cos(bx)$
- Amplitude and period of sine and cosine functions
- Writing the equation of a sine or cosine function given its graph: Problem type 1
- Sketching the graph of  $y = a \sin(x)$  or  $y = a \cos(x)$
- Sketching the graph of  $y = \sin(bx)$  or  $y = \cos(bx)$

### Section 6.4 (2 topics)

- Sketching the graph of a tangent or cotangent function: Problem type 2
- Domains and ranges of trigonometric functions

### Section 6.5 (7 topics)

- Sketching the graph of  $y = a \sin(x+c)$  or  $y = a \cos(x+c)$
- Sketching the graph of  $y = a \sin(bx+c)$  or  $y = a \cos(bx+c)$
- Amplitude, period, and phase shift of sine and cosine functions
- Writing the equation of a sine or cosine function given its graph: Problem type 2
- Sketching the graph of  $y = \sin(x)+ d$  or  $y = \cos(x)+ d$
- Sketching the graph of  $y = \sin(x+c)$  or  $y = \cos(x+c)$
- Sketching the graph of  $y = a \sin(bx)+ d$  or  $y = a \cos(bx)+ d$

### Section 6.6 (12 topics)

- Sine, cosine, and tangent ratios: Numbers for side lengths
- Sine, cosine, and tangent ratios: Variables for side lengths
- Using a calculator to approximate sine, cosine, and tangent values
- Using the Pythagorean Theorem to find a trigonometric ratio
- Finding trigonometric ratios given a right triangle
- Using a trigonometric ratio to find a side length in a right triangle

- Using trigonometry to find a length in a word problem with one right triangle
- Using a trigonometric ratio to find an angle measure in a right triangle
- Using trigonometry to find angles of elevation or depression in a word problem
- Solving a right triangle
- Using trigonometry to find a length in a word problem with two right triangles
- Using a calculator to approximate inverse trigonometric values

#### Section 6.7 (8 topics\*)

- Coterminal angles
- Trigonometric functions and special angles: Problem type 1
- Trigonometric functions and special angles: Problem type 2
- Trigonometric functions and special angles: Problem type 3
- Reference angles: Problem type 1
- Reference angles: Problem type 2
- Determining the location of a terminal point given the signs of trigonometric values
- Finding values of trigonometric functions given information about an angle: Problem type 1

#### Chapter 6 Supplementary Topics (3 topics)

- Special right triangles: Exact answers
- Understanding trigonometric ratios through similar right triangles
- Relationship between the sines and cosines of complementary angles

(\* ) Some topics in this section are also covered in a previous section of this Objective.

Topics are only counted once towards the total number of topics for this Objective.

### **Ch.7-Trigonometric Identities, Inverses, and Equations (33 topics, due on 11/29/2016)**

#### Section 7.1 (4 topics)

- Finding values of trigonometric functions given information about an angle: Problem type 2
- Finding values of trigonometric functions given information about an angle: Problem type 3
- Simplifying trigonometric expressions
- Verifying a trigonometric identity

#### Section 7.2 (3 topics\*)

- Verifying a trigonometric identity
- Proving trigonometric identities: Problem type 1
- Proving trigonometric identities: Problem type 2

#### Section 7.3 (4 topics)

- Sum and difference identities: Problem type 1
- Sum and difference identities: Problem type 2
- Proving trigonometric identities using sum and difference properties: Problem type 1
- Proving trigonometric identities using sum and difference properties: Problem type 2

#### Section 7.4 (2 topics)

- Double-angle identities: Problem type 1
- Half-angle identities: Problem type 1

### Section 7.5 (6 topics)

- Values of inverse trigonometric functions
- Composition of a trigonometric function with its inverse trigonometric function: Problem type 1
- Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 1
- Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 2
- Composition of trigonometric functions with variable expressions as inputs: Problem type 1
- Composition of trigonometric functions with variable expressions as inputs: Problem type 2

### Section 7.6 (8 topics)

- Finding solutions in an interval for a basic equation involving sine or cosine
- Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
- Solving a basic trigonometric equation involving sine or cosine
- Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 1
- Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant
- Solving a trigonometric equation involving a squared function: Problem type 1
- Solving a trigonometric equation involving an angle multiplied by a constant

### Section 7.7 (4 topics)

- Finding solutions in an interval for a trigonometric equation in factored form
- Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2
- Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 1
- Finding solutions in an interval for an equation with sine and cosine using sum and difference identities

### Chapter 7 Supplementary Topics (3 topics)

- Finding values of trigonometric functions given information about an angle: Problem type 4
- Composition of a trigonometric function with its inverse trigonometric function: Problem type 2
- Solving a trigonometric equation involving more than one function

(\* ) Some topics in this section are also covered in a previous section of this Objective.  
Topics are only counted once towards the total number of topics for this Objective.

## **Ch.8-Applications of Trigonometry (20 topics, due on 11/29/2016)**

### Section 8.1 (3 topics)

- Solving a triangle with the law of sines: Problem type 1
- Solving a triangle with the law of sines: Problem type 2
- Solving a word problem using the law of sines

### Section 8.2 (4 topics)

- Solving a triangle with the law of cosines
- Solving a word problem using the law of cosines
- Finding the area of a triangle using trigonometry
- Using trigonometry to find the area of a right triangle

## Section 8.5 (7 topics)

- Plotting points in polar coordinates
- Plotting complex numbers
- Writing a complex number in standard form given its trigonometric form
- Writing a complex number in trigonometric form: Special angles
- Multiplying and dividing complex numbers in trigonometric form
- De Moivre's Theorem: Answers in trigonometric form
- Converting rectangular coordinates to polar coordinates: Special angles

## Section 8.6 (3 topics)

- De Moivre's Theorem: Answers in standard form
- Finding the  $n$ th roots of a number: Problem type 1
- Finding the  $n$ th roots of a number: Problem type 2

## Chapter 8 - Strengthening Core Skills (3 topics)

- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with addition
- Solving a system of linear equations using elimination with multiplication and addition

## Ch.10-Analytical Geometry and the Conic Sections (30 topics, due on 12/07/2016)


### Section 10.2 (12 topics)

- Writing an equation of a circle given its center and a point on the circle
- Writing an equation of a circle given the endpoints of a diameter
- Graphing an ellipse given its equation in standard form
- Graphing an ellipse centered at the origin:  $Ax^2 + By^2 = C$
- Graphing an ellipse given its equation in general form
- Finding the foci of an ellipse given its equation in general form
- Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis
- Writing an equation of an ellipse given the foci and the major axis length
- Identifying the center and radius to graph a circle given its equation in standard form
- Identifying the center and radius to graph a circle given its equation in general form: Basic
- Finding the center, vertices, and foci of an ellipse
- Writing the equation of a circle centered at the origin given its radius or a point on the circle

### Section 10.3 (6 topics)

- Graphing a hyperbola given its equation in standard form
- Graphing a hyperbola centered at the origin:  $Ax^2 + By^2 = C$
- Graphing a hyperbola given its equation in general form
- Finding the foci of a hyperbola given its equation in general form
- Writing an equation of a hyperbola given the foci and the vertices
- Finding the center, vertices, foci, and asymptotes of a hyperbola

### Section 10.4 (8 topics)

- Range of a quadratic function 
- Graphing a parabola of the form  $ay^2 + by + cx + d = 0$  or  $ax^2 + bx + cy + d = 0$
- Writing an equation of a parabola given the vertex and the focus
- Finding the focus of a parabola of the form  $ay^2 + by + cx + d = 0$  or  $ax^2 + bx + cy + d = 0$

- Classifying conics given their equations
- Graphing a parabola of the form  $y^2 = ax$  or  $x^2 = ay$
- Writing an equation of a parabola given the focus and the directrix
- Writing an equation of a parabola given its graph

#### Section 10.5 (4 topics)

- Graphically solving a system of linear and quadratic equations
- Solving a system of linear and quadratic equations
- Solving a system of nonlinear equations: Problem type 1
- Solving a system of nonlinear equations: Problem type 2

### **Ch.11-Additional Topics in Algebra (21 topics, due on 12/07/2016)**

#### Section 11.1 (5 topics)

- Finding the first terms of an arithmetic sequence using an explicit rule
- Finding the first terms of a geometric sequence using an explicit rule
- Finding the first terms of a sequence using an explicit rule with multiple occurrences of n
- Finding the first terms of a sequence using a recursive rule
- Factorial expressions

#### Section 11.2 (7 topics)

- Finding the next terms of an arithmetic sequence with integers
- Identifying arithmetic sequences and finding the common difference
- Finding a specified term of an arithmetic sequence given the first terms
- Finding a specified term of an arithmetic sequence given the common difference and first term
- Finding a specified term of an arithmetic sequence given two terms of the sequence
- Writing an explicit rule for an arithmetic sequence
- Sum of the first n terms of an arithmetic sequence

#### Section 11.3 (9 topics)

- Finding the next terms of a geometric sequence with signed numbers
- Identifying arithmetic and geometric sequences
- Identifying geometric sequences and finding the common ratio
- Finding a specified term of a geometric sequence given the first terms
- Finding a specified term of a geometric sequence given the common ratio and first term
- Finding a specified term of a geometric sequence given two terms of the sequence
- Arithmetic and geometric sequences: Identifying and writing an explicit rule
- Sum of the first n terms of a geometric sequence
- Sum of an infinite geometric series

## ALEKS Time Goals – Fall 2016

Each week, you must complete:

- all prerequisites for the current objective pie and the goal topics in the current objective assigned in class
- or*
- a minimum of 5 hours in ALEKS

If all assigned goal topics and prerequisites are completed by the time goal date assigned in class each week, your (minimum) five-hour time goal is waived for that week. If do not complete the assigned topics by the goal time, you are responsible for *at least* five hours of ALEKS work for that week.

Goal topics and due dates depend on what is covered in class. Topics and dates will be assigned at the end of each class meeting, so please be sure to pay attention and write this information down.

Time Goal:	Begins:	Ends:	
1	8/28/16	9/6/16 11:59 pm	5 hours
2	9/7/16	9/13/16 11:59 pm	5 hours
3	9/14/16	9/20/16 11:59 pm	5 hours
4	9/21/16	9/27/16 11:59 pm	5 hours
5	9/28/16	10/4/16 11:59 pm	5 hours
6	10/5/16	10/11/16 11:59 pm	5 hours
7	10/12/16	10/18/16 11:59 pm	5 hours
8	10/19/16	10/25/16 11:59 pm	5 hours
9	10/26/16	11/1/16 11:59 pm	5 hours
10	11/2/16	11/8/16 11:59 pm	5 hours
11	11/9/16	11/15/16 11:59 pm	5 hours
12	11/16/16	11/22/16 11:59 pm	5 hours
13	11/23/16	11/29/16 11:59 pm	5 hours
14	11/30/16	12/6/16 11:59 pm	5 hours
15	12/7/16	12/13/16 11:59 pm	5 hours