## Math 11 Pre-Calculus Suggested Completion Dates – 2017/18

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**NOTE:** LG 1-19 **must** be completed by Monday, June 4th or a temporary mark of “0” will be assigned for incomplete learning guides.

The course final exam **must** be written by Friday, June 22nd.
Math 11 Pre-Calculus Formula Sheet

Important formulas you should know how to apply in this course. You will be given a copy of this formula sheet on each of your quizzes and unit tests.

\[ t_n = t_1 + (n - 1)d \]

\[ S_n = \frac{n}{2} [2t_1 + (n - 1)d] \quad \quad S_n = \frac{n}{2} [t_1 + t_n] \]

\[ t_n = t_1 r^{n-1} \]

\[ S_n = \frac{t_1(r^n - 1)}{r - 1} \quad \quad S_n = \frac{r t_n - t_1}{r - 1} \]

\[ S_\infty = \frac{t_1}{1 - r} \]

\[ x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

\[ c^2 = a^2 + b^2 - 2ab \cos C \]

\[ \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \]
Math 11 Pre-Calculus LG 1
ARITHMETIC SEQUENCES AND SERIES

INTRODUCTION:
There are many different kinds of patterns of numbers. Check out pages 4-5.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) identify and build an arithmetic sequence.
2) find unknown quantities using the arithmetic sequence formula.
3) find the sum of an arithmetic series.
4) manipulate the arithmetic series formula in order to find an unknown quantity.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

**Expectation #1: Identify and build an arithmetic sequence.**
**Expectation #2: Find unknown quantities using the arithmetic sequence formula.**

1. Watch and take notes on instructional video on Arithmetic Sequences.
2. In the textbook, complete the Investigate Arithmetic Sequences activity PART-A ONLY on pages 6 and 7. Then complete #4 and 5 on page 8.
4. Read Key Ideas on page 16. In your math journal, give an example of an arithmetic sequence. With your arithmetic sequence identify how you determined the difference. Write the formula for the general term of an arithmetic sequence and identify the parts of the formula (ie. $t_1$, $n$, $d$, and $t_n$).
5. In the textbook, complete pages 16-20 #1-7, 9-11, 16, 17, 19, 24.

**Expectation #3:** Find the sum of an arithmetic series.
**Expectation #4:** Manipulate the arithmetic series formula in order to find an unknown quantity.

1. Watch and take notes on instructional video on Arithmetic Series.
2. In the textbook, read about the Mathematician Gauss at the top of page 22. Then read Link the Ideas on page 24.
3. Work through Example #1 on page 25 and then complete Your Turn on page 25.
4. Work through Example #2 on page 26 and then complete Your Turn on page 26.
5. Read Key Ideas on page 27. In your math journal, write the formula for finding the sum of an arithmetic sequence. Define the following variables: $t_1, n, d, t_n, S_n$.
6. In the textbook, complete pages 27-31 #1-8, 10, 11, 13, 15, 17, 18, 20, 23.

**REVIEW AND CHALLENGE**

1. In the textbook, complete Chapter 1 Review pages 66-67 #1-11.

**Key Terms:** sequence, arithmetic sequence, common difference ($d$), general term ($t_n$), $t_1, n$, arithmetic series, $S_n$.

**PRACTICE QUIZZES**

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
**INTRODUCTION:**
You’ve now looked at numbers that grow arithmetically. In this learning guide, we will look at groups of numbers that grow exponentially (the numbers are multiplied by a common ratio).

**LEARNING GUIDE EXPECTATIONS:**
On the completion of this learning guide you will be able to:

1) identify and build a geometric sequence.
2) find unknown quantities using the geometric sequence formula.
3) find the sum of a geometric and infinite geometric series.
4) manipulate the geometric and infinite geometric series formulae in order to find an unknown quantity.

**EVALUATION:**
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

**RESOURCES NEEDED:**
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.

**LEARNING ACTIVITIES:**

1. Watch and take notes on instructional video on Geometric Sequences.
2. In the textbook, read page 32 and the Link the Ideas on page 34.
3. Work through Example 1 on pages 34 and 35. Now complete Your Turn on page 35.
4. Work through Example 2 on pages 35. Now complete Your Turn on page 35.
5. Work through Example 3 on pages 36-37. Now complete Your Turn on page 37
7. Read Key Ideas on page 39. In your math journal, define a geometric sequence. Determine how you would find the common ratio. Write the formula for the general term of a geometric sequence and define \( t_1, n, r, \) and \( t_n \).


**Expectation #3:** Find the sum of a geometric and infinite geometric series. **Expectation #4:** Manipulate the geometric and infinite geometric series formulae in order to find an unknown quantity.

1. Watch and take notes on instructional video on Geometric Series.
2. Read page 46 and complete the Investigate Fractals activity on pages 46-47.
3. Read Link the Ideas on pages 48-49.
5. Work through Example 2 on pages 50-51. Now complete Your Turn on page 51.
6. Work through Example 3 on page 52.
7. Read Key Ideas on page 53. In your math journal, define what a geometric series is. Write the formulas for finding the sum of geometric series.
9. Watch and take notes on instructional video on Infinite Geometric Series.
11. Read Link the Ideas on pages 60-61.
12. Work through Example 1 on page 61. Now complete Your Turn on page 61.
13. Work through Example 2 on pages 62.
14. Read Key Ideas on page 63. In your math journal, define what an infinite geometric series is and explain how you know if the sum converges or diverges. Write the formulas for finding the sum of an infinite geometric series.
15. Complete pages 63-64 #1, 2, 4-11, 13, 15-18.

**REVIEW AND CHALLENGE**


**Key Terms:** geometric sequence, common ratio \((r)\), geometric series, infinite geometric series, convergent series, divergent series.
PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
Math 11 Pre-Calculus LG 3
TRIGONOMETRY

INTRODUCTION:
One of the most useful branches of mathematics….check out pages 72 and 73.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) sketch an angle in standard position and identify the reference angle.
2) determine the exact values of the sine, cosine and tangent ratios of 30°, 45° and 60°.
3) solve trigonometric problems involving angles between 0° and 360°.
4) find unknown parts of a triangle using the sine law or the cosine law.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Sketch an angle in standard position and identify the reference angle. Expectation #2: Determine the exact values of the sine, cosine and tangent ratios of 30°, 45° and 60°.

1. Watch and take notes on instructional video on Angles in Standard Position.
2. Read pages 74 and the Link the Ideas on page 77. Read pages 78 and 79.
3. Work through Example 1 on pages 79-80. Now complete Your Turn on page 80.
4. Work through Example 2 on page 80. Now complete Your Turn on page 80.
5. Work through Example 3 on page 81. Now complete Your Turn on page 81.
6. Work through Example 4 on page 82.
7. Read Key Ideas on page 82. In your math journal, sketch an angle of 120° in standard position and label the initial arm, terminal arm and the reference angle. Draw and label the 2 special triangles on page 82 and make sure you can determine the exact trig ratios for the angles 30°, 45°, and 60°.

8. Complete page 83-86 #1-9, 11-13, 15-17, 19, 21.

**Expectation #3: Solve trigonometric problems involving angles between 0° and 360°.**

1. Watch and take notes on instructional video on Trig Ratios of any Angle.

2. Complete the Investigate Trigonometric Ratios for Angles Greater Than 90° on pages 88-89.

3. Read Link the Ideas on page 90.

4. In your math journal, include the information about the trig ratios in the 4 quadrants found on page 90. A short-cut way of remembering the signs of the ratios can be as follows:

   ![Graph showing trigonometric ratios in quadrants]

<table>
<thead>
<tr>
<th>Quad 1</th>
<th>Quad 2</th>
<th>Quad 3</th>
<th>Quad 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sine +</td>
<td>All +</td>
<td>Tan +</td>
<td>Cos +</td>
</tr>
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   Remember:
   **All Students Take Calculus!!**
   - In Quad 1: All trig ratios are positive.
   - In Quad 2: Sine is positive, the rest are negative.
   - In Quad 3: Tangent is positive, the rest are negative.
   - In Quad 4: Cosine is positive, the rest are negative.

5. Work through Example 1 on page 91. In your journal, complete Your Turn on page 91.

6. Work through Example 2 on page 91. In your journal, complete Your Turn on page 91.

7. Work through Example 3 on page 92. In your journal, complete Your Turn on page 92.

8. Work through Example 4 on page 93. In your journal, complete Your Turn on page 93.

9. Read the top of page 94 and then work through Example 5 on page 94. In your journal, complete Your Turn on page 94.

10. Work through Example 6 on page 95. In your journal, complete Your Turn on page 95.

11. Complete pages 96-98 #1-9, 11-16, 18, 22.

**Expectation #4: Find unknown parts of a triangle using the sine law or the cosine law.**
1. **Watch and take notes on instructional video on the Sine Law.**

2. Read the top of page 100 and Link the Ideas on pages 101-102.

3. Work through Example 1 on pages 102-103. Now complete Your Turn on page 103.

4. Work through Example 2 on page 104. Now complete Your Turn on page 104.

5. Read about the ambiguous case on pages 104-105.


7. Read Key Ideas on page 107. In your journal, write down the formula for the sine law and explain when you would use this law. For each ambiguous case, determine when there would be no solution, 1 solution or 2 solutions.


9. **Watch and take notes on instructional video on the Cosine Law.**

10. Read Link the Ideas on page 116.

11. Work through Example 1 on pages 116-117. Now complete Your Turn on page 117.

12. Work through Example 2 on pages 117-118. Now complete Your Turn on page 118.


14. Read Key Ideas on page 119. In your journal, write down the formula for the cosine law and explain when you would use this law.


**REVIEW AND CHALLENGE**


**PRACTICE QUIZZES**

- Practice quiz #1
- Practice quiz #2
- Practice quiz #3
- Practice quiz #4
INTRODUCTION:
A review of Learning Guides 1-3.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:

LG 1:  1) identify and build an arithmetic sequence.
        2) find unknown quantities using the arithmetic sequence formula.
        3) find the sum of an arithmetic series.
        4) manipulate the arithmetic series formula in order to find an unknown quantity.

LG 2:  5) identify and build a geometric sequence.
        6) find unknown quantities using the geometric sequence formula.
        7) find the sum of a geometric and infinite geometric series.
        8) manipulate the geometric and infinite geometric series formulae in order to find an unknown quantity.

LG 3:  9) sketch an angle in standard position and identify the reference angle.
        10) determine the exact values of the sine, cosine and tangent ratios of 30°, 45° and 60°.
        11) solve trigonometric problems involving angles between 0° and 360°.
        12) find unknown parts of a triangle using the sine law or the cosine law.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. All students will write the Unit 1 Test which will cover all of the expectations of Learning Guides 1-3.

RESOURCES NEEDED:

- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.
LEARNING ACTIVITIES:

In order to review for the unit test, you should do the following:

2. Complete Chapter 1 Practice Test pages 69-70 #1-12.

PRACTICE UNIT TESTS

Practice test #1
Practice test #2
Practice test #3
Practice test #4
INTRODUCTION:

Quadratic functions are used in many activities to describe an arcing motion. In Physics, the motion of any projectile moving through the air can be explained using a quadratic equation. By the end of this learning guide you will understand what a quadratic function looks like when it is graphed, and you will be able to describe some characteristics of the graph from the equation.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:
1) analyze and graph quadratic functions and identify the vertex, domain and range, $x$ and $y$ intercepts, axis of symmetry, and direction of opening.
2) convert quadratic functions from standard form to vertex form by “completing the square”.

EVALUATION:

You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:

Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Analyze and graph quadratic functions, and identify the vertex, domain and range, $x$ and $y$ intercepts, axis of symmetry, and direction of opening.

1. Watch and take notes on instructional video on Quadratic Functions.
2. In the Math 11 text, complete the Investigation activity on pages 143-144.
3. Watch and take notes on instructional video on Graphing and Analyzing Quadratic Functions.
4. In the Math 11 text, read and take notes on the material between pages 144-156. Make sure to include the highlighted/bold words.

5. In the Math 11 text, read and take notes between pages 164-172. Complete the Example 1 Your Turn section on pages 166-168.

6. Read Key Ideas on pages 156 & 174. In your math journal, explain the difference between vertex form and standard form for the equation of a parabola including a graph and discussion of what happens to the graph when the values of a, p, and q are changed in different ways. Use appropriate terminology in your explanation.

7. Complete the Check Your Understanding questions listed below:
   - pages 157-162 #1→10, 12, 14, 16a, and 17
   - pages 174-179 #1, 2, 4→10, 12, 15, and 17

**Expectation #2: Convert quadratic functions from standard form to vertex form by “completing the square”**.

1. Watch and take notes on instructional video on Completing the Square.

2. In the Math 11 text, read and take notes from pages 180-192 making sure to indicate which example you found the easiest to understand.

3. In the Math 11 text, work through Example 2 on pages 187-188. Now complete the Your Turn section on page 188.

4. In the Math 11 text, work through Example 3 on pages 188-189. Now complete the Your Turn section on page 189.

5. Read Key Ideas on page 192. In your math journal, using an example of your choice, create a step by step set of instructions on Completing the Square that can be used by any student who takes Math 11 in the future. (make it easier to read than the textbook)

6. Complete the Check Your Understanding questions listed below:
   - pages 192-197 #1→16, 22, and 23

**REVIEW AND CHALLENGE**

1. In the Math 11 text, complete the Chapter 3 Review pages 198-200.

2. Complete all Journal activities.

**Key terms:** quadratic function, parabola, vertex, minimum value, maximum value, axis of symmetry, vertex form, standard form, domain, range, x-intercept, y-intercept, completing the square.
PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
Math 11 Pre-Calculus LG 6/7
QUADRATIC EQUATIONS

INTRODUCTION:
Many pieces of useful information can be found by solving a quadratic equation under various circumstances. The methods you learn in this guide can be applied to any function which has the highest variable exponent of 2. This information will prove to be extremely useful to you in your future endeavours in mathematics.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) solve quadratic equations by graphing.
2) factor quadratic equations in order to find the solutions.
3) solve quadratic equations by completing the square.
4) use the quadratic formula to determine the solutions.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Solve Quadratic Equations using:
1) graphing
2) factoring
3) completing the square
4) quadratic formula

1. Watch and take notes on instructional video on Solving Quadratics by Graphing.
2. In the Math 11 text, read and take notes on pages 206-214.
3. **Watch and take notes on instructional video on Solving Quadratics by Factoring.**
4. In the Math 11 text, read and take notes on pages 218-229. Work through Example 3 on pages 223-225. Now complete the **Your Turn** section on page 225.

5. **Watch and take notes on instructional video on Solving Quadratics by Completing the Square.**
6. In the Math 11 text, read and take notes on pages 234-240. Work through Example 2 on page 237. Now complete the **Your Turn** section on page 237.

7. **Watch and take notes on instructional video on Solving Quadratics by the Quadratic Formula.**

8. In the Math 11 text, read and take notes on pages 244-253. Work through Example 1 on pages 246-247 and Example 2 on pages 248-249. Now complete the **Your Turn** section on page 247 and 249.

9. Read Key Ideas on pages 214, 229, 240, and 253. In your math journal, make a three column chart that you will use to show the advantages, disadvantages, and why you like (or dislike) the four methods of solving quadratic equations.

10. Complete the **Check Your Understanding** questions listed below:
    - pages 215-217 #1\(\rightarrow\)7, 9\(\rightarrow\)11, and 13
    - pages 229-233 #1\(\rightarrow\)11, 13, 14, 16, 18, 20, 21, 24, 26, and 28
    - pages 240-243 #1\(\rightarrow\)10, and 15
    - pages 254-257 #1\(\rightarrow\)4, 6\(\rightarrow\)9, 12, 13, 16, 17, and 20

**REVIEW AND CHALLENGE**

1. In the Math 11 text, complete the Chapter 4 Review pages 258-260.
2. Complete all Journal activities.

**Key Terms:** quadratic equation, roots, zeros, extraneous root, quadratic formula, discriminant.

**PRACTICE QUIZZES**

- Practice quiz #1
- Practice quiz #2
- Practice quiz #3
- Practice quiz #4
INTRODUCTION:
In order to prepare for a Unit test, some activities are needed to properly study the material you will be tested on. The more questions you can practice, the better prepared you will become. It is also good practice to look at previous quizzes in this course to see the types of questions you might get on your next test, as well as see the ones that have caused you trouble in the past.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:

LG 5:  
1) analyze and graph quadratic functions and identify the vertex, domain and range, \(x\) and \(y\) intercepts, axis of symmetry, and direction of opening.
2) convert quadratic functions from standard form to vertex form by “completing the square”.

LG 6/7:  
3) solve quadratic equations by graphing.
4) factor quadratic equations in order to find the solutions.
5) solve quadratic equations by completing the square.
6) use the quadratic formula to determine the solutions.

EVALUATION:
Take the LG8 Unit #2 test in the test centre.

RESOURCES NEEDED:
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: LG #5 review.
1. Read through your journal entries and create some cue card study materials for this guide. (title/name on one side, formula/picture on the back)
1. Complete the Check Your Understanding questions listed below:
   - pages 157-162 #11, 13, 15, 16bc, 18→21, and 23→25
   - pages 174-179 #3, 11, 13, 14, 19, 23, and 24
   - pages 194-197 #17, 18, 20, 21, 25, 27, 29, and 30
3. Complete the Practice Test on pages 201-203.

Expectation #2: LG #6/7 review.

1. Read through your journal entries and create some cue card study materials for this guide. (title/name on one side, formula/picture on the back)
2. Complete the Check Your Understanding questions listed below:
   - pages 215-217 #8, 12, 14, and 15→18
   - pages 229-233 #12, 15, 17, 19, 22, 23, 27, 30, and 31
   - pages 240-243 #11, 12, 13, 16, and 18→21
   - pages 254-257 #5, 10, 14, 15, 18, and 21→23 (extra 19)
3. Complete the Practice Test on pages 261-262.

PRACTICE UNIT TESTS

Practice test #1
Practice test #2
Practice test #3
Practice test #4

Expectation #3: Write the Unit test.

1. Now that you have completed the review material for this unit, it is time to write the Unit #2 test. Get a test slip and fill it out. Take the test in the test center.
INTRODUCTION:
Radical equations can be used to model a variety of relationships. Check out pages 270-271.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) Convert between entire and mixed radicals.
2) Compare and order radicals.
3) Add and subtract radicals.
4) Multiply and divide radicals.
5) Solve radical equations.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Convert between entire and mixed radicals.
Expectation #2: Compare and order radicals.
Expectation #3: Add and subtract radicals.

1. Watch and take notes on instructional video on Converting Mixed-Entire Radicals with variables.
2. In the textbook, read Link the Ideas on page 273.
3. In the textbook, work through Example 1 on page 274. Now complete Your Turn on page 274.
4. Read Radicals in Simplest form on page 274.
5. Work through Example 2 on page 275. Now complete Your Turn on page 275.
6. In your math journal, explain and give an example of how to convert a mixed radical to an entire radical and explain and give an example of how to convert an entire radical to a mixed radical.

7. In the textbook, complete pages 278-279 #1-4.

8. Watch and take notes on instructional video on Ordering Radical Numbers.

9. Watch and take notes on instructional video on Adding and Subtracting Radicals.

10. In the textbook, work through Examples 3 and 4 and complete the corresponding Your Turns.

11. Read Key Ideas on page 278. In your journal,
   a) describe how you would compare radicals. Use an example to illustrate.
   b) describe how you would add or subtract radicals. Use an example to illustrate.
   c) describe how to simplify radicals. Use an example to illustrate.

12. In the textbook, complete pages 278-279 #5, 6, 8-10, 11, 13, 14, 17.

**Expectation #4: Multiply and divide radicals.**

1. Watch and take notes on instructional video on Multiplying Radicals.

2. In the textbook, read Link the Ideas on page 284.


4. In your math journal, describe how to multiply radicals. Use an example to illustrate.

5. Watch and take notes on instructional video on Dividing Radicals.

6. Read Dividing Radicals on page 286 and Rationalizing the Denominators on page 287.

7. Work through Example #3 on page 287 and then complete Your Turn on page 288.

8. Read Key Ideas on page 289. In your math journal,
   a) describe how to divide radicals. Use an example to illustrate.
   b) describe how to rationalize the denominator. Use an example to illustrate.

9. In the textbook, complete pages 289-292 #1-12, 13, 14, 15, 16, 20.
Expectation #5: Solve radical equations.

1. Watch and take notes on instructional video on Solving Radical Equations.

2. In the textbook, work through Examples 1-4 on pages 296-299 completing each Your Turn for practice.

3. Read Key Ideas on page 300. In your math journal, describe how to solve radical equations. Use an example to illustrate.

4. In the textbook, complete pages 300-302 #1-10, 11-14, 21

REVIEW AND CHALLENGE

1. In the textbook, complete Chapter 5 Review pages 304-305 #1-21.

Key Terms: like radicals, mixed radicals, entire radicals, rationalize, conjugate.

PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
INTRODUCTION:
Rational expressions are used in medicine, lighting, economics, space travel, engineering, acoustics and many other fields. Check out pages 308-309.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) Simplify rational expressions.
2) Multiply and divide rational expressions.
3) Add and subtract rational expressions.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:
Expectation #1: Simplify rational expressions.
1. Watch and take notes on instructional video on Non-permissible Values.
2. Watch and take notes on instructional video on Simplifying Rational Expressions.
3. In the textbook, complete Investigate Rational Expressions #2, 3, 5, 8 on page 311.
4. In the textbook, read Link the Ideas on page 312.
5. In your journal, explain how to find the non-permissible values of a rational expression.
6. In the textbook, work through Example 1 on page 312. Now complete Your Turn on page 312.
7. Read page 313.
8. Work through Examples 2 and 3 on page 314-316. Now complete Your Turn on page 315 and 316.
9. Read Key Ideas on page 317.
10. In your math journal, explain and give an example of how to simplify radicals.
11. In the textbook, complete pages 317-320 #1, 3, 4, 6-8, 11, 13, 15, 19, 23, 25

Expectation #2: Multiply and divide rational expressions.

1. Watch and take notes on instructional video on Multiplying and Dividing Rational Expressions.
2. In the textbook, read Investigate Multiplying and Dividing Rational Expressions #1-5, 7-9 on pages 322-323.
3. Read Link the Ideas on page 323.
4. Work through Example 1 on page 324. Now complete Your Turn on page 324.
5. Read page 325 and work through Example 2 and 3 on page 325-326. Complete Your Turn on page 325 and page 326.
6. Read Key Ideas on page 326.
7. In your math journal, describe how to multiply and divide radicals. Use an example for each to illustrate.
8. In the textbook, complete pages 327-329 #1-4, 8, 10, 14, 15, 17, 18.

Expectation #3: Add and subtract rational expressions.

1. Watch and take notes on instructional video on Adding and Subtracting Rational Expressions.
2. In the textbook, read Link the Ideas on page 332.
4. Read Key Ideas on page 335. In your math journal, describe how to add and subtract rational expressions. Use an example of each to illustrate.
5. In the textbook, complete pages 336-339 #1-3, 5-10, 16, 18.
REVIEW AND CHALLENGE

1. In the textbook, complete the Chapter 6 Review -- pages 352-354 #1, 3, 6 - 11, 13 – 15.

**Key Terms:** rational expression, non-permissible value.

PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
Math 11 Pre-Calculus LG 11
RATIONAL EQUATIONS

INTRODUCTION:
Rational equations are used in medicine, lighting, economics, space travel, engineering, acoustics and many other fields. Check out pages 341-342.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) Solve rational equations.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Solve rational equations.
1. Watch and take notes on instructional video on Rational Equations.
2. In the textbook, read Link the Ideas on page 342.
   3. Work through Examples 1 - 4 on pages 342-347. Now complete Your Turn on pages 343, 344, 345 and 347.
4. Read Key Ideas on page 348. In your math journal, describe how to solve rational equations. Use an example to illustrate.
5. In the textbook, complete pages 348-9 #1-8, 11, 12, 14, 15.
REVIEW AND CHALLENGE

1. In the textbook, complete a portion of the Chapter 6 Review -- page 354 #20, 21, 23.

**Key Terms:** non-permissible value, rational equation.

**PRACTICE QUIZZES**

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
INTRODUCTION:
A review of Learning Guides 9-11

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:

LG 9: 1) Convert between entire and mixed radicals.
       2) Compare and order radicals.
       3) Add and subtract radicals.
       4) Multiply and divide radicals.
       5) Solve radical equations.

LG 10: 6) Simplify rational expressions.
        7) Multiply and divide rational expressions.
        8) Add and subtract rational expressions.
        9) Multiply and divide radicals.

LG 11: 10) Solve rational equations

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. All students will write the Unit 3 Test which will cover all of the expectations of Learning Guides 9-11.

RESOURCES NEEDED:
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.
LEARNING ACTIVITIES:

In order to review for the unit test, you should do the following:

4. Additional review questions and practice quizzes are found at www.thssmath.com.

PRACTICE UNIT TESTS

Practice test #1
Practice test #2
Practice test #3
Practice test #4
INTRODUCTION:

This learning guide will investigate absolute value functions and their applications. Check out pages 356-357.

LEARNING GUIDE EXPECTATIONS:

On the completion of this learning guide you will be able to:
1) Determine the absolute value of numbers and expressions.
2) Sketch and describe the properties of absolute functions.
3) Solve absolute value equations.

EVALUATION:

You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:

Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:

Expectation #1: Determine the absolute value of numbers and expressions.

1. Watch and take notes on instructional video on Absolute Value.
2. In the textbook, complete Investigate Absolute Value on page 359.
3. In the textbook, read Link the Ideas on page 360.
4. In the textbook, work through Examples 1,2,3, and 4 on pages 360-362 and complete Your Turn on pages 360-362 as you complete each example.
5. Read Key Ideas on page 363.
6. In your math journal, explain what an absolute value is and how they can be calculated.
7. In the textbook, complete pages 363-366 #1, 2, 4, 5, 6, 8, 11, 12, 15, 18
Expectation #2: Sketch and describe the properties of absolute functions.
1. Watch and take notes on instructional video on Absolute Value Functions.
2. In the textbook, complete Investigate Absolute Value Functions on pages 368-369.
3. Read Link the Ideas on page 370.
6. Read Key Ideas on page 375.
7. In your math journal, describe how to sketch and analyze an absolute value function.

Expectation #3: Solve absolute value equations.
1. Watch and take notes on instructional video on Absolute Value Equations.
2. In the textbook, read page 380.
   3. Complete Investigate Absolute Value Equations #1-4, 7, 8 on page 381.
   4. Read Link the Ideas on page 381.
   5. Work through Examples 1-6 on pages 382-388 and complete Your Turn as you complete each example.
6. Read Key Ideas on page 388. In your math journal, describe how to solve absolute value equations. Use an example of each to illustrate.
7. In the textbook, complete pages 389-390 #1-6, 7, 9, 12, 16.

REVIEW AND CHALLENGE
1. In the textbook, complete Chapter 7 Review pages 410-412 #1-9, 11-14.

Key Terms: absolute value, piecewise function

PRACTICE QUIZZES
Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
**Math 11 Pre-Calculus LG 14**
**RECIPROCAL FUNCTIONS**

**INTRODUCTION:**
This learning guide will investigate reciprocal functions and their applications. Check out pages 392-393.

**LEARNING GUIDE EXPECTATIONS:**
On the completion of this learning guide you will be able to:
1) Graph and describe the properties of reciprocal functions.

**EVALUATION:**
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectation. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

**RESOURCES NEEDED:**
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

**LEARNING ACTIVITIES:**

**Expectation #1: Graph and describe the properties of reciprocal functions.**

1. **Watch and take notes on instructional video on Reciprocal Functions.**
2. In the textbook, read Link the Ideas on page 394.
3. Work through Examples 1 - 4 on pages 394-402 and complete Your Turn as you work through the examples.
4. Read Key Ideas on page 402. In your math journal, describe how to graph a reciprocal function. Use an example to illustrate.
5. In the textbook, complete pages 403-405 #1, 2, 6-9, 12.
REVIEW AND CHALLENGE

1. In the textbook, complete Chapter 7 Review pages 412 #15-18.

**Key Terms:** invariant point, reciprocal, vertical and horizontal asymptote.

**PRACTICE QUIZZES**

- Practice quiz #1
- Practice quiz #2
- Practice quiz #3
- Practice quiz #4
Math 11 Pre-Calculus LG 15
UNIT 4 REVIEW

INTRODUCTION:
A review of Learning Guides 13-14

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:

LG 13:
1) Determine the absolute value of numbers and expressions.
2) Sketch and describe the properties of absolute functions.
3) Solve absolute value equations.

LG 14:
1) Graph and describe the properties of reciprocal functions.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. All students will write the Unit 4 Test which will cover all of the expectations of Learning Guides 13 & 14.

RESOURCES NEEDED:
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:
In order to review for the unit test, you should do the following:

2. Complete Chapter 7 Practice Test pages 413 #1-12.
3. Additional review questions and practice quizzes are found at www.thssmath.com.
PRACTICE UNIT TESTS

Practice test #1
Practice test #2
Practice test #3
Practice test #4
INTRODUCTION:
In Business you can use straight lines to determine trends in a stock price movement. However, the price chart itself is quite volatile moving up and down at the whims of shareholders. When these two graphs meet you get a buying signal for analysts of the stock, so being able to predict where this happens is vital to making money in the stock market. This Learning Guide will teach you the basic skill of graphical solutions that these analysts use in their every day job.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) Describe how to use a graph to find the solutions for two equations.
2) Explain the different situations where a system of equations can have no solution, one solution, or infinitely many solutions.
3) Outline several different processes where you are able to find the solution to a system of equations algebraically.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:
Expectation #1: Describe how to use a graph to find the solutions for two equations.
Expectation #2: Explain the different situations where a system of equations can have no solution, one solution, or infinitely many solutions.
1. Watch and take notes on instructional video on Solving Quadratic Systems Graphically.
2. In the Math 11 text, complete the Investigation activity on pages 424-425.
3. In the Math 11 text, read and take notes on the Link the Ideas on pages 426.
4. In your math journal, develop a picture gallery to show when a system of equations has no solution, one solution, two solutions and infinitely many solutions.

5. In the Math 11 text, work through Example 1 on pages 427. Now complete the Your Turn section on page 427.

6. In the Math 11 text, work through Example 2 on pages 428-429. Now complete the Your Turn section on page 429.

7. In the Math 11 text, work through Example 3 on pages 429-430. Now complete the Your Turn section on page 430.

8. Read Key Ideas on pages 435. In your math journal, create a set of step-by-step instructions that can be used to instruct anyone on how to find the solutions of two equations graphically.

9. Complete the Check Your Understanding questions listed below:
   - pages 435-439 #1-4, 7-11, 13, 14, 17, and 20

Expectation #3: Outline several different processes where you are able to find the solution to a system of equations algebraically.

1. Watch and take notes on instructional video on Solving Quadratic Systems Algebraically.

2. In the Math 11 text, complete the Investigation activity on pages 440-441.

3. In the Math 11 text, read and take notes on the material between pages 440-451. Make sure to include the highlighted/bold words.

4. In the Math 11 text, choose 3 examples in this section, read and complete the Your Turn sections.

5. Read Key Ideas on page 451. In your math journal, choose one question from the Apply section, page 452-453, and use this problem to explain which method of solving systems of equations algebraically that you prefer.

6. Complete the Check Your Understanding questions listed below:
   - pages 451-456 #3, 4, 6, 8, 9, 10, 12, 13, 14, 16, 18, 19, 20, 22, and 24

REVIEW AND CHALLENGE

1. In the Math 11 text, complete the Chapter 8 Review pages 457-458.

2. Complete all Journal activities.

Key terms: System of linear-quadratic equations, system of quadratic-quadratic equations
PRACTICE QUIZZES

Practice quiz #1
Practice quiz #2
Practice quiz #3
Practice quiz #4
INTRODUCTION:
A CNC machine is a device used in the manufacturing industry to cut shapes into solid blocks of material. It is the main device used in creating aluminum wheels for cars, and you have probably seen it on Orange County Choppers. In order to program this device correctly, the person needs to understand how to eliminate the unwanted material. This often involves mathematical equations using Linear and Quadratic Inequalities.

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:
1) Explain how to find the solution for a two-variable linear equation.
2) Represent and solve a problem that involves a quadratic inequality in one variable including a graph.
3) Determine the solution of a quadratic equation using strategies like case analysis, graphing, roots and test points, or sign analysis.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. Please refer to your Mathematics 11 Pre-Calc Marks Record Sheet to determine the assessment.

RESOURCES NEEDED:
Math 11 Pre-Calc Text
THSS Math 11 Pre-Calc Learning Guides.

LEARNING ACTIVITIES:
Expectation #1: Explain how to find the solution for a two-variable linear equation.
1. Watch and take notes on instructional video on Linear Inequalities.
2. In the Math 11 text, complete the Investigation activity on pages 464-465.
3. In the Math 11 text, read and take notes on the material between pages 464-471. Make sure to include the highlighted/bold words.
4. In the Math 11 text, work through Example 1 on pages 466-467. Now complete the Your Turn section on page 467.
5. In the Math 11 text, work through Example 2 on pages 469. Now complete the Your Turn section on page 469.
6. Read Key Ideas on pages 472. In your math journal, using the graph of a two variable linear inequality, develop a set of step-by-step instructions that can be used to instruct anyone on how to create this graph.

7. Complete the **Check Your Understanding** questions listed below:
   - pages 472-475 #1→6, 8, 9, 11, 13, 15, 17, and 20

**Expectation #2: Represent and solve a problem that involves a quadratic inequality in one variable including a graph.**

1. Watch and take notes on instructional video on Quadratic Inequalities.
2. In the Math 11 text, Complete the Investigate activities on pages 476→477
3. In the Math 11 text, read and take notes from pages 476-484 making sure to include the highlighted/bold words.
4. In the Math 11 text, work through Example 1 on pages 478-479. Now complete the **Your Turn** section on page 479.
5. In the Math 11 text, work through Example 3 on pages 482. Now complete the **Your Turn** section on page 482.

6. Read Key Ideas on page 484. In your math journal, explain what is meant when a quadratic equation with only one variable is written as an inequality. Use appropriate terminology in your explanation.

7. Complete the **Check Your Understanding** questions listed below:
   - pages 484-487 #1→4, 6→13, 15, 16, 17, 19, and 20

**Expectation #3: Determine the solution of a quadratic equation using strategies like case analysis, graphing, roots and test points, or sign analysis.**

1. Watch and take notes on instructional video on Quadratic Inequalities in 2 Variables.
2. In the Math 11 text, complete the Investigation activity on pages 488-489.
3. In the Math 11 text, read and take notes on the material between pages 488-496. Make sure to include the highlighted/bold words.
4. In the Math 11 text, choose 3 examples in this section, read and complete the **Your Turn** sections.

5. Read Key Ideas on pages 496. In your math journal, using a graph of a quadratic equation, explain the difference between a quadratic inequality with 2 variables and a quadratic inequality with only one variable.

6. Complete the **Check Your Understanding** questions listed below:
   - pages 496-501 #1→8, 10→13, 15, 16, and 17
REVIEW AND CHALLENGE

1. In the Math 11 text, complete the Chapter 3 Review pages 198-200.
   2. Complete all Journal activities.

**Key terms:** System of linear-quadratic equations, system of quadratic-quadratic equations

PRACTICE QUIZZES

- [Practice quiz #1](#)
- [Practice quiz #2](#)
- [Practice quiz #3](#)
- [Practice quiz #4](#)
INTRODUCTION:
A review of Learning Guides 16-18

LEARNING GUIDE EXPECTATIONS:
On the completion of this learning guide you will be able to:

LG 16:
1) Describe how to use a graph to find the solutions for two equations.
2) Explain the different situations where a system of equations can have no solution, one solution, or infinitely many solutions.
3) Outline several different processes where you are able to find the solution to a system of equations algebraically.

LG 17/18:
4) Explain how to find the solution for a two-variable linear equation.
5) Represent and solve a problem that involves a quadratic inequality in one variable including a graph.
6) Determine the solution of a quadratic equation using strategies like case analysis, graphing, roots and test points, or sign analysis.

EVALUATION:
You are ready to progress to the next learning guide when you can demonstrate your understanding of the above expectations. All students will write the Unit 5 Test which will cover all of the expectations of Learning Guides 16-18.

RESOURCES NEEDED:
- Math 11 Pre-Calc Text
- THSS Math 11 Pre-Calc Learning Guides.
LEARNING ACTIVITIES:

In order to review for the unit test, you should do the following:

2. Complete Chapter 8 Practice Test pages 459 - 460 #1-12.
4. Additional review questions and practice quizzes are found at www.thssmath.com.

PRACTICE UNIT TESTS

Practice test #1
Practice test #2
Practice test #3
Practice test #4