MANDATORY ORIENTATION MEETING

All students enrolled in Math 143 for the Summer 2020 semester must attend the Live Zoom Orientation Meeting. All Orientation Zoom Meeting instructions will be emailed to your university email. Please check your university email and follow the directions that were sent to you.

Any student who does not attend an orientation meeting will be automatically dropped from the course.
How to Get Started in MATH 143

How To Get Started…

☐ 1. Attend the Zoom Orientation Meeting. (Check your university email for instructions.) Students who do not attend the orientation meeting will be dropped from the course.

☐ 2. Register for MyLabsPlus and complete the orientation homework.
   - Go to uidaho.mylabsplus.com (will redirect to https://uidaho-mlpui.openclass.com)
   - Your username will be your University of Idaho email address.
   - Your password will be assigned and emailed to you.
   - Enter your access code when prompted.

Students who fail to register for MyLabsPlus and complete the orientation homework within 24 hours of the Zoom orientation meeting will be automatically dropped from the course.

☐ 3. Get started on your first homework assignment by reading the eText, filling out every page of the notebook, and completing all homework exercises in MyLabsPlus.

☐ 4. Complete a proctor information form found on the next page of your course notebook. You must find a university approved proctor and complete the proctor information form and email it to your instructor by 5:00 PM Pacific time on June 19, 2020.
PROCTOR INFORMATION FORM, SUMMER 2020 POLYA CLASSES

STUDENT INFORMATION (Please print.)

Student Name (first and last): ________________________________

Student Signature: ________________________________________

Student Vnumber: ________________________________________

Vandalmail: _______________________________________________

Summer Address
Street (or PO Box): ______________________________________
City: ________________
State: ________________ Zip: ________________ Country: ________________

PROCTOR INFORMATION (Please print.)
Select a proctor from the NCTA: [http://www.ncta-testing.org/about-cctc]

Testing Center Name: ______________________________________

Location: _______________________________________________

Website: _______________________________________________

Contact Name at Testing Center: _______________________________

Email: _______________________________________________

Phone number: _________________________________________

All proctored exams must be administered at a testing center certified by the NCTA.
<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Classes Begin</td>
<td></td>
<td></td>
<td>Section 1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sections 1.1 &amp; 1.3, HW Due</td>
<td></td>
<td></td>
<td>HW Due</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Section 1.8, HW Due</td>
<td></td>
<td></td>
<td></td>
<td>Test 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Section 1.9, HW Due</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>29</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sections 2.1 &amp; 2.2, HW Due</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sections 2.3 &amp; 2.4, HW Due</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td>Mon</td>
<td>Tue</td>
<td>Wed</td>
<td>Thu</td>
<td>Fri</td>
<td>Sat</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Section 3.1** HW Due
- **Section 3.2** HW Due
- **Section 3.3** HW Due
- Quiz 2
- **Section 3.4** HW Due
- Test 2
- Sections 3.5 & 3.6 HW Due
- Sections 4.1 & 4.2 HW Due
- Quiz 3
- Sections 4.3 & 4.4 HW Due
- Section 4.5 HW Due
- Test 3
- **Section 5.1** HWDue
- Sections 5.2 & 5.3 HW Due
- Quiz 4
## August 2020

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Section 5.4 HW Due</td>
<td>Section 5.5 HW Due</td>
<td></td>
<td></td>
<td>Test 4</td>
<td>Extra Credit Due</td>
<td></td>
</tr>
</tbody>
</table>
# Math 143 Course Notebook Table of Contents

Course Syllabus ................................................................................................................. 3
Graph Paper ...................................................................................................................... 13
Section 1.1 .......................................................................................................................... 15
Section 1.3 .......................................................................................................................... 27
Section 1.4 .......................................................................................................................... 37
Section 1.5 .......................................................................................................................... 47
Section 1.6 .......................................................................................................................... 53
Section 1.7 .......................................................................................................................... 61
Section 1.8 .......................................................................................................................... 75
Section 1.9 .......................................................................................................................... 85
Test 1 Procedures ............................................................................................................. 91
Section 2.1 .......................................................................................................................... 97
Section 2.2 ........................................................................................................................ 109
Section 2.3 ....................................................................................................................... 119
Section 2.4 ........................................................................................................................ 133
Section 3.1 ....................................................................................................................... 141
Section 3.2 ....................................................................................................................... 159
Section 3.3 ....................................................................................................................... 171
Section 3.4 ....................................................................................................................... 185
Test 2 Procedures ........................................................................................................... 203
Section 3.5 ....................................................................................................................... 209
Section 3.6 ....................................................................................................................... 225
Section 4.1 ....................................................................................................................... 237
Section 4.2 ....................................................................................................................... 249
Section 4.3 ....................................................................................................................... 257
Section 4.4 ....................................................................................................................... 271
Section 4.5 ....................................................................................................................... 281
Test 3 Procedures ........................................................................................................... 295
Section 5.1 ....................................................................................................................... 301
Section 5.2 ....................................................................................................................... 325
Section 5.3 ....................................................................................................................... 343
Section 5.4 ....................................................................................................................... 353
Section 5.5 ....................................................................................................................... 365
Test 4 Procedures ........................................................................................................... 377
EXTRA CREDIT .............................................................................................................. 382
1. **GOALS OF THE COURSE:** The primary purpose of College Algebra is to improve your skills and competency in algebra so that you will be successful in calculus, the other math courses required for your major, and in the courses that use mathematics. Another goal is to help you develop your mathematical learning skills so that you will be more confident in future mathematical courses.

2. **LEARNING OUTCOMES:** After completing Math 143, the student should be able to:
   - Solve linear equations, quadratic equations, equations that are quadratic in form, rational equations, exponential equations, and logarithmic equations
   - Solve polynomial and rational inequalities
   - Determine the domain of polynomial functions, rational functions, root functions, exponential functions, and logarithmic functions
   - Understand the concept of composite functions, one-to-one functions, and inverse functions
   - Use synthetic division, the remainder theorem, the factor theorem, the fundamental theorem of algebra, and the intermediate value theorem to determine the zeros of polynomial functions
   - Sketch the graphs of basic functions using transformations including polynomial functions, root functions, absolute value functions, rational functions, exponential functions and logarithmic functions
   - Use critical thinking skills to solve word problems which include maximizing/minimizing problems in economics, physics, and geometry

3. **REQUIRED STUDENT MATERIALS**

   This is an online course. Every student must have a working computer, webcam, and a fast internet connection. All students must have access to a university approved testing center as all tests will be proctored at an approved testing center. All costs associated with testing will be incurred by the student. For more details, see the section in the syllabus under TEST PROCEDURES.

   **MATH 143 SUMMER 2020 COURSE NOTEBOOK:** Must be purchased at the U of I Bookstore. Students will be required to bring this course notebook to class and to all zoom tutoring sessions to receive help.

   **MyLabsPlus Access Code:** All students must purchase a Math 143 access code in the UI Bookstore OR purchase it online. Your instructor will email you directions as to how to purchase the code online and will also show you how to purchase a code online during the zoom orientation. If you have purchased the code at the UI bookstore, please have your code with you when you attend the zoom orientation meeting. Students who do not attend the zoom orientation meeting will be dropped from the course.

   To use your Access Code, you must do the following:
1. Go to https://uidaho-mlpui.openclass.com
2. Sign in. Your username is your U of I email address; e.g., joeyvandal@vandals.uidaho.edu. Your password will be given to you by your instructor. You are then encouraged to change your password.
3. Click on your course
4. Accept the license agreement, and then enter your Access Code that you purchased at the bookstore, or click “buy now” and use your credit card, or use the temporary access code.
5. You should now be ready to start the course.

HEADPHONES: Headphones are needed to listen to the video lectures at the computers.

TI 30X IIS REQUIRED CALCULATOR: You will need a calculator to work on some problems from the assignments, quizzes and/or tests. A TI 30X IIS is the only calculator allowed when testing.

4. GRADE CALCULATION

Your course instructor will send you a detailed description about how the Summer 2020 grades will be calculated. Your instructor will also explain how your grades will be calculated during the mandatory Zoom orientation meeting at the beginning of the summer session.

5. THE STUDENT WITH SPECIAL NEEDS

We are committed to accommodate students with special needs. Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through the Center for Disability and Resources located in the Pitman Center, Suite 127 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

- (208) 885-6307
- email at cdar@uidaho.edu
- website at www.uidaho.edu/current-student/cdar

6. TEST PROCEDURES

- All tests are password protected and will be proctored at a university approved proctoring facility. To see a list of university approved proctoring facilities in your area go to https://www.ncta-testing.org/about-cctc.
- Students are responsible for finding a qualified person to supervise and proctor exams. Students and their qualified proctor must complete the proctor information form found at the front of this course notebook. This form must be completed and received by the course instructor via email by 5:00 PM Pacific Time on June 19, 2020. If you need to change proctors for any reason, you must first obtain instructor permission and fill out a new proctor information form and have it approved by your instructor no later than one week prior to the next scheduled test deadline date.
- It is the students’ responsibility to schedule all tests with the proctoring facility and to adhere to all testing deadlines. All costs associated with test proctoring are the responsibility of the
student. If you do not have access to an approved proctoring facility in your area, or do not have adequate monetary resources, then you should NOT take an online course.

- The student must show a government issued picture identification to the proctor before taking an exam (Student ID cards are NOT acceptable)
- It is the responsibility of the student to bring a test cover sheet to each proctored exam. A copy of one test cover sheet can be found for each test in your course notebook. (See Test 1 Procedures, Test 2 Procedures, etc.)
- Tests can be taken anytime that you feel you are ready. Tests CANNOT be taken after the deadline. The deadline for each test is outlined below:
  
<table>
<thead>
<tr>
<th>Test</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>June 26 by 5:00 PM</td>
</tr>
<tr>
<td>Test 2</td>
<td>July 10 by 5:00 PM</td>
</tr>
<tr>
<td>Test 3</td>
<td>July 24 by 5:00 PM</td>
</tr>
<tr>
<td>Test 4</td>
<td>Aug 7 by 5:00 PM</td>
</tr>
</tbody>
</table>

- It is strongly recommended that each student schedule tests as soon as possible.
- Only a TI30xIIS calculator is allowed during tests.
- NO NOTES of any kind are allowed during tests.
- NO DEVICES which are capable of transmitting or receiving data, including but not limited to watches, phones, tablets, iPods, and calculators, may be on your person during the exam. Any such items are expected to be left at home or in a secured place outside of the testing area. Failure to do so will result in a zero on the exam and possibly a failing grade for the course.
- Students must earn at least a 60% on the corresponding practice test before the first version of the test will become available.
- After each test, students will have the opportunity to earn back up to 25% of each missed test question by completing an exam correction form for each missed question. Exam corrections must be scanned and sent to your instructor via email and must be received no later than 5:00 PM on the day listed below. The deadlines for submitting exam correction forms are outlined below:
  
  | Test 1 | Correction forms must be received by your instructor by 5:00 PM on June 27 |
  | Test 2 | Correction forms must be received by your instructor by 5:00 PM on July 11 |
  | Test 3 | Correction forms must be received by your instructor by 5:00 PM on July 25 |
  | Test 4 | Correction forms must be received by your instructor by 5:00 PM on August 7 |

- A blank exam correction form and a sample can be seen at the end of this course syllabus. Please make multiple copies of the blank exam correction form.

7. COMMUNICATIONS AND EMAIL

Announcements about the course, special sessions, changes in schedules or procedures, and so forth, will be sent to your university e-mail account. You are expected to check your University e-mail regularly. Every student must attend a mandatory orientation session at a time announced via email which will be sent to your university email account.

All emails must be sent to your instructor using your UNIVERSITY OF IDAHO email account. Emails sent using any other email account will not be read.

All emails must follow standard grammar and punctuation rules. Any email which fails to adhere to these standards will be returned to you for revision. Emails should also follow basic email etiquette.
Any emails that violate the student code of conduct regarding respect of others will be sent to the Dean of Students as appropriate.

8. ACADEMIC HONESTY

Students are expected to maintain Academic Honesty in all their work. Collaboration is encouraged on homework assignments. All tests are considered individual work and must be completed without unauthorized assistance of any kind, including the help of other students, tutors, notes, or unauthorized calculators. All scratch paper from tests are to be collected, scanned, and emailed to your instructor on the day that tests are administered.

The University of Idaho has defined acceptable behavior in the Student Code of Conduct Article II.A-1 – Academic Dishonesty [rev. 7-98, 7-05, 7-14, ed. 7-09]. The following summarizes relevant points related to your math course:

- Because academic honesty and integrity are core values at a university, the faculty finds that even one incident of academic dishonesty may merit expulsion.

- Cheating tests is a violation of this code.

- Plagiarism, falsification of academic records, falsification of records and the acquisition or use of test materials without faculty authorization are considered forms of academic dishonesty and, as such, are violations of this code.

- Instructors and students are responsible for maintaining academic standards and integrity in their classes. Consequences for academic dishonesty may be imposed by the course instructor. Such consequences may include but cannot exceed a grade of "F" in the course.

(The full text of the Student Code of Conduct may be found at http://www.uidaho.edu/DOS/judicialaffairs/studentcodeofconduct/Student%20Code%20of%20Conduct)

9. ASSIGNMENT/TEST EXTENSIONS

- The due dates for all homework, quizzes, and the tests are stated in this notebook. These due dates will not change and there will be NO EXTENSIONS except for reasons recognized by the University.

- Make up work for assignments will not be allowed unless a previous arrangement with the instructor is made prior to the assignment due date or in cases of medical or family emergency, in which case documentation of the emergency will be required. Documentation must be provided within two business days of the assignment’s due date, not to exceed the last day for taking Test 4. Email appropriate documentation to your instructor.

- If an extension is granted, the length of the extension will be determined by the number of days listed on the documentation.
10. **Summary of Expectations for Student Performance**

- Attend the mandatory zoom orientation with your instructor
- Purchase Math 143 Summer 2020 Course Notebook
- Purchase a MyLabsPlus Access code and register for software by the first day of class
- Complete the orientation quiz in MyLabsPlus
- Find a university approved test proctoring site and email a Proctor Information Form to your instructor by June 19, 2020
- Fill out every page of the course notebook and complete homework and quizzes as outlined in the course calendar
- Check your University of Idaho email at least one time every day
- Be on time and prepared for every zoom class meeting and pay attention for the entire zoom class period
- Have your course notebooks available during zoom class meetings with appropriate pages completed for the day
- Take tests at a university approved proctoring site. You must bring a copy of the test cover sheet with you to the proctoring site. The test cover sheet and all scratch paper will be scanned and emailed to the course instructor by 5:00 PM Pacific Time on the test deadline day
- Maintain Academic Honesty in all my work

11. **Summary of Expectations for Instructor**

- Be on time and prepared for each zoom class
- Be prepared to present upcoming material and answer student questions
- Respond to emails during business hours (Note: It may take more than one day to research and respond to an email. I will check my email at least once during each business day.)
- Establish zoom office hours
- Be available during designated zoom office hours
Fill out the form below to earn back partial credit (up to 25% of the worth of the question) for missed exam question. Send a photo (.jpg) or scan (.pdf at 300 dpi resolution) to your teacher by 5 PM PDT on the day AFTER the test deadline day for the question to be considered for partial credit.

| Copy down the exact question here. (Not required for word problems.) | Name ________________________________
| | (first and last) |
| | Exam 1 2 3 4 Question number_______ |
| | (circle exam number, fill in question number) |
| Work through the problem here, showing all work for all steps. | Write your steps to the problem in English. (Make yourself a set of directions.) |
| Explain your mistake. |
| To avoid this mistake in the future I will: |
Fill out the form below to earn back partial credit (up to 25% of the worth of the question) for missed exam question. Send a photo (.jpg) or scan (.pdf at 300 dpi resolution) to your teacher by 5 PM PDT on the day AFTER the test deadline day for the question to be considered for partial credit.

Copy down the exact question here. (Not required for word problems.)

\[
\text{Solve: } \frac{x+5}{2x-7} \geq 1
\]

Name: Sample Math 143 (first and last)

Exam 1 2 3 4 Question number 10 (circle exam number, fill in question number)

Work through the problem here, showing all work for all steps.

1. \[
\frac{x+5}{2x-7} - 1 \geq 0
\]

\[
\frac{x+5-1(2x-7)}{2x-7} \geq 0
\]

\[
\frac{-2x+7}{2x-7} \geq 0
\]

2. No need to factor!

3. \[
12-x = 0 \quad 2x-7 = 0
\]

\[
x = 12, \quad x = \frac{7}{2}
\]

4. Boundary points

5. \[
\begin{array}{c}
\frac{7}{2} \\
8 \\
12 \\
\end{array}
\]

6. \[
\begin{array}{c}
- & - \\
+ & + \\
+ & - \\
\end{array}
\]

7. Solution: \( \left( \frac{7}{2}, 12 \right) \)

Write your steps to the problem in English. (Make yourself a set of directions.)

1. Get 0 on the right side and simplify the left side.

2. Factor

3. Determine boundary points

4. Plot boundary points on a number line.

(All boundary points found from the denominator must be represented using an "open circle."

5. Pick a test value from each interval.

6. Determine if the expression is + or - on each interval.

7. Determine the solution.

Explain your mistake.

In the first step, I tried to multiply both sides of the inequality by \( 2x-1 \).

To avoid this mistake in the future I will: make sure to first set the right side to zero, then carefully get a common denominator to simplify the left side.
Graph Paper

Week ___ Exercise ___

Name ________________________________

#___

#___
Section 1.1

Work through each of the following tasks, carefully filling in the following pages in your notebook.

Section 1.1 Linear Equations

- Work through Section 1.1 TTK
- Work through Objective 1 then do problems #1-3
- Work through Objective 2 then do problems #4-5
- Work through Objective 3 then do problems #6-8
- Work through Objective 4 then do problems #9-11
- Work through Objective 5 then do problems #12-13
- Work through Objective 6 then do problems #14-17
Section 1.1 Linear and Rational Equations

1.1 Things To Know

1. Factoring Trinomials with a Leading Coefficient Equal to 1

Can you factor the polynomial \( x^2 - 2x - 24 \)? Click on the video link for this objective on page 1.1-2 to see how to factor this polynomial and to review this topic. You can also refer to section R.6 to review this topic.

2. Factoring Trinomials with a Leading Coefficient Not Equal to 1

Can you factor the polynomial \( 4x^2 + 17x + 15 \)? Click on the animation link for this objective on page 1.1-2 to see how to factor this polynomial and to review this topic. You can also refer to section R.6 to review this topic.
Section 1.1 Objective 1 Recognizing Linear Equations

What is the definition of an algebraic expression?

What is the definition of a linear equation in one variable?

In the Interactive Video on page 1.1-4, which equation is not linear? Explain why it is not linear.

NOW WORK SECTION 1.1 EXERCISES #1-3
Section 1.1 Objective 2  Solving Linear Equations with Integer Coefficients

What does the term coefficient mean?

Work through Example 1: Solve $5(x - 6) - 2x = 3 - (x + 1)$.

Work through the video that accompanies Example 2: Solve $6 - 4(x + 4) = 8x - 2(3x + 5)$.

NOW WORK SECTION 1.1 EXERCISES #4-5
Section 1.1 Objective 3 Solving Linear Equations Involving Fractions

What is the definition of a least common denominator (LCD)?

What is the first thing to do when solving linear equations involving fractions?

Work through the video that accompanies Example 3 and write your notes here:

\[
\frac{1}{3}(1 - x) - \frac{x + 1}{2} = -2
\]

NOW WORK SECTION 1.1 EXERCISES #6-8
Section 1.1 Objective 4 Solving Linear Equations Involving Decimals

When encountering a linear equation involving decimals, how do you eliminate the decimals?

Work through the video that accompanies Example 4 and write your notes here:
Solve $0.1(y - 2) + 0.03(y - 4) = 0.02(10)$

NOW WORK SECTION 1.1 EXERCISES #9-11
Section 1.1 Objective 5 Recognizing Rational Equations

What is a rational number?

What is a rational expression?

Write down the definition of a rational equation and write down at least one example of a rational equation.

Work through Example 5. Determine which of the following equations are rational equations. (Watch the video to check to see if you are correct.)

\[
a. \frac{2-x}{x+5} + 3 = \frac{4}{x+2} \\
b. x^2 - 2x - 24 = \frac{1}{2} \\
c. \frac{12}{x^2+x-2} - \frac{x+3}{x-1} = \frac{1-x}{x+2}
\]

NOW WORK SECTION 1.1 EXERCISES #12-13
Section 1.1 Objective 6  Solving Rational Equations that Lead to Linear Equations

Fill in the blanks below:
The process of solving a rational equation is very similar to the process of solving linear equations containing fractions. That is, we first determine the __________________________ and then we ___________________ both sides of the equation by the ____________.

We have to be extra cautious when solving rational equations because we have to be aware of _____________________.

What is a restricted value?

Work through Example 6 and take notes here: \( \frac{2-x}{x+2} + 3 = \frac{4}{x+2} \)

What is the definition of an extraneous solution?

Explain why there was an extraneous solution in Example 6.
Write down the five steps for **Solving Rational Equations**.

**Step 1**

**Step 2**

**Step 3**

**Step 4**

**Step 5**

Work through Example 7 by following the five steps above and take notes here. Watch the video to check your solution.

Solve \( \frac{2}{x+4} + \frac{1}{x-5} = \frac{5}{x^2-x-20} \).
Work through Example 8 by following the five steps for solving rational equations and take notes here. Watch the video to check your solution.

Solve \[ \frac{12}{x^2+x-2} - \frac{x+3}{x-1} = \frac{1-x}{x+2}. \]

NOW WORK SECTION 1.1 EXERCISES #14-17
Section 1.3

Work through each of the following tasks, carefully filling in the following pages in your notebook.

**Section 1.3 Complex Numbers**

- Work through Section 1.3 TTK
- Work through the Introduction to Section 1.3 then do problem #1
- Work through Objective 1 then do problem #2
- Work through Objective 2 then do problems #3-4
- Work through Objective 3 then do problems #5-7
- Work through Objective 4 then do problems #8-10
- Work through Objective 5 then do problems #11-12
Section 1.3 Complex Numbers

1.3 Things To Know

1. Simplifying Radicals

Can you simply radical expressions such as $\sqrt{50x^4y^3}$ or $\sqrt[3]{128a^5}$. Work through the video to see how to simplify the expression $\sqrt{50x^4y^3}$. Work through the animation to see how to simplify the expression $\sqrt[3]{128a^5}$.

Read the Introduction to Section 1.3

THE IMAGINARY UNIT

Take notes on the video that explains the imaginary unit here:

What is the definition of the imaginary unit?

NOW WORK SECTION 1.3 EXERCISE #1
Section 1.3 Objective 1 Simplifying Powers of $i$

Explain the cyclic nature of powers of $i$:

Work through Example 1 and take notes here: Simplify each of the following:

a. $i^{43}$

b. $i^{100}$

 c. $i^{-21}$

NOW WORK SECTION 1.3 EXERCISE #2
COMPLEX NUMBERS

What is a complex number?

Give several examples of complex numbers.

Is every real number considered a complex number? Why or why not?

Section 1.3 Objective 2 Adding and Subtracting Complex Numbers
Watch the video, work through Example 2: Perform the indicated operations:

a. $(7 - 5i) + (-2 + i)$

b. $(7 - 5i) - (-2 + i)$

NOW WORK SECTION 1.3 EXERCISES #3-4
Section 1.3 Objective 3 Multiplying Complex Numbers

Fill in the blanks below:

When multiplying two complex numbers, treat the problem as if were the multiplication of two ______________________ . Just remember that _____ = ______.

Work through the video that accompanies Example 3 and write your notes here.

Multiply \((4 - 3i)(7 + 5i)\)

Example 4: Simplify \((\sqrt{3} - 5i)^2\). Work through the video that accompanies Example 4 and write your notes here:

NOW WORK SECTION 1.3 EXERCISES #5-7
What is the definition of a complex conjugate?

Work through Example 5 and take notes here: Multiply the complex number \( z = -2 - 7i \) by its complex conjugate \( \bar{z} = -2 + 7i \).

What will always happen when you multiply a complex number by its complex conjugate?

Write down the Theorem seen after Example 5 in the eText.
Section 1.3 Objective 4  Finding the Quotient of Complex Numbers

Watch the video, work through Example 6 and take notes here: Write the quotient in the form \( a + bi: \frac{1-3i}{5-2i} \)

NOW WORK SECTION 1.3 EXERCISES #8-10

Section 1.3 Objective 5  Simplifying Radicals with Negative Radicands

Work through Example 7 and write your notes here: Simplify: \( \sqrt{-108} \)

True or False: \( \sqrt{a} \sqrt{b} = \sqrt{ab} \) for all real numbers \( a \) and \( b \).
Work through Example 8 and write your notes here: Simplify the following expressions:

a) \( \sqrt{-8} + \sqrt{-18} \)

b) \( \sqrt{-8} \cdot \sqrt{-18} \)

c) \( \frac{-6 + \sqrt{(-6)^2 - 4(2)(5)}}{2} \)

d) \( \frac{4 \pm \sqrt{-12}}{4} \)

NOW WORK SECTION 1.3 EXERCISES #11-12
Section 1.4

Work through each of the following tasks, carefully filling in the following pages of your notebook.

**Section 1.4 Quadratic Equations**
- Work through Objective 1 then do problems #1-4
- Work through Objective 2 then do problems #5-6
- Work through Objective 3 then do problems #7-10
- Work through Objective 4 then do problems #11-13
- Work through Objective 5 then do problems #14-15
Section 1.4 Quadratic Equations

Read the Introduction to Section 1.4
What is the definition of a quadratic equation in one variable?

Section 1.4 Objective 1. Solving Quadratic Equations by Factoring and the Zero Product Property

Watch the video located under Objective 1 and take notes here: (Be sure that you know and understand the zero product property.)

Work through the video that accompanies Example 1: Solve $6x^2 - 17x = -12$

NOW WORK SECTION 1.4 EXERCISES #1-4
Section 1.4 Objective 2 Solving Quadratic Equations Using the Square Root Property
Watch the video located just under Objective 2 and take notes on this page:

What is the square root property and when can we use it when solving quadratic equations?

Work through the video that accompanies Example 2. Solve each equation.

a) \( x^2 - 16 = 0 \)

b) \( 2x^2 + 72 = 0 \)

c) \( (x - 1)^2 = 7 \)

NOW WORK SECTION 1.4 EXERCISES #5-6
Section 1.4 Objective 3 Solving Quadratic Equations by Completing the Square

Write down three perfect square trinomials and factor each as a binomial squared.

What is the relationship between the linear term (x-term) and the constant term of every perfect square trinomial?

Work through Example 3 and take notes here.

What number should be added to each binomial to make it a perfect square trinomial?

a) \(x^2 - 12x\)

b) \(x^2 + 5x\)

c) \(x^2 - \frac{3}{2}x\)

NOW WORK SECTION 1.4 EXERCISES #7-8
Write down the 5 steps needed to solve the equation $ax^2 + bx + c = 0$ by completing the square.

1. 

2. 

3. 

4. 

5. 

Work through the video that accompanies Example 4. Be sure to use the 5 steps listed above. Solve $3x^2 - 18x + 19 = 0$ by completing the square.
Work through Example 5. Be sure to use the 5 steps listed on your previous page of notes:
Solve $2x^2 - 10x - 6 = 0$ by completing the square.

NOW WORK SECTION 1.4 EXERCISES #9-10
Section 1.4 Objective 4 Solving Quadratic Equations Using the Quadratic Formula

If you can solve the equation $ax^2 + bx + c = 0$, $a \neq 0$ by completing the square then you can derive the quadratic formula. **Work through the animation** on page 1.4-16 that derives the quadratic formula by following the 5-step process for completing the square. Derive the quadratic formula by filling in the steps below:

**Deriving the Quadratic Formula**

*(Write formulas AND descriptive words below.)*

Start with the equation $ax^2 + bx + c = 0$, $a \neq 0$.

**Step 1.**

**Step 2.**

**Step 3.**

**Step 4.**

**Step 5.**
Work through the video that accompanies Example 6 and write your notes here:
Solve $3x^2 + 2x - 2 = 0$ using the quadratic formula.

Work through the video that accompanies Example 7 and write your notes here: Solve $4x^2 - x + 6 = 0$ using the quadratic formula.

NOW WORK SECTION 1.4 EXERCISES #11-13
Section 1.4 Objective 5 Using the Discriminant to Determine the Type of Solutions of a Quadratic Equation

Watch the video located under Objective 5 and take notes here:

Work through Example 8 and take notes here: Use the discriminant to determine the number and nature of the solutions to each of the following quadratic equations:

a) \(3x^2 + 2x + 2 = 0\)

b) \(4x^2 + 1 = 4x\).

NOW WORK SECTION 1.4 EXERCISES #14-15
Section 1.5

Work through each of the following tasks, carefully filling in the following pages in your notebook.

Section 1.5 Applications of Quadratic Equations

☐ Work through Section 1.5 TTK #3 then do problems #1-2
☐ Work through Section 1.5 TTK #4 then do problems #3-4
☐ Work through Section 1.5 TTK #5 then do problem #5
☐ Work through Objective 2 then do problems #6-7
☐ Work through Objective 3 then do problems #8-9
Section 1.5 Applications of Quadratic Equations

1.5 Things To Know

3. Solving Quadratic Equations by Factoring and the Zero Product Property (Section 1.4).

How are your factoring skills? What does the zero product property say? Can you solve the equation \(6x^2 - 17x = -12\) by factoring and by using the zero product property? Watch the video on page 1.5-1 under Things To Know #3.

NOW WORK SECTION 1.5 EXERCISES #1-2

4. Solving Quadratic Equations by Completing the Square (Section 1.4)

Explain how to solve the equation \(3x^2 - 18x + 19 = 0\) by completing the square. Watch the video on page 1.5-1 under Things To Know #4.

NOW WORK SECTION 1.5 EXERCISES #3-4

5. Solving Quadratic Equations Using the Quadratic Formula (Section 1.4)

Write down the quadratic formula and solve the equation \(3x^2 + 2x - 2 = 0\) using the quadratic formula. Watch the video on page 1.5-1 under Things to Know #5.

NOW WORK SECTION 1.5 EXERCISE #5
Section 1.5 Objective 1 Solving Applications Involving Unknown Numeric Quantities  
We will skip this objective in this course.

Section 1.5 Objective 2 Using the Projectile Motion Model  
What is the projectile motion model seen in this objective?

Work through Example 2 taking notes here: A toy rocket is launched at an initial velocity of 14.7 m/s from a 49-m tall platform. The height $h$ of the object at any time $t$ seconds after launch is given by the equation $h = -4.9t^2 + 14.7t + 49$. When will the rocket hit the ground?

**NOTE:** If you encounter a quadratic equation that does not factor, remember that you can solve by using the quadratic formula.

Another model used to describe projectile motion (where the height is in feet and time is in seconds) is given by $h = -16t^2 + v_0t + h_0$.

**NOW WORK SECTION 1.5 EXERCISES #6-7**
Section 1.5 Objective 3 Solving Geometric Applications
Work through the interactive video that accompanies Example 3 and write your notes here: The length of a rectangle is 6 in. less than four times the width. Find the dimensions of the rectangle if the area is 54 in².

NOW WORK SECTION 1.5 EXERCISE #8

Work through Example 4 taking notes here: Jimmy bought a new 40-in. high-definition television. If the length of Jimmy’s television is 8 in. longer than the width, find the width of the television. (Remember the Pythagorean Theorem: \(a^2 + b^2 = c^2\))

NOW WORK SECTION 1.5 EXERCISE #9

Note: You are not assigned problems from objectives 4 and 5!
Section 1.6

Work through each of the following tasks, carefully filling in the following pages in your notebook.

Section 1.6 Other Types of Equations
- Work through Objective 1 then do problems #1-4
- Work through Objective 2 then do problems #5-10
- Work through Objective 3 then do problems #11-16
Section 1.6 Other Types of Equations

Section 1.6 Objective 1 Solving Higher-Order Polynomial Equations

Write the definition of a **linear equation**.

Write the definition of a **quadratic equation**.

Write the definition of a **polynomial equation**.

What is a useful technique that might be used to solve certain higher-order polynomial equations.
Work through the video that accompanies Example 1 and take notes here: Find all solutions to the equation $3x^3 - 2x = -5x^2$.

Work through the video that accompanies Example 2 and take notes here: Find all solutions of the equation $2x^3 - x^2 + 8x - 4 = 0$.

NOW WORK SECTION 1.6 EXERCISES #1-4
Section 1.6 Objective 2 Solving Equations That are Quadratic In Form (Disguised Quadratics)

What does it mean for an equation to be “quadratic in form”?

Work through the interactive video that accompanies Example 3 and solve each equation:

Example 3a: \(2x^4 - 11x^2 + 12 = 0\)

Example 3b: \(\left(\frac{1}{x-2}\right)^2 + \frac{2}{x-2} - 15 = 0\)
Example 3c: \(x^{2/3} - 9x^{1/3} + 8 = 0\) (Hint: \((x^a)^b = x^{ab}\))

Example 3d: \(3x^{-2} - 5x^{-1} - 2 = 0\)

NOW WORK SECTION 1.6 EXERCISES #5-10
Section 1.6 Objective 3 Solving Equations Involving Radicals

Work through Example 4 taking notes here: Solve $\sqrt{x - 1} - 2 = x - 9$

As indicated in the e-Text, make sure that you ALWAYS isolate the radical prior to squaring both sides of an equation that involves a square root.

What is an extraneous solution?

Why is it important to check your solutions when solving equations involving radicals?
Work through the video that accompanies Example 5 taking notes here: Solve
\( \sqrt{2x+3} + \sqrt{x-2} = 4 \)

NOW WORK SECTION 1.6 EXERCISES #11-16
Section 1.7

Work through each of the following tasks, carefully filling in the following pages of your notebook.

Section 1.7 Linear Inequalities

☐ Work through Section 1.7 TTK #1 then do problems #1-3
☐ Work through Section 1.7 TTK #2 then do problems #4-6
☐ Work through Objective 1 then do problems #7-13
☐ Work through Objective 2 then do problems #14-16
☐ Work through Objective 3 then do problems #17-22
☐ Work through Objective 4 then do problems #23-25
Section 1.7 Linear Inequalities

1.7 Things To Know
1. Describing Intervals of Real Numbers (Section R.1)
   You must get familiar with Interval Notation, Set Builder Notation, and Using a Number Line to describe solutions. Click on Section R.1 to see the following summary table which describes 5 different types of intervals.

<table>
<thead>
<tr>
<th>Type of Interval and Graph</th>
<th>Interval Notation</th>
<th>Set-Builder Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open interval</td>
<td>$(a, b)$</td>
<td>${x</td>
</tr>
<tr>
<td>Closed interval</td>
<td>$[a, b]$</td>
<td>${x</td>
</tr>
<tr>
<td>Half-open intervals</td>
<td>$(a, b]$</td>
<td>${x</td>
</tr>
<tr>
<td></td>
<td>$[a, b)$</td>
<td>${x</td>
</tr>
<tr>
<td>Open infinite intervals</td>
<td>$(a, \infty)$</td>
<td>${x</td>
</tr>
<tr>
<td></td>
<td>$(-\infty, b)$</td>
<td>${x</td>
</tr>
<tr>
<td>Closed infinite intervals</td>
<td>$[a, \infty)$</td>
<td>${x</td>
</tr>
<tr>
<td></td>
<td>$(-\infty, b]$</td>
<td>${x</td>
</tr>
</tbody>
</table>
Go to Page R.1-12 in the Review Chapter and Try Section R.1 Example 2: Given the set sketched on the number line, a) identify the type of interval, b) write the set using set-builder notation, and c) write the set using interval notation.

\[ \frac{6}{5} \quad 0 \quad 3 \]

a) Identify the type of interval:

b) Write the set using set-builder notation:

c) Write the set using interval notation.

Go to Page R.1-13 in the Review Chapter and Try Section R.1 Example 3 and work through the video:

a) Write the set \( \left[ -\frac{1}{3}, \infty \right) \) in set builder notation and graph the set on a number line.

b) Write the set \( \left\{ x \mid -\frac{7}{2} < x \leq \pi \right\} \) in interval notation and graph the set on a number line.

NOW WORK SECTION 1.7 EXERCISES #1-3
Now go back to Section 1.7

1.7 Things To Know

2. Understanding the Intersection and Union of Sets (Section R.1)
   Watch the video under on page 1.7-1 (Things to Know #2) to see how to find the intersection and union of intervals. Take notes on the following two examples that appear in this video:

   Example a) Find the intersection: \([0,\infty) \cap (-\infty,5]\)

   Example b) Find the intersection: \((-\infty,-2) \cup (-2,\infty) \cap [-4,\infty)\)

NOW WORK SECTION 1.7 EXERCISES #4-6
Section 1.7 Introduction

Read through the Introduction to Section 1.7 and fill in the blanks below:

Unlike ________________________ that usually have a finite number of solutions (or no solution at all), inequalities often have __________________________ solutions. For instance, the inequality $2x - 3 \leq 5$ has _______________________ solutions because there are infinite values of $x$ for which the inequality is ____________.

What are the three methods that are typically used to describe the solution to an inequality?

1. ________________________________________________________________

2. ________________________________________________________________

3. ________________________________________________________________

Represent the solution to the inequality $2x - 3 \leq 5$ using the three methods from above. (See Figure 2).
Section 1.7 Objective 1 Solving Linear Inequalities

What is the definition of a linear inequality?

Be sure that you are familiar with the 6 properties of linear inequalities below:

**Properties of Inequalities**

Let $a$, $b$, and $c$ be real numbers:

<table>
<thead>
<tr>
<th>Property</th>
<th>In Words</th>
<th>Example</th>
</tr>
</thead>
</table>
| 1        | If $a < b$, then $a + c < b + c$ | The same number may be added to both sides of an inequality. | $-3 < 7$  
$-3 + 4 < 7 + 4$  
$1 < 11$ |
| 2        | If $a < b$, then $a - c < b - c$ | The same number may be subtracted from both sides of an inequality. | $9 < 2$  
$9 - 6 < 2 - 6$  
$3 < -4$ |
| 3        | For $c > 0$, if $a < b$, then $ac < bc$ | Multiplying both sides of an inequality by a positive number does not switch the direction of the inequality. | $3 > 2$  
$(3)(5) > (2)(5)$  
$15 > 10$ |
| 4        | For $c < 0$, if $a < b$, then $ac > bc$ | Multiplying both sides of an inequality by a negative number switches the direction of the inequality. | $3 > 2$  
$(3)(-5) < (2)(-5)$  
$-15 < -10$ |
| 5        | For $c > 0$, if $a < b$, then $\frac{a}{c} < \frac{b}{c}$ | Dividing both sides of an inequality by a positive number does not switch the direction of the inequality. | $6 > 4$  
$\frac{6}{2} > \frac{4}{2}$  
$3 > 2$ |
| 6        | For $c < 0$, if $a < b$, then $\frac{a}{c} > \frac{b}{c}$ | Dividing both sides of an inequality by a negative number switches the direction of the inequality. | $6 > 4$  
$\frac{6}{-2} > \frac{4}{-2}$  
$-3 < -2$ |
Work through the animation that can be seen on page 1.7-7 for an explanation of why multiplying or dividing both sides of an inequality by a negative number switches the direction of the inequality symbol.

Work through the video that accompanies Example 1 and take notes here:
Solve the inequality $2 - 5(x - 2) < 4(3 - 2x) + 7$. Express the answer in set-builder notation.

Work through Example 2 and take notes here: Solve the inequality $-9x - 3 \geq 7 - 4x$. Graph the solution set on a number line and express the answer in interval notation.

NOW WORK SECTION 1.7 EXERCISES #7-9
Read page 1.7-10 and fill in the blanks:

When a linear inequality involves fractions, we begin the solution process in the same way as when solving ______________________________ involving fractions. That is, we _____________________ the fractions by first multiplying both sides of the inequality by the __________________________________ .

Similarly, if we encounter a linear inequality involving decimals, we can __________________ the decimals by multiplying both sides of the inequality by the ______________________ ____________________________ .

Work through the video that accompanies Example 3 and take notes here:
Solve the inequalities:

a. \( \frac{1-4w}{5} - \frac{w}{2} \leq -5 \)

b. \( 3.7y - 6 > 6.1 + 3.45y \)

NOW WORK SECTION 1.7 EXERCISES #10-13
Section 1.7 Objective 2  Solving Three-Part Inequalities

Work through the video that accompanies Example 4 taking notes here:
Solve the inequality
\[-2 \leq \frac{2-4x}{3} < 5.\]
Graph the solution set on a number line and write the solution in set-builder notation and interval notation.

NOW WORK SECTION 1.7 EXERCISES #14-16

Section 1.7  Objective 3  Solving Compound Inequalities
Watch the video seen on the top of page 1.7-15 and fill in the blanks below:

A compound inequality consists of two inequalities that are joined together using the words ______________ or ______________.

A number is a solution to a compound inequality involving the word “and” if that number is a solution to ______________ inequalities.

Explain why \(x = 2\) is a solution to the compound inequality:
\[x + 2 < 5 \text{ and } 3x \geq -6\]

A number is a solution to a compound inequality involving the word “or” if that number is a solution to ____________ inequality.

Is \(x = 8\) a solution to the compound inequality
\[x + 3 \leq 1 \text{ or } 2x - 5 > 7?\] why or why not?
Write the 3-Step Guidelines for Solving Compound Linear Inequalities

Step 1.

Step 2.

Step 3.

Work through the video that accompanies Example 5 and take notes here:
Solve the compound inequality $2x - 7 < -1 \text{ and } 3x + 5 \geq 3$. Write the solution in interval notation.
Work through the video that accompanies Example 6 and take notes here:
Solve the compound inequality $1 - 3x \geq 7$ or $3x + 4 > 7$. Write the solution in interval notation.

Work through the video that accompanies Example 7 and take notes here:
Solve the compound inequality $3x - 1 < -7$ and $4x + 1 > 9$.

NOW WORK SECTION 1.7 EXERCISES #17-22
Section 1.7 Objective 4 Solving Linear Inequality Word Problems

Work through Example 8 and take notes here:
Suppose you rented a forklift to move a pallet with 70-lb blocks stacked on it. The forklift can carry a maximum of 2,535 lbs. If the pallet weighs 50-lb by itself with no blocks, how many blocks can be stacked on a pallet and lifted by the forklift?
Work through the video that accompanies Example 9 and take notes here:
The perimeter of a rectangular fence is to be at least 80 feet and no more than 140 feet. If the width of the fence is 12 feet, what is the range of values for the length of the fence?

NOW WORK SECTION 1.7 EXERCISES #23-25