



THE P/R IDEA

Prepare and Reflect

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PREPARATION

- What do you expect students will have done to be prepared for class each day?
- How do you relay these expectations to your students?
- Do you assess their preparedness in any way?
- If so, how do you assess it and how does it figure into your students' grades?



REFLECTION

- Do you expect your students to reflect upon their own thinking and their own work?
- If so, what do you expect them to do?
- How do you relay these expectations to your students?
- How do you assess their self-reflection?



THE STUDENT ATTRIBUTES FROM THE COLLEGE READINESS STANDARDS

Attribute	Evidence of Achievement
Demonstrates intellectual engagement	<ul style="list-style-type: none">-Actively explores new ideas, posing questions about their meaning, significance, and implications.- Perceives mathematics as a way of understanding — a view that mathematics must make sense, and is not a sequence of algorithms to be memorized and applied



THE STUDENT ATTRIBUTES FROM THE COLLEGE READINESS STANDARDS

Attribute	Evidence of Achievement
Takes responsibility for own learning	-Examines and learns from his or her errors and seeks help when needed - Conscientiously prepares work assigned for class
Perseveres when faced with time-consuming or complex tasks.	-Is convinced that effort is an important component of success in mathematics



ATTRIBUTES OF FORMATIVE ASSESSMENT

Attribute	Evidence of Inclusion
Involving Students in their learning	<ul style="list-style-type: none">-Specific comments given to students such as they are on the right path and in what way-Students' contributions encouraged and built upon
Giving Feedback	<ul style="list-style-type: none">-Completed work analyzed to work out why a student has or has not achieved
Student Self Assessment Opportunities	<ul style="list-style-type: none">-Students asked to review their own work, record their progress, and suggest ways they can improve-Time provided for students to reflect and talk about their learning



TWO QUESTIONS FOR STUDENTS:

- When your English instructor tells you, “Tomorrow we will be discussing the third chapter in the novel we’re reading,” what will you do to be ready for tomorrow?
- When I tell you, “Tomorrow we will be discussing Section 2.4 from our Math book,” what will you do to be ready for tomorrow?



The Well-Meaning “Cold Duck” Approach

**Arrive to class a “cold duck”...
“Stumble through” class activities, notes, etc...**

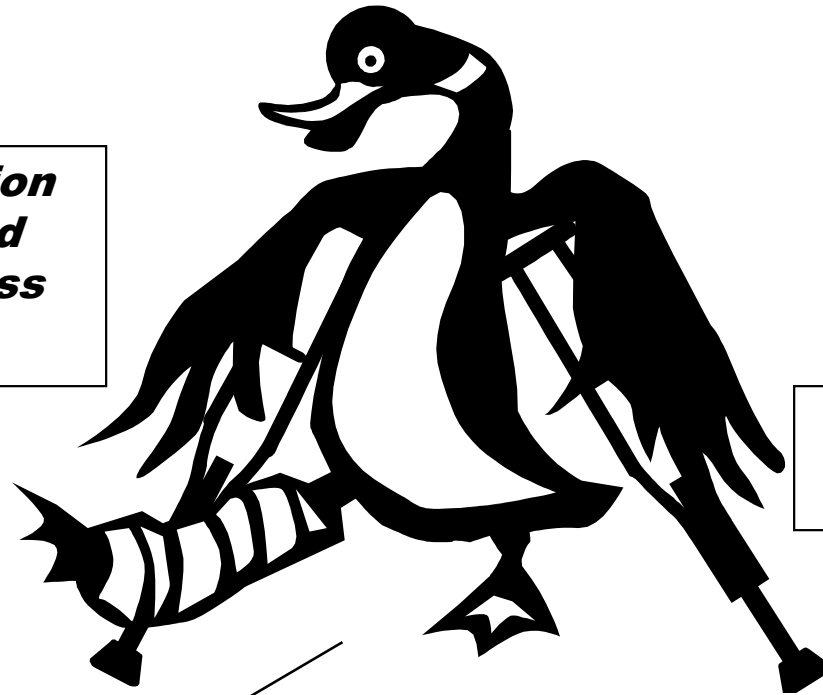


Head home with very good intentions to do quality homework...



The “Crutches”

***Isolated information
from the text and
possibly from class
notes***



***Answers in the
back of the book***

**Limp back to class with an unfortunately good
chance of “stumbling” again...**



DEPARTMENTAL GOALS/EXPECTATIONS:

- Encourage student responsibility
- Preparation expectations are specific and clear
- Preparedness is required
- Preparedness is assessed (and it 'counts')



MANY INDIVIDUAL APPROACHES

- Common goals and expectations
- Importance of flexibility and adaptability
- Colleagues elsewhere have developed their own ways to meet the goals...



POSSIBLE PREPARATION TASKS:

- Visual Organizer
 - Concept Map
 - Outline
 - Condensed Notes
- Vocabulary/Symbol List
- “Discussion Problems” (problems to try from the text that will then be discussed in class)
- Explorations/Activities
- Online Preparation Problems/Reading Questions
- Ask Questions About the Section
- Write Two Test Questions
- And Many More...



ONE IDEA

THE “P/R” HOMEWORK COVERSHEET

- Students are asked to complete **specific preparation** tasks before each section.
- **Preparation tasks are checked** before each section is addressed in class.
- After students have completed the homework, they are asked to **reflect upon some aspect of their learning** in the section.
- All preparation activities and homework are **turned-in** with the coversheet attached.
- Preparation, homework, and reflection are all **assessed in section grade**.



A FEW COVERSHEET EXAMPLES...

Could either of these examples be adapted to help meet and assess your preparation/reflection expectations?



Name _____ Section # _____

1. Create an **outline or concept map** to illustrate how the vocabulary words concepts rules in this section relate to each other.

2. Use your outline or concept map to write a brief **summary** of the section.

3. List any vocabulary words, examples or practice problems that you didn't understand.

4. **REFLECT** on the section. Answer any 2 of the following questions. Be specific, details count.
 1. The most important concept in this section is _____
 2. The concept I am still unsure about is _____
 3. The most likely mistake that I might make is _____
 4. When studying for the chapter test, the concept I will most need to review is _____

P/R Prepare/Reflect Task
Section: _____

Name: _____
Date: _____



PREPARE - Before the day of the discussion/lesson

- **PRE-READ THE SECTION** Pre-reading only takes a few minutes and is extremely helpful in making the most of your study time. Here are some ideas of how to pre-read our textbook:

Look for vocabulary words (bold or italic) / Skim any boxed information / Skim all examples

- **ACTIVELY READ THE SECTION** Now you are ready to read the section completely. While you are reading, you should work through the examples. You can also begin your visual organizer at this time.

Before class discussion (these stamps can only be earned before the class discussion, they cannot be made up):

- (1 pt.) **VISUAL ORGANIZER** is completed and **VOCAB WORDS AND DEFINITIONS** are listed on the back of this page.
- (1 pt.) **CLASS DISCUSSION PROBLEMS** are sincerely attempted/completed on the right-hand side of attached, separate, vertically folded paper. If a discussion problem is to be done on the graphing calculator, record a sketch of any graph created and/or entered values and results.
- **START YOUR HOMEWORK** After preparing for the section, you will often find you feel ready to start the practice problems and the model problems. This is a great idea as the material is fresh in your mind and it will help you clarify what questions you want to ask during the class discussion/lesson.

MODEL PROBLEMS - After the class discussion/lesson (half-credit if late)

(3 pts.) The degree to which the **MODEL PROBLEMS** are neatly completed with questions clear, work shown, final answers **HIGHLIGHTED**, and **ANSWERS CORRECT** (These must be done on separate paper, one side only. They also must be turned in with this cover sheet. Graphs must be of high quality and completed on graph paper):



REFLECT - After the discussion/lesson and model problems (half-credit if late)

- (1 pt.) Write a 1-2 sentence reflection in this space about how you feel about what you learned in this section. You may reflect on a particular problem, on a topic, or on the section in general.

- (1 pt.) **VISUAL ORGANIZER, VOCABULARY DEFINITIONS, and CLASS DISCUSSION PROBLEMS** are complete, corrected, and of high quality when turned-in.



How do you think students might react to these coversheets and what kind of work would you anticipate seeing?



3.2
Vocabs

Visual Organizer

1. Divisible: If $g(x)$ is factor of $f(x)$, then $f(x)$ is divisible by $g(x)$. (ex) x^4-16 is divisible by x^2-4 , by x^2+4 , by $x+2$, and by $x-2$.
2. Long Division: The polynomial x^4-16 is not divisible by x^2+3x+1 , use long division.
3. Theorems: can be proven using definitions, axioms, & other theorems

Division Algorithm for Polynomials
 If $f(x)$ and $p(x)$ are polynomials and if $p(x) \neq 0$, then there exist unique polynomials $q(x)$ and $r(x)$ such that
 $f(x) = p(x) \cdot q(x) + r(x)$
 (ex) $(x^3-6x-6) = (x-3)(x^2+3x+3) - 1$
 $r(x) = 0$ or degree of $r(x) <$ degree of $p(x)$. The polynomials $q(x)$ is the quotient, and $r(x)$ is the remainder, in the division of $f(x)$ by $p(x)$.

Remainder Theorem | If a polynomial $f(x)$ is divided by $x-c$, the remainder is $f(c)$

(Pg. 220)
Factor Theorem | A polynomial $f(x)$ has factor $x-c$ if and only if $f(c)=0$
 $f(x)$ has factor $x-c \iff f(c)=0$, if and only if = IFF \iff

Guidelines for Synthetic Division of $a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$ by $x-c$

Section 3.2

"Properties of Division"

(10, 14, 30, p 224 Ex. 7)

Class Discussion	Problems
10. Use the remainder theorem to find $f(c)$ $f(x) = 2x^3 + 4x^2 - 3x - 1$ $f(3) = 2(3)^3 + 4(3)^2 - 3(3) - 1$ $= 2(27) + 4(9) - 9 - 1$ $= 54 + 36 - 10$ $= 54 + 26$ $f(3) = 80$	$f(x) = 2x^3 + 4x^2 - 3x - 1; C=3$ $2x^3 + 4x^2 + 27$ $x-3 \mid 2x^3 + 4x^2 - 3x - 1$ $- (2x^3 - 6x^2)$ $+10x^2 - 3x$ $- (10x^2 - 30x)$ $27x - 1$ $- (27x - 81)$ remainder: 80
Synthetic $\begin{array}{r rrrr} & 2 & 4 & -3 & -1 \\ & & 6 & 30 & 81 \\ \hline & 2 & 10 & 27 & 80 \end{array}$ ← Remainder	
11. Use factor theorem/show $x-c$ is a factor of $f(x)$ $f(x) = x^3 + x^2 - 11x + 10; C=2$ $f(x) = 8 + 4 - 22 + 10 = 0$ $x-2$ is a factor of $f(x)$ $x^3 + x^2 - 11x + 10$ $x^2 + 3x - 5$ $x^3 + x^2 - 11x + 10 = (x-2)(x^2 + 3x - 5)$ New factoring tools	

APR for add on loan

Purchase Price - Down Payment

$$I = Pt$$

Early Payoff Amount by Rule of 78

$$h = \frac{n \cdot \frac{APR}{12} \cdot 100}{1 - \left(1 + \frac{APR}{12}\right)^{-n}} - 100$$

1) 13.5

2) 11

3) 8.5

4) 9.0

18) $4551 - 3850 = 292.46$
 $A = \$731$
 $B = 18.99$

ANOTHER IDEA

THE IN-CLASS CHECK “P/R” ASSIGNMENT

- Students are asked to read each section before class, and to list important terms and formula
- As part of their preparation students must also work on 2 – 4 skill problems from the section
- The last preparation task is to list their muddiest idea from the reading of the material

- At the beginning of each class, their preparation work is checked off. This is done quickly, the student either attempted each task, or they did not.



ANOTHER IDEA

THE IN-CLASS CHECK “P/R” ASSIGNMENT

- After the material is covered in class, students are asked to reflect on their learning
- This includes revisiting the problems attempted in the prepare assignment earlier, and correcting mistakes
- A new problem may also be assigned at this time
- Finally, students must revisit their muddiest idea, and discuss either...
 - How their muddiest idea was addressed, or
 - How they will get their muddiest idea addressed
- This work is turned in at the next class, and graded.



P/R Prepare/Reflect Task – MAT 161

Section 2.2 Activity

Name: _____

Prepare – Before the day of the discussion/lesson

Begin by reading the assigned section, and then complete each of the following tasks.

LIST & DEFINE the important terms, ideas, or formulas from the section. Your definitions should be in your own words. (1 pt)

ANSWER questions S-1 and S-5 on page 144; and question 4 on page 145. (1 pt)

MUDDIEST IDEA: Describe the one idea and/or problem you are having the most trouble with after preparing for this section. (2 pt)

Reflect – After the discussion/lesson and homework

After attempting the homework for this section, complete the following tasks.

REVISE your answers to the questions in the “Answer” area of the prepare section above. Take this time to correct any answers. (4 pts)

MUDDIEST IDEA REVISITED: Does this idea remain “muddy” or did you get the issue resolved? If you still have questions, how will you get them answered? If not, how did you resolve the issue? (2 pt)



P/R Prepare/Reflect Task – MAT161

Test 2 Activity

Name: _____

Prepare – Before the day of the discussion/lesson

Begin by reading pages 302 – 304 of your text, then complete each of the following tasks.

LIST & DEFINE the important objectives for this unit. You may need to look through your notes to help you remember. (2 pt)

MUDDIEST IDEA: Describe the one idea and/or problem you are having the most trouble with as you begin your preparations for test 2. (2 pt)

Reflect – After your test is returned

After reviewing the test, complete the following tasks.

REWORK: On the back of this sheet, rework one of the problems from the test that you missed the most points on. (If you missed more than 1, try any 1 of the problems.) (4 pt)

REFLECTION: After reviewing your test, what can you do differently to help you do better on test 3? (1 pt)



Prepare — Before the day of the discussion/lesson

Begin by reading section 4.4. You do not need to read the “An Algebraic Look” that begins on page 363. After you have finished the reading, complete each of the following tasks.

LIST & DEFINE the important terms from the section. Your definition should be in your own words. Place your definitions in the space below. (1 pt)

The Richter scale is a common real-world logarithmic function; as t , the earthquake's ^{measured} magnitude, gets bigger, the strength of that earthquake increases by 10^t .

The common log, $\log x$, is the power of 10 that gives x .
The function $\log x$ is the inverse of the function 10^t .

Relative Intensity — The measure of two objects when compared.

The natural log is the inverse of the exponential function $y = e^x$.

ANSWER question S-4 on page 368, and problem 8 from page 370. (1 pt)

MUDDIEST IDEA: Describe the one idea and/or problem you are having the most trouble with after preparing for this section. (2 pt)

Word problems, I'll need to practice these more, I don't understand what they're asking most of the time.

Reflect — After the discussion/lesson and homework

After attempting the homework for this section, complete the following tasks.

REVISE your answers to the questions in the “Answer” area of the prepare section above. Take this time to correct any answers. (4 pts)

MUDDIEST IDEA REVISITED: Does this idea remain “muddy” or did you get the issue resolved? If you still have questions, how will you get them answered? If not, how did you resolve the issue? (2 pt)

Only a little bit, I'm starting to get the hang of them, but will still need some practice before the test.



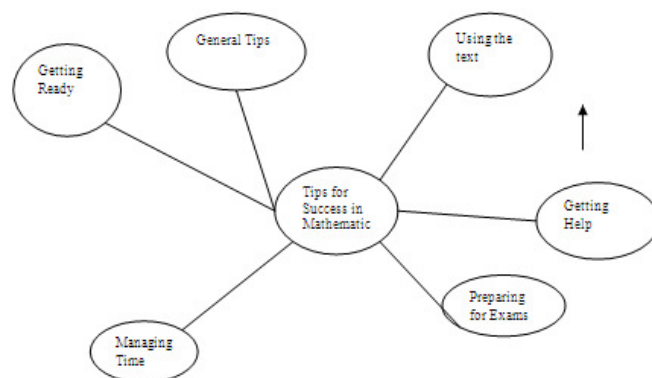
IDEAS FOR IMPROVING QUALITY

- Expect a steep learning curve
- Be clear and patient
- Provide exemplars
- Compare vocab lists (mine vs. yours)
- Vocab tests
- Lots of specific feedback early on
- Consistent scoring (from day one)



Name _____ ME # _____ 1.1 _____

1. Create an **outline or concept map** to illustrate how the vocabulary words in this section relate to each other.



2. Use your outline or concept map to write a brief **summary** of the section.

There are 6 tips to follow for success in mathematics. These include getting ready for the course, general tips for success, and using the text. In addition, a math student should follow tips for getting help, preparing for exams, and managing time.

3. Write a 1-2 sentence **response** to the section.

As a teacher of study strategies for many years, I have noticed that a person may understand a study strategy but not know how to apply it in math. Math can be scary for some students, though, so trying out sound tips really can help!

SOME CHALLENGES

- Time in class spent checking prep work
- Time spent grading
- Steep learning curve for students at the beginning of the quarter
- Initial student resistance
- Maintaining consistency (day-to-day)



WHY IT'S WORTH IT

- Students see the value, even when they don't "like it".
- Students are asking higher quality questions.
- Class time is more productive and focused on more challenging/relevant topics...
- Student/student communication is more natural and easier to instigate.
- Students are more willing to investigate ideas, share thinking, and take risks.
- Students are more responsible, organized, and independent.



SOME ADVICE

- Be patient and flexible (with yourself, your colleagues, and your students)
- Take 'baby steps'
- Collaborate



WHAT'S NEXT FOR SFCC

- At Spokane Falls CC
 - Continued faculty collaboration
 - Weekly meetings
 - Department-Organized Workshops/Training
 - Rethinking Precollege Mathematics Grant
 - Focus groups
 - Program assessment
- At Wake Tech CC
 - Development for online courses

