Adult Basic Education

# Mathematics

# Mathematics 1104A

## Coordinate Geometry, Factoring, Solving Quadratic Equations and Equations Involving Rational Expressions

# Study Guide

**Prerequisite:** Grade 9 Mathematics

**Credit Value**: 1

**Text:** *Mathematics 10.* Alexander and Kelly; Addison-Wesley,1998.

**Required Mathematics Courses**
**[Degree and Technical Profile/Business-Related College Profile]**

**Mathematics 1104A**
Mathematics 1104B
Mathematics 1104C
Mathematics 2104A
Mathematics 2104B
Mathematics 2104C
Mathematics 3104A
Mathematics 3104B
Mathematics 3104C

## Table of Contents

# To the Student

## I. Introduction to Mathematics 1104A

This course has two distinct topics. Firstly, the Cartesian coordinate system is used to determine the slope of line segments, as well as perpendicular line segments and parallel line segments. You should draw a neat diagram and work graphically as well as algebraically to solve a problem. The slopes of vertical and horizontal line segments are also discussed. These concepts are then extended to include lines which are really comprised of line segments. You will be given different information about a line and asked to find its equation (in standard form or $y = mx + b$ form) and draw its graph. Given the equation of a line, the intercepts and slope are determined and special cases are investigated.

The second topic looks at factoring *trinomials* of the form $ax^2 + bx + c$ and factoring a *difference of squares* which has a degree of 2. You will use factoring to solve quadratic equations and equations involving rational expressions.

## II. Resources

You will require the following:

- *Addison Wesley Mathematics 10,* Western Canadian edition Textbook
- Scientific calculator
- graph paper
- Access to a TI-83 Plus graphing calculator (see your instructor)
- and/or *Graphmatica* or *Winplot* graphing software

**Notes concerning the textbook**:

**Glossary**: Knowledge of mathematical terms is essential to understand concepts and correctly interpret questions. Written explanations will be part of the work you submit for evaluation, and appropriate use of vocabulary will be required.

Your text for this course includes a Glossary where definitions for mathematical terms are found. Be sure you understand such definitions and can explain them in your own words. Where appropriate, you should include examples or sketches to support your definitions.

**Examples**: You are instructed to study carefully the **Examples** in each section and see your instructor if you have any questions. These **Examples** provide full solutions to problems that can be of great use when answering assigned **Exercises**.

## To the Student

**Notes concerning technology**:

It is important that you have a **scientific** calculator for your individual use. Ensure that the calculator used has the word "scientific" on it as there are calculators designed for calculation in other areas such as business or statistics which would not have the functions needed for study in this area. Scientific calculators are sold everywhere and are fairly inexpensive. You should have access to the manual for any calculator that you use. It is a tool that can greatly assist the study of mathematics but, as with any tool, the more efficient its use, the better the progress.

You will require access to some sort of technology in order to meet some of the outcomes in this course. Since technology has become a significant tool in the study of Mathematics, your textbook encourages you to become proficient in its use by providing you with step-by-step exercises that will teach you about the useful functions of the TI-83 Plus Graphing calculator. **See your instructor concerning this**. Please note that a graphing calculator is not essential for success in this course but it is useful.

While graphing calculators and graphing software (*Graphmatica* or *Winplot*) are useful tools, they cannot provide the same understanding that comes from working paper and pencil exercises.

## III. Study Guide

**This Study Guide is required at all times.** It will guide you through the course and you should take care to complete each unit of study in the order given in this Guide. Often, at the beginning of each unit, you will be instructed to see your instructor for **Prerequisite** exercises. Please do not skip this step! It should only take a few minutes for you and your instructor to discover what, if any, prerequisite skills need review.

To be successful, you should read the **References and Notes** first and then, when indicated by the ▶▶ symbols, complete the **Work to Submit** problems. Many times you will be directed to see your instructor, and this is vital, especially in a Mathematics course. If you have only a hazy idea about what you just completed, nothing will be gained by continuing on to the next set of problems.

# To the Student

**Reading for this Unit:** In this box, you will find the name of the text, and the chapters, sections and pages used to cover the material for this unit. As a preliminary step, skim the referenced section, looking at the name of the section, and noting each category. Once you have completed this overview, you are ready to begin.

**References and Notes**

This left hand column guides you through the material to read from the text.

It will also refer to specific **Examples** found in each section. You are directed to study these **Examples** carefully and see your instructor if you have any questions. The **Examples** are important in that they not only explain and demonstrate a concept, but also provide techniques or strategies that can be used in the assigned questions.

The symbols ▶▶ direct you to the column on the right which contains the work to complete and submit to your instructor. You will be evaluated on this material.

Since the answers to **Discussing the Ideas** and **Communicating the Ideas** are not found in the back of the student text, you **must** have these sections corrected by your instructor **before** going on to the next question.

This column will also contain general **Notes** which are intended to give extra information and are not usually specific to any one question.

**Work to Submit**

There are four basic categories included in this column that correspond to the same categories in the sections of the text. They are **Investigate, Discussing the Ideas**, **Exercises**, and **Communicating the Ideas**.

**Investigate:** This section looks at the thinking behind new concepts. The answers to its questions are found in the back of the text.

**Discussing the Ideas**: This section requires you to write a response which clarifies and demonstrates your understanding of the concepts introduced. The answers to these questions are not in the student text and will be provided when you see your instructor.

**Exercises**: This section helps to reinforce your understanding of the concepts introduced. There are three levels of **Exercises**:
**A:** direct application of concepts introduced
**B:** multi-step problem solving and some real-life situations
**C:** problems of a more challenging nature
The answers to the **Exercises** questions are found in the back of the text.

**Communicating the Ideas:** This section helps confirm your understanding of the lesson of the section. If you can write a response, and explain it clearly to someone else, this means that you have understood the topic. The answers to these questions are not in the student text and will be provided when you see your instructor

This column will also contain **Notes** which give information about specific questions.

## IV. Recommended Evaluation

| | |
|---|---|
| Written Notes | 10% |
| Assignments | 10% |
| Test(s) | 30% |
| Final Exam *(entire course)* | 50% |
| | 100% |

**The overall pass mark for the course is 50%.**

## Unit 1 - Coordinate Geometry: Slopes of Line Segments

**To fulfill the objectives of this unit, students should complete the following:**

**Reading for this unit**: *Mathematics 10*

Chapter 3:
- Section 3.3: pages 162 - 169
- Section 3.4: pages 175 - 179
- Mathematics File: pages 182 and 183
- Section 3.5: pages 184 - 189
- Review: pages 192 - 195

| References and Notes | Work to Submit |
|---|---|
| Quad paper or graph paper is required for this unit.<br><br>Carefully read **Section 3.3**. Pay particular attention to the **Examples** which are worked in each section.<br><br>**Note**: When finding the slope of a line segment, the order in which the $x$-coordinates are subtracted **must** be the **same** as the order in which the $y$-coordinates are subtracted.<br><br>Answer the following questions. ▶▶ | 1.1 **Investigate**, page 162<br>Answer questions 1 and 2.<br><br>1.2 Define the term *slope*.<br><br>1.3 Write the formula for the slope of a line segment joining $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$. |

## Unit 1 - Coordinate Geometry: Slopes of Line Segments

### References and Notes

Read **Visualizing** on page 165.

Answer the following questions.
▶▶

Since the answers to **Discussing the Ideas** are not in the back of the textbook, see your instructor for correction before proceeding to the next question in the Study Guide.

When you graph a line segment and calculate its slope, make sure that the slope fits the diagram.

If you graph a line segment and it rises to the right, it will have a positive slope.

If it falls to the right, the slope will be negative.

Horizontal segments have a slope of zero and vertical segments have undefined slopes.

### Work to Submit

1.4 **Discussing the Ideas**, page 165
Answer question 1.

1.5 **Exercises**, pages 166 - 169
Answer questions 1 - 6.
(*See note below on questions 1 and 2*.)

Answer questions 7 and 8.
(*See note below on question 7*.)

Answer questions 10, 11a), 12, 17, 18 and 19.
(*See note below on questions 17 and 18*.)

**Questions 1 and 2**: Since a coordinate system is not used, use positive values for the rise and run.

**Question 7**: You are asked to determine the slope from the diagram. This is misleading! You should graph the line segment and then use the formula for slope.

**Question 17 and 18**: When you draw the segments on a grid, make sure that the sign of the slope, "+" or "- ", fits the sketch! Use the slope formula to do these problems. For example in 17(a)

$$slope = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{1}{2} = \frac{6-2}{x-(-1)} \quad \Rightarrow \quad \frac{1}{2} = \frac{4}{x+1}$$

$$cross-multiplying, we\ get:$$

$$8 = x + 1$$

$$7 = x$$

## Unit 1 - Coordinate Geometry: Slopes of Line Segments

| References and Notes | Work to Submit |
|---|---|
| Carefully read **Section 3.4**.<br><br>Study **Examples 1** and **2**.<br><br>Answer the following questions. ▶▶ | 1.6 **Investigate**, page 175<br>Answer questions 1 - 3.<br><br>1.7 **Discussing the Ideas**, page 177<br>Answer questions 1, 2 and 3.<br>(*See note below on question 3.*) |
| See your instructor for correction of **Discussing the Ideas** before completing the **Exercises**. | **Question 3**: If you cannot recall how to find the midpoint of a line segment, see page 157 in the textbook.<br><br>1.8 **Exercises**, pages 177 - 179<br>Answer questions 1 - 6.<br>(*See note below on question 1.*)<br><br>Answer questions 9, 10, 13 and 14.<br>(*See note below on questions 13 and 14.*)<br><br>**Question 1**: Graphs can be misleading. Lines may **appear** to be parallel, but not have the same slope.<br><br>**Questions 13 and 14**: These questions are similar to **Example 2** on page 176.<br><br>1.9 **Communicating the Ideas**, page 179 |
| Bring **Communicating the Ideas** to the instructor for correction. | |

## Unit 1 - Coordinate Geometry: Slopes of Line Segments

| References and Notes | Work to Submit |
|---|---|
| Read **Mathematics File** on pages 182 and 183. Carefully work through the solution given to the problem. | 1.10 **Mathematics File**, pages 182 and 183<br>Answer questions 1 - 7.<br>(*See notes below on questions 1 and 5*.) |
| | **Question 1**: Whole numbers like 3, can be written as $\frac{3}{1}$ . |
| | **Question 5**: Recall that the slopes of parallel lines are equal. Therefore, 5a) becomes $\frac{2}{3} = \frac{4}{k}$ and you can then solve for *k*. |
| Read **Section 3.5.**<br><br>Read **Investigate** in the box on page 184.<br><br>Note that the relationship between the slopes of perpendicular lines does not hold for vertical or horizontal lines.<br><br>Study **Examples 1** and **2.**<br><br>Answer the followings questions. ▶▶<br><br>See your instructor for correction of **Discussing the Ideas** before completing the **Exercises**. | 1.11 **Discussing the Ideas**, page 186<br>Answer questions 1 - 4. |

## Unit 1 - Coordinate Geometry: Slopes of Line Segments

### References and Notes

It is important that you draw a diagram for most of the **Exercises**. A diagram will help you visualize the problem and decide whether or not your answer is reasonable.

You should ask your instructor to correct **Communicating the Ideas** before continuing to the next unit.

### Work to Submit

1.12 **Exercises,** pages 187 and 188
Answer questions 1 - 5.
(*See note below on these questions*.)

Answer questions 7 - 14.
(*See note below on questions 12 and 14*.)

**Questions 1 - 5**: You can find which line segments are perpendicular by multiplying their slopes and checking that the product is $-1$.

**Questions 12 and 14**: These questions are similar to **Example 2** on page 186. There are many solutions to question 12. First calculate the slope of the line segment given and then find the negative reciprocal to give the slope of the perpendicular line segment.

1.13 **Communicating the Ideas**, page 189

## Unit 2 - Coordinate Geometry: The Straight Line

**To fulfill the objectives of this unit, students should complete the following:**

**Reading for this unit**: Mathematics *10*

Chapter 10:
- Section 4.1: pages 198 - 204
- Section 4.2: pages 207 - 212
- Section 4.3: pages 214 - 220
- Patterns in Equations: page 221
- Section 4.4: pages 224 - 228
- Section 4.5: pages 229 - 235

### References and Notes

You will need quad paper or graph paper for this unit.

Carefully read **Section 4.1**. Study **Examples 1** and **2**. These examples demonstrate how to generate a table of values from an equation, and then how to graph the points. The *x*-value is described as the <u>independent</u> variable and the *y*-value is the <u>dependent</u> value. The value of *y* depends on the value substituted for *x*, which can be any number (independent). Draw neat sketches. It is important to label graphs properly and use a ruler to draw axes and lines.

Answer the following questions. ▶▶

### Work to Submit

2.1 **Exercises**, page 202 - 204
Answer questions 1 - 5.
(*See notes below on questions 3, 4 and 5.*)

Answer questions 6 - 8 and 9.
*(See note below on question 9.)*

## References and Notes

For most of the questions in this **Exercise**, the equations can be easily graphed if you first let $x = 0$, solve for *y*, and then let $y = 0$, and solve for $x$. You can choose any other value for $x$ and solve for *y*, just to get a third point for verification.

Only two points are needed to graph a straight line. A third point will verify that the graph is a straight line or will identify errors in calculations.

After completing **Communicating the Ideas**, bring your work to the instructor for correction

Read **Section 4.2**.

Carefully study **Examples 1**, **2** and **3**.

Answer the following questions. ▶▶

## Work to Submit

**Question 3**: This question is similar to the rental -hall problem on page 198.

**Question 4**: The fixed cost is $300.00. That is, if no players played ( $n = 0$ ), the cost to the team would still be $300.00. The cost, in dollars, per player is 20.

**Question 5**: The 100 in the equation is the average speed of the car.

**Question 9**: If you write the equation that represents the rule, you should get $2x + y = 12$.

2.2 **Communicating the Ideas**, page 204

2.3 **Discussing the Ideas**, page 210
Answer questions 1 and 2.

## References and Notes

You may recall that when the slope is an integer, it may be written as a fraction with a denominator of 1. For example, $3 = \frac{3}{1}$.

## Work to Submit

2.4 **Exercises**, pages 210 - 212
Answer questions 1 - 5.
(*See note below on question 5*.)

Answer questions 7 - 11.
(*See note below on questions 10 and 11*.)

Answer questions 12 - 17.
(*See notes below on questions 14 - 16*.)

**Question 5**: You should draw 2 lines for each given slope. Obviously there is an infinite number of lines with a given slope that could be drawn on a grid.

**Questions 10 and 11**: You could use geometry or algebra to do these questions. With geometry, use the slope to move from the known point to the unknown. With algebra, use the formula $slope = \frac{y_2 - y_1}{x_2 - x_1}$ and solve for the unknown coordinate.

**Question 14:** You can find the slope of the line determined by each pair of points. Use this slope to move up or down to find two more points on the line.

**Questions 15 and 16:** The definition for *collinear* is given in question 15. If the slopes of AB, BC and AC are equal, then, because of the Constant Slope Property (page 207), they are collinear.

In 15c, you could also calculate the distance between points. If AB + BC = AC, then the points are collinear.

## Unit 2 - Coordinate Geometry: The Straight Line

| References and Notes | Work to Submit |
|---|---|
| | 2.5 **Communicating the Ideas**, page 212 |
| Bring **Communicating the Ideas** to your instructor for correction. | |
| Read **Section 4.3**. | |
| Answer the following questions. ▶▶ | 2.6 **Investigate**, page 214<br>Complete questions 1 - 6. |
| After completing **Investigate** on page 214, you should recognize that in the equation $y = mx + b$, the $m$-value represents the slope, and the $b$-value represents the $y$-intercept. | |
| The remainder of **Section 4.3** will develop your ability to: a) graph a line using the slope and $y$-intercept and b) determine an equation from its graph. | |
| Carefully study **Examples 1** and **2**. Note that when you are graphing a line from its $y$-intercept and slope, you must always locate the $y$-intercept first and then use the slope to find another point on the line. | |
| The method in **Example 2**, page 217, can be used only if the exact $y$-intercept can be found. | |

## Unit 2 - Coordinate Geometry: The Straight Line

| References and Notes | Work to Submit |
|---|---|
| Answer the following questions. ▶▶ | 2.7 **Visualizing**, page 216<br>Answer questions 1 and 2. |
| See your instructor for correction of **Discussing the Ideas** before moving on to the **Exercises**. | 2.8 **Discussing the Ideas**, page 217 |
| | 2.9 **Exercises**, pages 217 - 220<br>Answer questions 1 - 5, 10 and 11.<br>(*See note below on questions 10 and 11*.)<br><br>Answer questions 20 and 21.<br>(*See note below on questions 20 and 21*.) |
| | **Questions 10 and 11**: Substitute the coordinates of the point for $x$ and $y$ in the equation, then solve for the unknown. ($b$ or $m$) |
| | **Questions 20 and 21**: You should be able to find the slope of the other line by finding the negative reciprocal of the slope of the given line.<br><br>Also, if the line crosses the $x$-axis, you know that the $y$-coordinate at that point is 0. Substitute $y = 0$ into the given equation to find the $x$-coordinate. Use the same idea if the line crosses the $y$-axis. |

## Unit 2 - Coordinate Geometry: The Straight Line

| References and Notes | Work to Submit |
|---|---|
| See your instructor for correction of **Communicating the Ideas** before moving to the next question.<br><br>Read **Section 4.4**.<br><br>Carefully study **Examples 1** and **2**. Note that **Example 1** determines the equation of a line when given the slope and a point on the line.<br><br>There is more than one method to solve this particular type of problem.<br><br>Try this: substitute the given slope and coordinates in the $y = mx + b$ equation to find $b$. | 2.10 **Communicating the Ideas**, page 220<br><br>2.11 **Patterns in Equations and Lines**, page 221<br>Answer questions 1 and 2.<br>(*See note below on these questions*.)<br><br>**Questions 1 and 2:** You are asked to determine the equation of a line using two particular points on the line, namely the $x$-intercept and $y$-intercept. Use these two intercepts to find the slope and then write the equation in the form $y = mx + b$. |

| References and Notes | Work to Submit |
|---|---|
| **Example 2** finds the equation of a line when given two points on the line.<br><br>Answer the following questions. ▶▶<br><br>See your instructor for correction of **Discussing the Ideas** before moving on to the **Exercises**. | 2.12 Write the *standard form* of the equation of a line.<br><br>2.13 **Discussing the Ideas**, page 225<br>Answer questions 1 - 4.<br><br>2.14 **Exercises**, pages 226 - 228<br>Answer questions 1 - 4.<br>(*See note below on questions 3 and 4*.)<br><br>Answer questions 5 - 7.<br>(*See note below on question 6*.)<br><br>Answer questions 9 - 11 and 13.<br>(*See note below on questions 11 and 13*.)<br><br>**Questions 3 and 4**: You will use the Equation of a Line Property (page 199). If the coordinates of the point satisfy the equation, then the point is on the line.<br><br>**Question 6**: It is not necessary to graph the line.<br><br>**Questions 11 and 13**: Again, you will use the Equation of a Line Property. Substitute the coordinates of the point into the given equation and solve for *k*.<br><br>2.15 **Communicating the Ideas**, page 228 |

## Unit 2 - Coordinate Geometry: The Straight Line

| References and Notes | Work to Submit |
|---|---|
| Read **Section 4.5**.<br><br>Carefully study **Examples 1**, **2** and **3**.<br>[Omit **Visualizing** on page 230.]<br><br>When looking at the standard form $Ax + By + C = 0$ , to find the $x$-intercept, let $y = 0$ and the equation becomes $Ax + C = 0$ and so $x = -C/A$ . Therefore, if two lines have the same $x$-intercept, the values of $C/A$ in the equation $Ax + By + C = 0$ must be equal.<br><br>Similarly, if two lines have the same $y$-intercept, the values of $C/B$ must be equal.<br><br>To find if two lines have the same slope, you must rearrange the equation $Ax + By + C = 0$ and put it in $y = mx + b$ form (slope, $y$-intercept form). You should find that two lines have the same slope if the values of $A/B$ are equal.<br><br>Answer the following questions. ⏭<br><br>See your instructor for correction of **Discussing the Ideas** before moving on to the **Exercises**. | 2.16 **Discussing the Ideas**, page 232<br>Answer questions 1, 2 and 3. |

## Unit 2 - Coordinate Geometry: The Straight Line

| References and Notes | Work to Submit |
|---|---|
| | 2.17 **Exercises**, pages 233 - 235<br>Answer questions 1 - 6.<br>(*See note below on questions 5 and 6*.)<br><br>Answer questions 8 and 9.<br>(*See note below on question 9*.)<br><br>Answer questions 10 - 14 and 18 - 20.<br>(*See note below on questions 10 and 18*.)<br><br>**Questions 5 and 6**: The easiest way to determine the slope and *y*-intercept is to rearrange the equation and put it in<br>$y = mx + b$ form. (See **Example 2** on page 230.)<br><br>**Question 9**: You should use the general properties on page 232 to find the characteristics of these lines.<br><br>**Questions 10 and 18**: When answering these questions, consider the explanation in **References and Notes**.<br><br>2.18 **Communicating the Ideas**, page 235 |
| See your instructor for correction of **Communicating the Ideas**.<br><br>See your instructor for an evaluation of Chapter 4. | |

## Unit 3 - Factoring Polynomials and Solving Quadratic Equations

**To fulfill the objectives of this unit, students should complete the following:**

**Reading for this unit**: *Mathematics 10*

| | | |
|---|---|---|
| Chapter 6: | Section 6.6: | pages 362 - 367 |
| | Section 6.7: | pages 369 - 373 |
| | Section 6.8: | pages 374 - 379 |
| | Section 6.9 | pages 380 - 385 |

### References and Notes

Read **Section 6.6**.

Omit any reference to algebra tiles since you will <u>not</u> be using them to model expanding and factoring of polynomials. Carefully read and work through the problems in **Examples 1** and **2**. (Omit **Examples 3** and **4**.)

In **Example 1a**, you must factor $x^2 + 11x + 24$. Since you are using mental math to find 2 integers which have a product (P) of 24 and sum (S) of 11, it will be helpful to write:

<u>P = 24</u> <u>S = 11</u>

2, 12
3, 8 ⇨ 11
4, 6

For 1b, write:

<u>P = −12</u> <u>S = 1</u>

−4, 3
4, −3 ⇨ 1

### Work to Submit

## Unit 3 - Factoring Polynomials and Solving Quadratic Equations

| References and Notes | Work to Submit |
|---|---|
| Answer the following questions. ▶▶<br><br>This section deals with factoring trinomials of the form $x^2 + bx + c$, which means that the coefficient of the $x^2$ term must be 1 before the factoring methods taught in this section can be used.<br><br>Read **Section 6.7**.<br><br>Omit I**nvestigation**, page 369.<br><br>This section deals with factoring trinomials of the form $ax^2 + bx + c$. The $x^2$ term has a coefficient, $a$, which cannot be factored out of the trinomial. To factor this trinomial, you must look for two integers with a product of '$ac$' before you choose a pair with a sum of '$b$'. | 3.1 Define the following terms:<br>i) polynomial<br>ii) binomial<br>iii) trinomial<br><br>3.2 **Discussing the Ideas**, page 364<br>Answer question 1.<br><br>3.3 **Exercises**, pages 364 - 367<br>Answer questions 1 - 5, 6a) – 6i), 7a) – 7i), 8, 9, 10, 13, 16 and 17.<br>(*See note below for questions 16 and 17*.)<br><br>**Questions 16 and 17**: You may want to refer to **Example 2**, page 363, before you work on these questions.<br><br>If the coefficient of the squared term, (e.g. $x^2$ ) is not 1, you must remove the common factor **before** writing the polynomial as a product of two binomials. |

## Unit 3 - Factoring Polynomials and Solving Quadratic Equations

### References and Notes

Carefully read the bottom of page 369 and study **Examples 1**, **2** and **4**.

Note that in **Example 1**, you are asked to factor $3x^2 - 10x + 8$. You should look for two numbers whose product is 24 ($ac$) and sum is $-10$ ($b$). Write:

| P = 24 | S = −10 |
|---|---|
| −2, −12 | |
| −6, −4 ✓ | −10 |

Now you must rewrite the middle term of the trinomial $3x^2 - 10x + 8$ by using the $-6$ and $-4$. It now becomes $3x^2 - 6x - 4x + 8$. You can see that $-6x - 4x = -10x$.

Rewrite the trinomial by taking a common factor ($3x$) from the first two terms and a common factor ($-4$) from the last two terms.
$3x^2 - 6x - 4x + 8 =$
$3x(x - 2) - 4(x - 2)$

Now, $(x - 2)$ is a common factor! Therefore, you get
$(x-2)(3x-4)$.

In **Example 4**, there is a common factor which is always taken out first.

### Work to Submit

## Unit 3 - Factoring Polynomials and Solving Quadratic Equations

### References and Notes

Answer the following questions. ▶▶

If you have any difficulty with this topic, see your instructor before moving on to the next section.

Read **Section 6.8**.

Omit **Investigation**, page 374

This section factors a special polynomial that is a difference of squares:

$x^2 - y^2$

Square Difference Square

Factoring a difference of squares follows a very predictable pattern.

Read the text on the bottom of page 374. Carefully study **Examples 1**, **2**, and **3**. (Omit **Example 4**.)

See your instructor now, if you need help with these **Examples**.

### Work to Submit

3.4 **Discussing the Ideas**, page 371
Answer questions 1 and 2.

3.5 **Exercises**, pages 371 - 373
Answer questions 1 and 3.
(*See note below on question 3.)*

Answer questions 4a) - 4e),
5 (omit 5f and 5l),
7a) - 7j) (omit 7f), 8,
9a), 9b), 9c), 9f),
10a), 10c), 10d), and 15.

**Question 3**: Ignore the reference to algebra tiles.

## Unit 3 - Factoring Polynomials and Solving Quadratic Equations

### References and Notes

Answer the following questions.
▶▶

Read **Section 6.9**.

This section solves equations by using the factoring skills you've developed so far in this unit.

Unlike a polynomial, a quadratic equation has an ' = ' sign in it.

Carefully study **Example 1** on page 380 and make sure that you read and understand the important property in the box on the bottom of the page.

Study **Examples 2** and **3**.
Often a quadratic equation has two solutions (also called roots).

Answer the following questions.
▶▶

### Work to Submit

3.6 **Discussing the Ideas**, page 376
Answer question 3.

3.7 **Exercises**, pages 376 and 377
Answer questions 3, 4a) - 4h), and 5a) - 5l).

3.8 **Communicating the Ideas**, page 379

3.9 Define the term *quadratic*.

3.10 **Discussing the Ideas**, page 383
Answer questions 1 and 2.

3.11 **Exercises**, page 384
Answer questions 1 - 3.

## Unit 4 - Solving Equations Involving Rational Expressions

**To fulfill the objectives of this unit, students should complete the following**:

| | | | |
|---|---|---|---|
| **Reading for this unit**: | Mathematics *10* | | |
| | Chapter 7: | Section 7.1: | page 400 |
| | | Section 7.6: | pages 431 - 435 |

### References and Notes

Since you will be completing only **Section 7.6** of the chapter, you should first read the introductory paragraphs on page 400. This should explain what a rational expression is.

Read **Section 7.6**.

Carefully study **Examples 1**, **2**, **3** and **4**.

You will notice that an equation containing rational expressions can be solved by multiplying both sides by a common denominator.

**Example 3** is solved by using the short cut method explained on page 182 in *Mathematics 10*.

You should see why the shortcut is the same as multiplying both sides by a common denominator.

The shortcut can ONLY be used when an equation has a only one rational expression on each side.

### Work to Submit

## Unit 4 - Solving Equations Involving Rational Expressions

| References and Notes | Work to Submit |
|---|---|
| Answer the following questions. ▶▶ | 4.1 Define the term *rational expression*. |
| | 4.2 **Discussing the Ideas**, page 433<br>Answer questions 1 - 3. |
| Don't forget to find the value of the variable for which the equation is not defined.<br><br>Although the four examples in the textbook do not check the solutions found, it is a very good practice to substitute the solution(s) into the original equation and see if it really works.<br><br>**Example 3** is a problem where the solution does not work. | |
| Answer the following questions. ▶▶ | 4.3 **Exercises**, pages 434 and 435<br>Answer questions 1, 2, 3, 4, 5, 7 and 8. |