30807 T10   9:30 am – 10:45 am   **E 202**

INSTRUCTOR: Dr. Kelly Molkenthin (pronounced "molk-in-tine")
                         Office: C 234, 860-215-9455
                         Email: kmolkenthin@trcc.commnet.edu

                         ****
                         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.
                         ****

REQUIRED MATERIAL:

   • The text is <u>Elementary and Intermediate Algebra 5th Ed</u>., Baratto & Bergman, 2014. You can purchase a hardcover or paperback book with ALEKS access code or just the electronic access kit (which includes ebook).

   • 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.

                         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 spring term
                             only to ALEKS.

CALCULATORS: Scientific calculators will be needed for many homework problems and it is REQUIRED that
           you bring one to **every class** and **each exam**. 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.

   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 she is 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 she/he is taking.

Course Code: 4JLVE-WXG4H

GRADING: 4 One-Hour Exams: 400 points (100 each)
                    Final Exam: 150 points
                    ALEKS   300 points
                    Attendance/Participation: 50 points

                    Total: 900 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:

A → 93% and above   **A-** → 90 - 92%

B+ → 87 - 89%   **B** → 83 - 86%   **B-** → 80 - 82%

C+ → 77 - 79%   **C** → 73 - 76%   **C-** → 70 - 72%

D+ → 67 - 69%   **D** → 63 – 66%   **D-** → 60 – 62%

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

EXAMS: You will have four in-class exams and one 2 hour in-class final exam. Exams are scheduled for the following dates:

- ♦ **Exam 1: Thursday 9/29**
- ♦ **Exam 2: Thursday 10/20**
- ♦ **Exam 3: Thursday 11/10**
- ♦ **Exam 4: Thursday 12/8**
- ♦ **Final Exam: Thursday 12/15**

This <u>may</u> 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 8 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 Thursday, 12/15, 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 course 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 six 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 Wednesday 9/7, 11:59 pm
- ♦ Time Goal #2 – due Wednesday 9/14, 11:59 pm
- ♦ Time Goal #3 – due Wednesday 9/21, 11:59 pm
- ♦ Time Goal #4 – due Wednesday 9/28, 11:59 pm
- ♦ **Objective Pie #1: due** Wednesday **9/28, 11:59 pm**

      Exam #1 – Thursday 9/29

- ♦ Time Goal #5 – due Wednesday 10/5, 11:59 pm
- ♦ Time Goal #6 – due Wednesday 10/12, 11:59 pm
- ♦ Time Goal #7– due Wednesday 10/19, 11:59 pm
- ♦ **Objective Pie #2: due** Wednesday **10/19, 11:59 pm**

      Exam #2 – Thursday 10/20

- Time Goal #8 – due Wednesday 10/26, 11:59 pm

- Time Goal #9 – due Wednesday 11/2, 11:59 pm

- Time Goal #10 – due Wednesday 11/9, 11:59 pm

- **Objective Pie #3: due** Wednesday **11/9, 11:59 pm**

  Exam #3 – Thursday 11/10

- Time Goal #11 – due Wednesday 11/16, 11:59 pm

- Time Goal #12 – due Wednesday 11/23, 11:59 pm

- Time Goal #13 – due Wednesday 11/30, 11:59 pm

- Time Goal #14 – due Wednesday 12/7, 11:59 pm

- **Objective Pie #4: due** Wednesday **12/7, 11:59 pm**

  Exam #4 – Thursday 12/8

- Time Goal #15 – due Wednesday 12/14, 11:59 pm

- **Course Mastery Pie: due** Wednesday **12/14, 11:59 pm**

  2 hour Final Exam – Thursday 12/15

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 you 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 scheduled exams).

Note: Class BEGINS at 9:30 am.   It is expected that you will be in your seat and ready to go at 9:30 am. Plan on arriving to class 5 minutes prior to the scheduled start time. Students arriving after 9:30 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 9:30 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 CANCELATION: 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 cancelations, 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.
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/ and follow the link to myCommnet Alert. Please: DO NOT email or call instructor regarding weather delays/closings.

STUDENT EMAILS: Students are required to have a valid email. If it is necessary for me to email the entire class, I will use ALEKS and/or COMMNET to do this quickly and efficiently. If you do not regularly use your TRCC email, please be sure your TRCC email is properly forwarded to the email you regularly check.

EXPECTATION: 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 3 "academic" hours per week, therefore you should expect to spend *at least* **6 - 9 hours per week** on this class, outside of class meetings, every week!

HOMEWORK QUESTIONS: Class time is reserved for presentation of material. Homework questions will be answered outside class meetings.

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) 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 cultivates understanding and different representations of functions. The course covers linear, quadratic, exponential, rational, radical functions, equations and expressions and operations on them with emphasis on modeling and solving real world problems.

COURSE OUTCOMES:

At the completion of MAT 137, the student will be able to do the following:

FACTORING
1) Factor monomials
2) Factor polynomials by grouping
3) Factor perfect square trinomials, difference of squares, sum/difference of cubes
4) Factor quadratics

Quadratic Functions and/or Expressions
1) Provide multiple representations of quadratic functions or expressions by hand and/or using technology
2) Determine identifying characteristics of quadratic functions or expressions (e.g., factors)
3) Evaluate, simplify, and perform operations on quadratic functions or expressions
4) Solve quadratic equations algebraically (e.g., factoring, completing the square, and quadratic formula with rational solutions) and/or graphically
5) Solve real world applications involving quadratic equations and functions

Radical Functions and/or Expressions
1) Provide multiple representations of simple radical functions or expressions by hand and/or using technology, with primary emphasis on square root
2) Determine identifying characteristics of radical functions or expressions
3) Evaluate, simplify, and perform operations on simple radical functions or expressions
4) Solve simple radical equations algebraically and/or graphically

5) Solve real world applications involving radical functions
6) Identify imaginary numbers

Exponential Functions and/or Expressions
1) Provide multiple representations (e.g., tables, graphs, symbols) of exponential functions or expressions by hand and/or using technology
2) Determine identifying characteristics of exponential functions or expressions
3) Evaluate, simplify, and perform operations on exponential functions or expressions
4) Identify real world applications involving exponential functions and/or solve graphically

Rational Functions and/or Expressions
1) Provide multiple representations of simple rational functions or expressions by hand and/or using technology
2) Determine identifying characteristics of rational functions or expressions
3) Evaluate, simplify, and perform operations on simple rational functions or expressions
4) Solve simple rational equations algebraically and/or graphically
5) Solve real world applications involving rational functions

Mathematical Practices

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning

ACCOMMODATIONS: Students with learning disabilities should contact the Learning Specialist, Matt Liscum, at 860-215-9265 or via email at 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 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

Week of:	Chapter(s):	Topics Covered:
8/30	2.5, 6.1	Functions, An Introduction to Factoring
9/6	6.2, 6.3	Factoring Special Products, Factoring: Trial and Error ♦ Time Goal #1 – due Wednesday 9/7, 11:59 pm
9/13	6.4, 6.5	Factoring: The *ac* Method, Factoring Strategies ♦ Time Goal #2 – due Wednesday 9/14, 11:59 pm
9/20	6.6	Factoring and Problem Solving, ♦ Time Goal #3 – due Wednesday 9/21, 11:59 pm
9/27	7.1	Roots and Radicals ♦ **Objective Pie #1, Chapters 2,6: due WEDNESDAY, 9/28, 11:59 pm** ♦ Time Goal #4 – due Wednesday 9/28, 11:59 pm ♦ **Exam #1, Chapter 2 & Chapter 6: Thursday 9/29**
10/4	7.2, 7.3, 7.4	Simplifying Radical Expressions, Operations on Radicals, Solving Radical Equations ♦ Time Goal #5 – due Wednesday 10/5, 11:59 pm
10/11	7.4, 7.5, 7.6	Solving Radical Equations, Rational Exponents, Complex Numbers ♦ Time Goal #6 – due Wednesday 10/12, 11:59 pm
10/18	8.1	Solving Quadratic Equations ♦ **Objective Pie #2, Chapter 7: due WEDNESDAY, 10/19, 11:59 pm** ♦ Time Goal #7– due Wednesday 10/19, 11:59 pm ♦ **Exam #2, Chapter 7: Thursday 10/20**
10/25	8.1, 8.2	Solving Quadratic Equations, continued…, The Quadratic Formula ♦ Time Goal #8 – due Wednesday 10/26, 11:59 pm
11/1	8.3, 8.4	An Introduction to Parabolas, Quadratic Equations and Problem Solving ♦ Time Goal #9 – due Wednesday 11/2, 11:59 pm
11/8		Catch up, review ♦ **Objective Pie #3, Chapter 8: due WEDNESDAY, 11/9, 11:59 pm** ♦ Time Goal #10 – due Wednesday 11/9, 11:59 pm ♦ **Exam #3, Chapter 8: Thursday 11/10**
11/15	9.1, 9.2, 9.3	Simplifying Rational Expressions, Multiplying and Dividing Rational Expressions, Adding and Subtraction Rational Expressions ♦ Time Goal #11 – due Wednesday 11/16, 11:59 pm
11/22	9.6	Rational Equations and Problem Solving ♦ Time Goal #12 – due Wednesday 11/23, 11:59 pm **No class Thursday 11/24 – Thanksgiving Break**
11/29	9.6, 10.4	Rational Equations and Problem Solving, continued…, Exponential Functions ♦ Time Goal #13 – due Wednesday 11/30, 11:59 pm
12/6		♦ **Objective Pie #4, Chapters 9,10: due WEDNESDAY, 12/7, 11:59 pm** ♦ Time Goal #14 – due Wednesday 12/7, 11:59 pm ♦ **Exam #4, Chapter 9, 10: Thursday 12/8**
12/13		♦ Time Goal #15 – due Wednesday 12/14, 11:59 pm ♦ **Full Pie due WEDNESDAY, 12/14, 11:59 pm** ♦ **FINAL EXAM – Thursday 12/15** *****2 hour final exam*****

ALEKS® Course Syllabus

Dates	Objective
08/29/2016 - 09/28/2016	Ch.2-Functions and Graphs (13 topics)
08/29/2016 - 09/28/2016	Ch.6-Factoring (38 topics)
09/29/2016 - 10/19/2016	Ch.7-Radicals and Exponents (81 topics)
10/20/2016 - 11/09/2016	Ch.8-Quadratic Functions (30 topics)
11/10/2016 - 12/07/2016	Ch.9-Rational Expressions (72 topics)
11/10/2016 - 12/07/2016	Ch.10-Exponential and Logarithmic Functions (5 topics)

Ch.2-Functions and Graphs (13 topics, due on 09/28/2016)

Section 2.5 (8 topics)

- Identifying functions from relations
- Domain and range from ordered pairs
- Table for a linear function
- Evaluating functions: Linear and quadratic or cubic
- Variable expressions as inputs of functions: Problem type 1
- Finding outputs of a one-step function that models a real-world situation: Function notation
- Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
- Finding inputs and outputs of a two-step function that models a real-world situation: Function notation

Section 2.6 (5 topics)

- Vertical line test
- 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

Ch.6-Factoring (38 topics, due on 09/28/2016)

Section 6.1 (12 topics)

- Greatest common factor of 2 numbers
- Factoring a linear binomial
- Introduction to the GCF of two monomials
- Greatest common factor of three univariate monomials

- Greatest common factor of two multivariate monomials
- Factoring out a monomial from a polynomial: Univariate
- Factoring out a monomial from a polynomial: Multivariate
- Factoring out a binomial from a polynomial: GCF factoring, basic
- Factoring a univariate polynomial by grouping: Problem type 1
- Factoring a univariate polynomial by grouping: Problem type 2
- Factoring a multivariate polynomial by grouping: Problem type 1
- Factoring a multivariate polynomial by grouping: Problem type 2

Section 6.2 (9 topics)

- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a difference of squares in one variable: Basic
- Factoring a difference of squares in one variable: Advanced
- Factoring a difference of squares in two variables
- Factoring a polynomial involving a GCF and a difference of squares: Univariate
- Factoring a polynomial involving a GCF and a difference of squares: Multivariate
- Factoring a sum or difference of two cubes

Section 6.3 (7 topics*)

- Factoring a quadratic with leading coefficient 1
- Factoring a quadratic in two variables with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with a negative leading coefficient
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables

Section 6.4 (12 topics*)

- Factoring a quadratic with leading coefficient 1
- Factoring a quadratic in two variables with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring a quadratic by the ac-method
- Factoring a quadratic in two variables with leading coefficient greater than 1
- Factoring a quadratic with a negative leading coefficient
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a product of a quadratic trinomial and a monomial

Section 6.5 (21 topics*)

- Factoring out a monomial from a polynomial: Univariate
- Factoring out a monomial from a polynomial: Multivariate
- Factoring a univariate polynomial by grouping: Problem type 2
- Factoring a multivariate polynomial by grouping: Problem type 1
- Factoring a quadratic with leading coefficient 1

- Factoring a quadratic in two variables with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a quadratic with leading coefficient greater than 1: Problem type 2
- Factoring a quadratic in two variables with leading coefficient greater than 1
- Factoring a quadratic with a negative leading coefficient
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a perfect square trinomial in two variables
- Factoring a difference of squares in one variable: Advanced
- Factoring a difference of squares in two variables
- Factoring a polynomial involving a GCF and a difference of squares: Univariate
- Factoring a polynomial involving a GCF and a difference of squares: Multivariate
- Factoring a product of a quadratic trinomial and a monomial
- Factoring with repeated use of the difference of squares formula
- Factoring a sum or difference of two cubes

Section 6.6 (7 topics)

- Solving an equation written in factored form
- Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Solving a quadratic equation needing simplification
- Solving a word problem using a quadratic equation with rational roots
- Writing a quadratic equation given the roots and the leading coefficient

(*) 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-Radicals and Exponents (81 topics, due on 10/19/2016)

Section 7.1 (14 topics)

- Square root of a perfect square
- Using a calculator to approximate a square root
- Introduction to the Pythagorean Theorem
- Pythagorean Theorem
- Word problem involving the Pythagorean Theorem
- Square root of a rational perfect square
- Square roots of integers raised to even exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- Cube root of an integer
- Finding n^{th} roots of perfect n^{th} powers with signs
- Finding the nth root of a perfect n^{th} power fraction
- Word problem involving radical equations: Basic
- Distance between two points in the plane: Exact answers

Section 7.2 (18 topics*)

- Finding the nth root of a perfect n^{th} power monomial
- Simplifying the square root of a whole number less than 100

- Simplifying the square root of a whole number greater than 100
- Simplifying a radical expression with an even exponent
- Introduction to simplifying a radical expression with an odd exponent
- Simplifying a radical expression with an odd exponent
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Introduction to simplifying a higher radical expression
- Simplifying a higher radical expression: Univariate
- Simplifying a higher radical expression: Multivariate
- Simplifying a quotient of square roots
- Rationalizing a denominator: Quotient involving square roots
- Rationalizing a denominator: Square root of a fraction
- Rationalizing a denominator: Quotient involving a monomial
- Rationalizing a denominator: Quotient involving a higher radical
- Rationalizing a denominator: Quotient involving higher radicals and monomials
- Distance between two points in the plane: Exact answers

Section 7.3 (24 topics*)

- Introduction to square root addition or subtraction
- Square root addition or subtraction
- Square root addition or subtraction with three terms
- Introduction to simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of higher roots
- Simplifying a sum or difference of higher radical expressions
- Introduction to square root multiplication
- Square root multiplication: Basic
- Square root multiplication: Advanced
- Introduction to simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Univariate
- Simplifying a product of radical expressions: Multivariate
- Introduction to simplifying a product of higher roots
- Simplifying a product of higher radical expressions
- Introduction to simplifying a product involving square roots using the distributive property
- Simplifying a product involving square roots using the distributive property: Basic
- Simplifying a product involving square roots using the distributive property: Advanced
- Special products of radical expressions: Conjugates and squaring
- Simplifying a quotient involving a sum or difference with a square root
- Rationalizing a denominator: Quotient involving square roots
- Rationalizing a denominator using conjugates: Integer numerator
- Rationalizing a denominator using conjugates: Square root in numerator
- Rationalizing a denominator using conjugates: Variable in denominator

Section 7.4 (12 topics*)

- Introduction to solving a radical equation
- Solving a radical equation that simplifies to a linear equation: One radical, basic
- Solving a radical equation that simplifies to a linear equation: One radical, advanced
- Solving a radical equation that simplifies to a linear equation: Two radicals
- Solving a radical equation with two radicals that simplifies to sqrt(x) = a
- Solving a radical equation that simplifies to a quadratic equation: One radical, basic

- Solving a radical equation with a quadratic expression under the radical
- Solving a radical equation that simplifies to a quadratic equation: Two radicals
- Algebraic symbol manipulation with radicals
- Word problem involving radical equations: Basic
- Word problem involving radical equations: Advanced
- Solving an equation with a root index greater than 2: Problem type 1

Section 7.5 (10 topics)

- Converting between radical form and exponent form
- Rational exponents: Unit fraction exponents and whole number bases
- Rational exponents: Unit fraction exponents and bases involving signs
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Product rule
- Rational exponents: Quotient rule
- Rational exponents: Products and quotients with negative exponents
- Rational exponents: Power of a power rule
- Rational exponents: Powers of powers with negative exponents

Section 7.6 (6 topics)

- Using i to rewrite square roots of negative numbers
- Simplifying a product and quotient involving square roots of negative numbers
- Adding or subtracting complex numbers
- Multiplying complex numbers
- Dividing complex numbers
- Simplifying a power of i

(*) 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-Quadratic Functions (30 topics, due on 11/09/2016)

Section 8.1 (7 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
- Solving an equation of the form $x^2 = a$ using the square root property
- Solving a quadratic equation using the square root property: Exact answers, basic
- Solving a quadratic equation using the square root property: Exact answers, advanced
- Completing the square
- Solving a quadratic equation by completing the square: Exact answers

Section 8.2 (6 topics)

- Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Solving a quadratic equation with complex roots
- Discriminant of a quadratic equation
- Solving a word problem using a quadratic equation with irrational roots

Section 8.3 (11 topics)

- Graphing a parabola of the form $y = ax^2$
- Graphing a parabola of the form $y = ax^2 + c$
- Graphing a function of the form $f(x) = ax^2$
- Graphing a function of the form $f(x) = ax^2 + c$
- Finding the vertex, x-intercepts, and axis of symmetry from the graph of a parabola
- Graphing a parabola of the form $y = (x-h)^2 + k$
- 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
- Classifying the graph of a function
- Midpoint of a line segment in the plane

Section 8.4 (6 topics)

- Solving an equation with exponent 1/a: Problem type 1
- Solving an equation that can be written in quadratic form: Problem type 1
- Solving an equation that can be written in quadratic form: Problem type 2
- Finding the maximum or minimum of a quadratic function
- Word problem involving the maximum or minimum of a quadratic function
- Solving a quadratic equation by graphing

Ch.9-Rational Expressions (72 topics, due on 12/07/2016)

Section 9.1 (15 topics)

- Simplifying a ratio of multivariate monomials: Basic
- Simplifying a ratio of univariate monomials
- Quotient of expressions involving exponents
- Simplifying a ratio of multivariate monomials: Advanced
- Restriction on a variable in a denominator: Linear
- Restriction on a variable in a denominator: Quadratic
- Evaluating a rational function: Problem type 1
- Evaluating a rational function: Problem type 2
- Domain of a rational function: Excluded values
- Simplifying a ratio of factored polynomials: Linear factors
- Simplifying a ratio of polynomials using GCF factoring
- Simplifying a ratio of linear polynomials: 1, -1, and no simplification
- Simplifying a ratio of polynomials by factoring a quadratic with leading coefficient 1
- Simplifying a ratio of polynomials: Problem type 1
- Simplifying a ratio of polynomials: Problem type 2

Section 9.2 (10 topics)

- Multiplying rational expressions involving multivariate monomials
- Multiplying rational expressions made up of linear expressions
- Multiplying rational expressions involving quadratics with leading coefficients of 1
- Multiplying rational expressions involving quadratics with leading coefficients greater than 1
- Multiplying rational expressions involving multivariate quadratics
- Dividing rational expressions involving multivariate monomials
- Dividing rational expressions involving linear expressions

- Dividing rational expressions involving quadratics with leading coefficients of 1
- Dividing rational expressions involving quadratics with leading coefficients greater than 1
- Dividing rational expressions involving multivariate quadratics

Section 9.3 (22 topics)

- Finding the LCD of rational expressions with linear denominators: Relatively prime
- Finding the LCD of rational expressions with linear denominators: Common factors
- Finding the LCD of rational expressions with quadratic denominators
- Writing equivalent rational expressions with monomial denominators
- Writing equivalent rational expressions with polynomial denominators
- Writing equivalent rational expressions involving opposite factors
- Introduction to adding fractions with variables and common denominators
- Adding rational expressions with common denominators and monomial numerators
- Adding rational expressions with common denominators and binomial numerators
- Adding rational expressions with common denominators and GCF factoring
- Adding rational expressions with common denominators and quadratic factoring
- Adding rational expressions with different denominators and a single occurrence of a variable
- Adding rational expressions with denominators ax and bx: Basic
- Adding rational expressions with denominators ax and bx: Advanced
- Adding rational expressions with denominators ax^n and bx^m
- Adding rational expressions with multivariate monomial denominators: Basic
- Adding rational expressions with linear denominators without common factors: Basic
- Adding rational expressions with linear denominators without common factors: Advanced
- Adding rational expressions with linear denominators with common factors: Basic
- Adding rational expressions with denominators ax-b and b-ax
- Adding rational expressions involving different quadratic denominators
- Adding 3 rational expressions with different quadratic denominators

Section 9.6 (25 topics)

- Solving a word problem on proportions using a unit rate
- Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
- Solving a proportion of the form x/a = b/c
- Solving a proportion of the form (x+a)/b = c/d
- Solving a proportion of the form a/(x+b) = c/x
- Solving a rational equation that simplifies to linear: Denominator x
- Solving a rational equation that simplifies to linear: Denominator x+a
- Solving a rational equation that simplifies to linear: Denominators a, x, or ax
- Solving a rational equation that simplifies to linear: Denominators ax and bx
- Solving a rational equation that simplifies to linear: Like binomial denominators
- Solving a rational equation that simplifies to linear: Unlike binomial denominators
- Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: Proportional form, basic
- Solving a rational equation that simplifies to quadratic: Denominator x
- Solving a rational equation that simplifies to quadratic: Binomial denominators, constant numerators
- Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators

- Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: Proportional form, advanced
- Solving for a variable in terms of other variables in a rational equation: Problem type 1
- Solving for a variable in terms of other variables in a rational equation: Problem type 2
- Solving for a variable in terms of other variables in a rational equation: Problem type 3
- Word problem on proportions: Problem type 1
- Word problem involving multiple rates
- Solving a work problem using a rational equation
- Solving a distance, rate, time problem using a rational equation

Ch.10-Exponential and Logarithmic Functions (5 topics, due on 12/07/2016)

Section 10.4 (5 topics)

- Table for an exponential function
- Graphing an exponential function: $f(x) = a^x$
- Graphing an exponential function: $f(x) = a(b)^x$
- Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
- Solving an exponential equation by finding common bases: Linear exponents

Section 10.7 (1 topic*)

- Solving an exponential equation by finding common bases: Linear exponents

(*) 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.