

# MATH 20-1

## RATIONAL EXPRESSIONS & EQUATIONS

### Module SIX

Module 6 - Assignment Booklet

V2b/2015

Student Name:

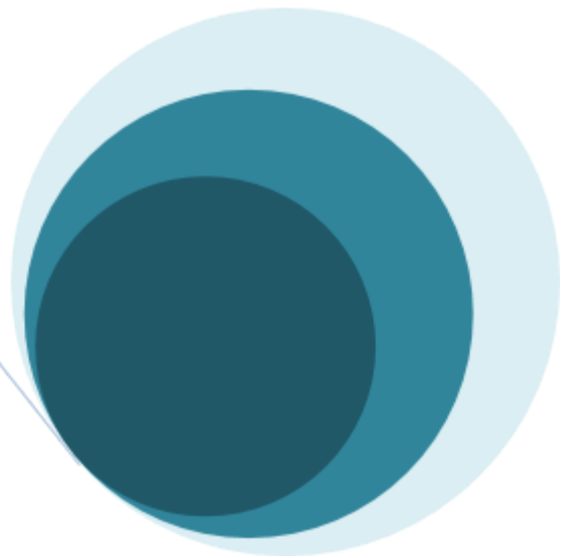
---

<http://moodle.blackgold.ca>

Deadline:

Notes:

Practice Questions Section:





**TEACHING VIDEOS**

The following suggested videos will help you to understand how to work with rational expressions and equations

| QR                                                                                                                                                                                                                                                                        | URL                                                       | DESCRIPTION                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------------------|
| Bookmark The following Site for Math 20-1 Help:<br><a href="https://sites.google.com/a/btps.ca/math20/">https://sites.google.com/a/btps.ca/math20/</a><br><br>Or use the following QR Code for quick access:<br><a href="http://bit.ly/1RSfHE2">http://bit.ly/1RSfHE2</a> |                                                           |  |
| I recommend you watch all the videos in this series.<br>Below are only a few quick examples of very useful videos.                                                                                                                                                        |                                                           |                                                                                     |
| <b>Lesson One: Simplifying Rational Expressions</b>                                                                                                                                                                                                                       |                                                           |                                                                                     |
|                                                                                                                                                                                          | <a href="http://bit.ly/1N3KUjm">http://bit.ly/1N3KUjm</a> | Identifying Non-Permissible Values                                                  |
|                                                                                                                                                                                         | <a href="http://bit.ly/1ULtzUv">http://bit.ly/1ULtzUv</a> | Simplifying Rational Expressions: Common Monomial Factors                           |
|                                                                                                                                                                                        | <a href="http://bit.ly/1jsFxIX">http://bit.ly/1jsFxIX</a> | Introduction to Rational Expressions Simplification                                 |
|                                                                                                                                                                                        | <a href="http://bit.ly/25Ddbso">http://bit.ly/25Ddbso</a> | Simplifying Rational Expressions: Common Binomial Factors                           |
| <b>Lesson Two: Multiplying and Dividing Rational Expressions</b>                                                                                                                                                                                                          |                                                           |                                                                                     |
|                                                                                                                                                                                        | <a href="http://bit.ly/1N3KUjm">http://bit.ly/1N3KUjm</a> | Introduction to Rational Expression Simplification                                  |
|                                                                                                                                                                                        | <a href="http://bit.ly/1ihLwZ6">http://bit.ly/1ihLwZ6</a> | Multiplying Rational Expressions                                                    |

<http://bit.ly/1RBu2mG>

Dividing Rational Expressions

**Lesson Three: Adding and Subtracting Radical Expressions**

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |

**Lesson Four: Solving Rational Equations**

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |

**Lesson Five: Applications of Rational Equations**

|  |  |  |
|--|--|--|
|  |  |  |
|  |  |  |

**TEXT SECTIONS 6.1 - PRACTICE ACTIVITY****Text Chapter Six – Rational Expressions and Equations****6.1*****Rational Expressions*****Coil Lesson 1:**

Simplifying Rational Expressions

Solve the following questions found in your ***Pre-Calculus 11* text book**. Show complete steps and full solutions and correct your answers with the ones in the back of the text book.

**Section 6.1: Pages 317 – 321 #4, 8, 24ac, 26abcd**

---

4

a.

b.

c.

d.

e.

f.

g.

h.

8

a.

b.

c.

d.

e.

f.

24 a.

b.

c.

**MODULE ASSESSMENT****Lesson 1: SIMPLIFYING RATIONAL EXPRESSIONS**

1. a. What does the term *rational* mean in “rational number” and “rational expression”?  
(2 marks)

|  |
|--|
|  |
|--|

- b. Will a rational expression always have at least one non-permissible value? Give reasons to support your answer. (2 marks)

|  |
|--|
|  |
|--|

- c. When writing an equivalent rational expression, why do you multiply both the numerator and denominator by the same factor? (2 marks)

|  |
|--|
|  |
|--|

2. Identify the non-permissible value(s) for each of the following rational expressions.

a.  $\frac{(x+1)(x-2)}{3(x-2)}$  (2 marks)

b.  $\frac{10x}{2x-y}$  (2 marks)

|  |  |
|--|--|
|  |  |
|--|--|

c.  $\frac{3x^2 + xy - 2y^2}{9x^2 - 4y^2}$  (5 marks)

|  |
|--|
|  |
|--|

3. Simplify the following rational expressions. Identify the non-permissible values.

a.  $\frac{4x^2y^3}{16x^3y}$  (2 marks)

b.  $\frac{3ab}{6a^2b - 12ab^2}$  (3 marks)

c.  $\frac{x^2 + 4x - 21}{x^2 - 49}$  (3 marks)

d.  $\frac{3x^2 - 7x - 6}{6x^2 + 4x}$  (3 marks)

4. Copy your answer from Try This 6 into the space provided or attach a copy of your response to this Module 6 Assignment Booklet. (8 marks)

The work of four different students is shown. Each student has made an error in simplifying certain rational expressions.

- Analyze the work of each student.
- Identify and explain the error.
- Show the correct solution.

1. Marlee

|                                                                                                             |  |
|-------------------------------------------------------------------------------------------------------------|--|
| $\frac{x^2 - 9}{3x + 9} = \frac{(x-3)(\cancel{x+3})}{3(\cancel{x+3})}$ $= \frac{x-3}{3}$ $= x-1, x \neq -3$ |  |
|-------------------------------------------------------------------------------------------------------------|--|

2. Neetu

|                                                                                                     |  |
|-----------------------------------------------------------------------------------------------------|--|
| $\frac{2x-4}{x^2+3x-10} = \frac{2(\cancel{x-2})}{(x+5)(\cancel{x-2})}$ $= \frac{2}{x+5}, x \neq -5$ |  |
|-----------------------------------------------------------------------------------------------------|--|

3. Aaron

$$\begin{aligned}\frac{-x+1}{x^2-1} &= \frac{\cancel{-x+1}}{(\cancel{x+1})(x-1)} \\ &= \frac{-1}{x-1}, x \neq \pm 1\end{aligned}$$

4. Siobhan

$$\begin{aligned}\frac{2x^2-10x+12}{2x-4} &= \frac{\cancel{2}(x^2-5x+6)}{\cancel{2}(x-2)} \\ &= \frac{(x-3)\cancel{(x-2)}}{\cancel{x-2}} \\ &= x-3\end{aligned}$$

**TEXT SECTIONS 6.2 - PRACTICE ACTIVITY****Text Chapter Six – Rational Expressions and Equations****6.2*****Multiplying and Dividing Radical Expressions*****Coil Lesson 2:**

Multiplying and Dividing Rational Expression

Solve the following questions found in your ***Pre-Calculus 11*** textbook. Show complete steps and full solutions and correct your answers with the ones in the back of the textbook.

**Section 6.2: Pages 327 – 330; #2, 8, 16, 18**

2

a.

b.

c.

d.

8

a.

b.

c.

16.

18.

**MODULE ASSESSMENT****Lesson 2: MULTIPLYING AND DIVIDING RATIONAL EXPRESSIONS**

1. Simplify each expression. Identify the non-permissible values of the variables.

a.

(3 marks)

$$\frac{2x^2}{3y} \times \frac{9y}{8x}$$

b.

(4 marks)

$$\frac{p^2 + 2p - 15}{p^2 - 3p + 2} \times \frac{p^2 - 4}{p^2 + 7p + 10}$$

c.

(4 marks)

$$\frac{2x^2 + 5x + 3}{6x + 6} \times \frac{3x - 6}{2x^2 + x - 3}$$

2. Simplify each expression. Identify the non-permissible values of the variables.

a.

(4 marks)

$$\frac{50a}{12b^2} \div \frac{15a^2}{9}$$

b.

(5 marks)

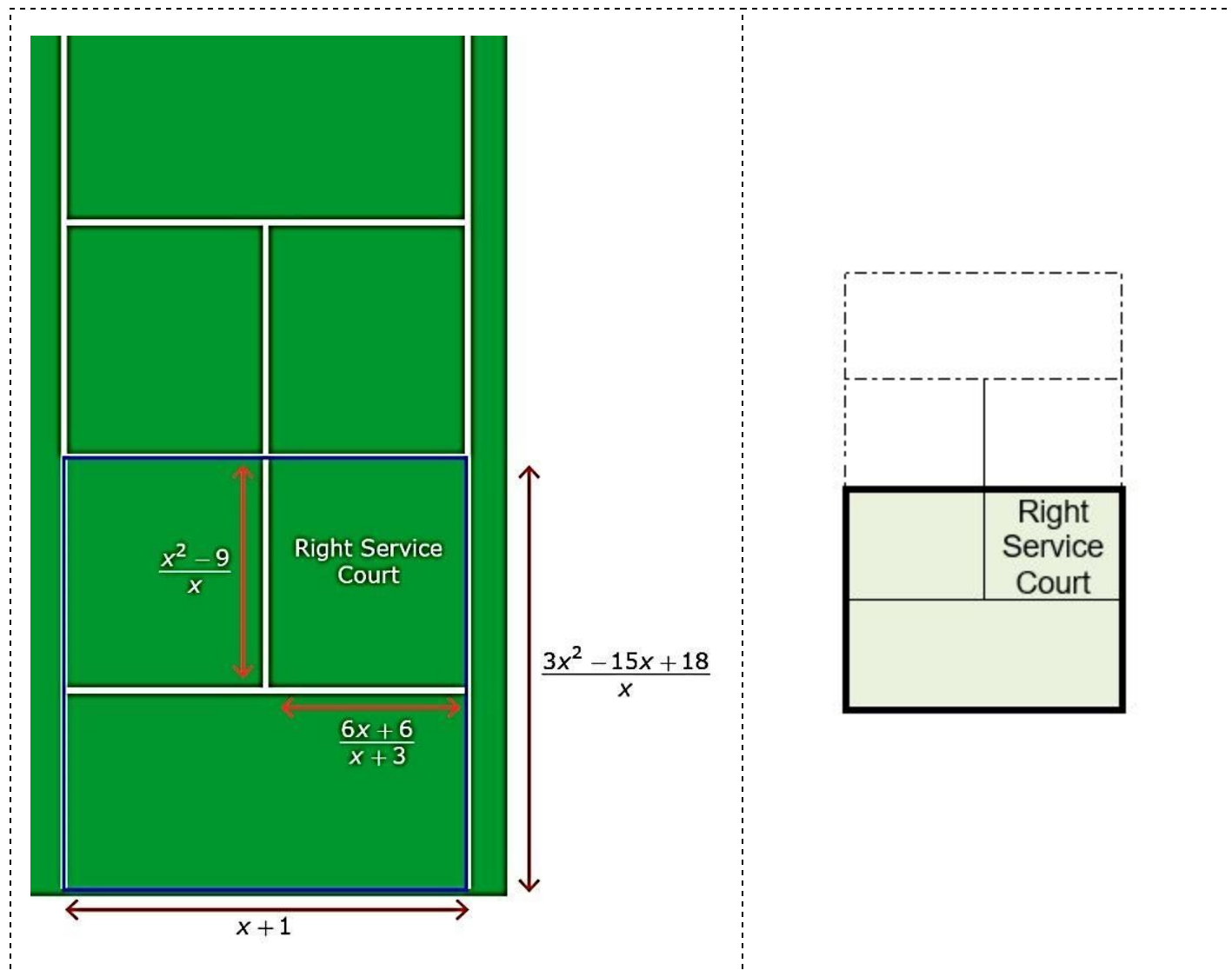
$$\frac{\frac{4x+12}{2x+2}}{\frac{x+3}{x^2-1}}$$

c.

(5 marks)

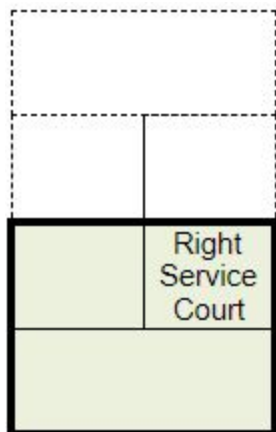
$$\frac{x^2-x-6}{x+4} \div \frac{3x^2+6x}{x^2-16}$$

3. The approximate dimensions of half of a singles tennis court are shown in the diagram. In tennis, players take turns serving a ball into designated regions on the opponent's side of the net. One of these regions is called the right service court.



- a. Write an expression that represents the area of the right service court. (5 marks)

- b. Write an expression that represents the area of the half-court, the bottom half that is outlined in blue or the thick black part outlined below. (5 marks)



- c. Write an expression representing the fraction of the half court that is occupied by the right service court. (6 marks)

*Hint: divide the area of the right service court by the area of the half court.*

**TEXT SECTIONS 6.3 - PRACTICE ACTIVITY****Text Chapter Six – Rational Expressions and Equations****6.3*****Adding and Subtracting Rational Expressions*****Coil Lesson 3:**

Adding and Subtracting Rational Expressions

Solve the following questions found in your ***Pre-Calculus 11*** textbook. Show complete steps and full solutions and correct your answers with the ones in the back of the textbook.

**Section 6.3: Pages 336 – 340; #1, 5, 6, 7, 10, 12, 15, 23**

---

1 a.

b.

c.

d.

e.

f.

5 a.

b.

c.

d.

e.

f..

6

a.

b.

c.

d.

e.

f.

7 a.

b.

10 a.

b.

12.

15     a.

b.

23.

**MODULE ASSESSMENT****Lesson 3: ADDING & SUBTRACTING RATIONAL EXPRESSIONS**

1. Find the common denominator of the following fractions, and then find the sum and state the non-permissible values. (4 marks)

$$\frac{a}{b} + \frac{c}{d}$$

2. Simplify and state the non-permissible values.

a.  $\frac{4x}{x+2} + \frac{3}{x-1}$

(5 marks)

b.  $\frac{3x}{x-4} + \frac{6}{x+2}$

(6 marks)

3. Simplify the following expression. State the non-permissible values. (8 marks)

$$\frac{6x-24}{x^2+2x-15} \div \left( \frac{x^2}{x^2+x-12} - \frac{x-2}{x-3} \right)$$

**TEXT SECTIONS 6.4 - PRACTICE ACTIVITY****Text Chapter Six – Rational Expressions and Equations****6.4*****Rational Equations*****Coil Lesson 4:**

Solving Rational Equations

Solve the following questions found in your ***Pre-Calculus 11* textbook**. Show complete steps and full solutions and correct your answers with the ones in the back of the textbook.

**Section 6.4: Pages 348 – 351; #3, 8,**

3

a.

b.

c.

d.

8.

**MODULE ASSESSMENT****Lesson 4: SOLVING RATIONAL EQUATIONS**

1. Solve each equation and identify all non-permissible values.

a.  $\frac{6}{2x-1} = \frac{4}{x+1}$  (7 marks)

b. 
$$\frac{2a}{a^2 + 2a - 3} - \frac{a - 2}{2a - 2} = \frac{4}{a + 3}$$

(8 marks)

2. Solve each equation and identify the non-permissible values. Record the answers as exact values.

a.  $\frac{1}{x-4} + \frac{1}{x} = 2$  (8 marks)

b.  $\frac{n}{n-2} + \frac{1}{n^2-4} = \frac{3n-1}{3n+6}$  (8 marks)

4. Solve the following making sure to check your solutions for extraneous roots. (8 marks each)

a.

$$\frac{2}{m-3} + \frac{1}{m} = \frac{6}{m^2-3m}$$

b.

$$\frac{x^2 + x + 2}{x + 1} - x = \frac{x^2 - 5}{x^2 - 1}$$

- c. Explain why there is an extraneous solution for a and b. (2 marks)

**TEXT SECTIONS 6.4 - PRACTICE ACTIVITY****Text Chapter Six – Rational Expressions and Equations****6.4*****Rational Equations*****Coil Lesson 5:****Applications of Rational Equations**

Solve the following questions found in your ***Pre-Calculus 11* textbook**. Show complete steps and full solutions and correct your answers with the ones in the back of the textbook.

**Section 6.4: Pages 348 – 351; #13, 15, 16**

13.

|            | Time to Fill Pool (h) | Fraction Filled in<br>1 hour | Fraction Filled in<br>x hours |
|------------|-----------------------|------------------------------|-------------------------------|
| Hose A     |                       |                              |                               |
| Hose B     |                       |                              |                               |
| Both Hoses |                       |                              |                               |

15.

|                 | Time to Harvest all<br>(h) | Fraction of harvest<br>done per hour | Fraction of harvest<br>done in $t$ hours |
|-----------------|----------------------------|--------------------------------------|------------------------------------------|
| Nikita alone    |                            |                                      |                                          |
| Neighbour alone |                            |                                      |                                          |
| Together        |                            |                                      |                                          |

16.

|                   | Distance<br>(km) | Speed<br>(km/h) | Time<br>(h) |
|-------------------|------------------|-----------------|-------------|
| To Forde Lake     |                  |                 |             |
| Beyond Forde Lake |                  |                 |             |

**MODULE ASSESSMENT****Lesson 5: APPLICATIONS OF RATIONAL EQUATIONS**

1. The Iditarod Trail Sled Dog Race is an annual race that spans the Iditarod Trail in Alaska. Teams of sled dogs race a distance of 1049 mi (miles)! The race record is a finishing time of 8 d 19 h 46 min 39 s.

One particular leg of the race spans 200 km. One team covered this span at a rate of 10 km/h faster on the way there than on the way back. If the total time for the trip was 9 h, what was the team's average speed on the way back? *(8 marks)*

2. Another event at Super Race Day is the Lawnmower Derby. Team members try to mow a standard-size lawn as quickly as possible. Terri and Candace can mow the lawn in 18 min. If it takes Candace 30 min to mow a lawn alone, how long does it take Terri to mow the lawn alone? (6 marks)

### Congratulations!

Module 6 is now complete!

Before you hand in this assignment make sure:

- your first and last name are clearly printed on the front page
- all pages are securely stapled together
- you have used pencil, erased mistakes, and used rulers where appropriate
- all questions are neat, organized and **legible** in a **literate** mathematical order
- sign out your next module and start working through the module and viewing the multimedia links

#### How to Prepare for your Module Test

Remember that I have selected only a small amount of practice questions from the textbook. To prepare for your module test you *may* need to

- do more text questions, the more practice the better
- work through the practice test at the end of the chapter
- use the Math 10-C Explained website for review of basic concepts,
- Use the <https://sites.google.com/a/btps.ca/math20/> website for Math 20-1 help
- do several practice tests on [www.exambank.com](http://www.exambank.com)
- purchase *The Key* for an itemized list of outcomes with practice questions and tests and fully worked out solutions.

#### **Remember to:**

- Give yourself lots of time here at Outreach when you come in to write your test before we close. You cannot finish a test the next day.
- Write **within a week** of handing in your module while the material is still fresh in your mind and your skills are sharp!!
- Bring your calculator, pencil and your double sided formula sheet!

Best of Luck!!