### Part I-SP, Summary Report on Status of Strategic Planning Goals/Objectives

<table>
<thead>
<tr>
<th>Program/Function /Service</th>
<th>Strategic Goal/Objective&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Related UWF Strategic Goal&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Method of Assessment</th>
<th>Summary of Assessment Results&lt;sup&gt;cd&lt;/sup&gt;</th>
<th>Use of Assessment Results to Improve Program/Function/Service&lt;sup&gt;e&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math/Stat</td>
<td>We will collect necessary data to do analysis and assessment on our programs and General Studies courses (STA2023 and MAC1105). According to the assessments, we will make changes to improve our programs.</td>
<td>1. <strong>Strategic Focus: High Quality Academic Programs</strong></td>
<td>Check if the assessments are done or not and what the department plans to do according to the assessments.</td>
<td>met</td>
<td>The data for our BS program and MS program were collected and analyzed. Assessments were done for BS and MS programs, and MAC1105 and STA2023 the two general studies courses most students take. Exit surveys were done. According to the assessment results, suggestions have been made by the department to improve teaching and learning for 2010/2011.</td>
</tr>
<tr>
<td></td>
<td>We will make efforts to recruit students into our programs. Recruiting materials for math and statistics majors will be distributed to prospective</td>
<td>2. <strong>Strategic Focus: Purposeful Enrollment Growth</strong></td>
<td>Check if recruiting materials are distributed, if the department representatives</td>
<td>met</td>
<td>Our faculty attended open houses and students’ orientation sessions, and visited/contacted local high schools. Materials about our programs were distributed.</td>
</tr>
</tbody>
</table>

<sup>a</sup> Strategic Goal/Objective

<sup>b</sup> Related UWF Strategic Goal

<sup>c</sup> Method of Assessment

<sup>d</sup> Summary of Assessment Results

<sup>e</sup> Use of Assessment Results to Improve Program/Function/Service
<table>
<thead>
<tr>
<th>students during open houses and freshmen orientation sessions</th>
<th>attend the open house or orientations or not.</th>
<th>distributed to prospective students. The suggestions have been made by the department on how to recruit students to the programs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our faculty members will continue to visit/contact local high schools and community colleges to make our program known and to recruit students.</td>
<td><strong>2. Strategic Focus: Purposeful Enrollment Growth</strong> Check how many high schools were visited/contacted.</td>
<td>met We visited/contacted local high schools and met with math teachers to recruit students. Several faculty members and the Chair of the department visited all high schools in Escambia County and some in Santa Rosa County. The faculty members also visited FAMU, and several junior colleges to recruit students.</td>
</tr>
<tr>
<td>We will offer non-traditional online courses with Elluminate for our MS program students.</td>
<td><strong>1. Strategic Focus: High Quality Academic Programs</strong></td>
<td><strong>2. Strategic Focus: Purposeful Enrollment Growth</strong> Check how many sections are offered.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>We will offer all STA2023 sections with the new teaching method. The sections will be taught with HAWKES. This student centered teaching method will not only improve teaching and learning, but also reduce the cost for delivery the courses. We will use my-math-lab in lower division courses to enhance teaching and learning.</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check if all sections are taught with this new method. Check if the assessment is done or not.</td>
</tr>
<tr>
<td></td>
<td>3. Strategic Focus: Academic &amp; Student Support Services</td>
<td></td>
</tr>
<tr>
<td>We will hold a local math conference in Fall 2009. Math instructors in nearby colleges will be invited. We will use this as a recruitment opportunity. We will hold AMC math competitions for local high school students.</td>
<td>4. Strategic Focus: Partnership &amp; Collaboration</td>
<td>Check if the conference is held or not.</td>
</tr>
<tr>
<td></td>
<td>2. Strategic Focus: Purposeful Enrollment Growth</td>
<td></td>
</tr>
<tr>
<td>Recruit a math faculty. The department is short of three math faculty. It is difficult to deliver the upper level math courses.</td>
<td>5. Strategic Focus: Investment in People</td>
<td>Check if a faculty is recruited or not.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Provide Junior faculty members release time to do research.</td>
<td>5. Strategic Focus: Investment in People</td>
<td>Check how many junior faculty received release time.</td>
</tr>
<tr>
<td>We will have uniform syllabi, assignments, tests, and final exams for MAC1105, MGF 1106, MAC1114, and MAC1140. Assessment data for these courses will be collected.</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check if the uniform tests are given and how well students have done.</td>
</tr>
</tbody>
</table>
I-ALC. Undergraduate Programs - To be completed by academic units offering degree programs.

Annual Report, 2009-2010

Department/Division:  Mathematics and Statistics

College:  Arts and Sciences

Part I-ALC, Summary Report on Assessment, Academic Learning Compacts (ALC)

Program Title:  Mathematical Sciences  Degree:  BS  CIP Code: 27.0101

*Prepare separate summary table for each degree program.

bFor example, BA, BS, BSBA

- Based on direct measures of student learning in the domain(s) your department assessed, compare your students’ performance this year to their performance last year.
- Duplicate this section when reporting assessments for more than one domain for a given program.

Indicate the student learning outcome assessed (check one):

<table>
<thead>
<tr>
<th>Content</th>
<th>Communication</th>
<th>Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>x Critical Thinking</td>
<td>x Integrity/Values</td>
<td>Other (describe)</td>
</tr>
</tbody>
</table>

Based on departmental assessments, student learning in this domain was (check one):

| Worse than last year | Equivalent to last year | Slightly better than last year | Moderately better than last year | x Dramatically better than last year | Cannot be compared (this is the first year for this assessment) |

Describe the direct measure(s) used to assess student learning in this domain (e.g., answers to questions included on an exam, performance on a paper or project scored with a rubric, etc.). Include information about any additional measures used to assess learning outcomes in this domain.

Exit Surveys, and Proseminars (capstone course)

Student Learning Outcome (Critical Thinking):

- Analyze the essentials of a problem logically
- Choose and execute calculation and manipulation strategies that are relevant to mathematics
- Select and apply appropriate mathematical tools and techniques
- Solve mathematical problems
- Use information technology appropriately to conduct research
- Transfer knowledge from one context to another

Student Learning Outcome (Communication):

- Write coherent and accurate reports of mathematical processes and problems
- Deliver oral presentations that explain math concepts or defend mathematical arguments effectively and accurately

If you observed changes in student performance on this measure when comparing the two years, briefly describe (in
Use of Assessment Data for Making Decisions. Describe the process used in your department to evaluate assessment evidence and make decisions (include dates of relevant department meetings if known). Describe the decisions made to improve student learning in your program. Describe how these decisions are related to the assessment evidence collected by your department.

Every student will register for one credit hour proseminar (capstone course) during the senior year. The student will conduct research under a faculty’s guidance in one semester. The faculty will choose a topic for the student in mathematics or statistics. The student will meet with the faculty regularly to report the progress and seek advice. By the end of the semester, the student will give an oral presentation to students and faculty, and submit a written report based on the research and findings. A Committee will be formed to evaluate student’s presentation and report.

One student took the proseminar (capstone courses) in summer 2009 and received “I”; Seven (7) took it in fall 2009 and all passed; 9 took it in spring 2010, all passed. During 2009/2010, three (3) students retook it and two of them passed and one did not. The students gave oral presentations and submitted written reports. The committees evaluated the proseminars according to “Student Learning Outcomes of the Critical Thinking and Communication of the BS program” and recommended 17 students pass, 4 students retake the proseminar and one fail. The students’ oral presentations were excellent.

The students have done well in their research under faculty’s guidance
Surveys of exit students were done. 15 surveys were collected. The students are satisfied in general about the programs. They praised math faculty for doing their best to help students.

Use of Assessment Data for Improvement of Assessment Procedures. Describe any changes made to assessment methods. Explain the relation between these changes and the information obtained from previous assessments.

1. The Proseminar Committee created a rubric that guides students throughout the proseminar. Based on the document, students can clearly see what they are expected to do during the semester. The important deadlines are also included. This has enhanced the quality of the proseminar.

2. During a department meeting, how to improve teaching and learning was discussed. Some suggestions were made according to the study.

3. All students used UWF’s thesis/dissertation format for their written reports.
Describe the Department’s Commitment to Assessment Activities in 2010-2011

<table>
<thead>
<tr>
<th>Domain(s) to be examined in assessment plan in 2010-2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Critical Thinking</td>
</tr>
<tr>
<td>2. Communication</td>
</tr>
</tbody>
</table>

### Assessment question(s) to be addressed in 2010-2011

- Analyze the essentials of a problem logically
- Choose and execute calculation and manipulation strategies that are relevant to mathematics
- Select and apply appropriate mathematical tools and techniques
- Use information technology appropriately to conduct research
- Write coherent and accurate reports of mathematical processes and problems
- Deliver oral presentations that explain math concepts or defend mathematical arguments effectively and accurately
I-ALP. Graduate Programs - To be completed by academic units offering graduate degree programs.

Annual Report, 2009-2010

Department/Division: **Mathematics and Statistics**  
College: **Arts and Sciences**

Part I-ALP, Summary Report on Assessment, Academic Learning Plans (ALP)

Program Title\textsuperscript{a}: **Mathematical Sciences**  
Degree\textsuperscript{b} __MS__  
CIP Code: **27.0101**

\textsuperscript{a}Prepare separate summary table for each degree program.  
\textsuperscript{b}For example, MA, MS, M.Ed., Ed.D.

- Based on **direct measures** of student learning in the Academic Foundations domain(s) your department assessed, compare your students' performance this year to their performance last year. Duplicate this section when reporting assessments for more than one domain for a given program.

<table>
<thead>
<tr>
<th>Indicate the student learning outcome assessed (check one):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>x</td>
</tr>
<tr>
<td>x</td>
<td>Critical Thinking</td>
</tr>
</tbody>
</table>

Based on departmental assessments, student learning in this domain was (check one):

<table>
<thead>
<tr>
<th>Worse than last year</th>
<th>Equivalent to last year</th>
<th>Slightly better than last year</th>
<th>Moderately better than last year</th>
<th>x Dramatically better than last year</th>
<th>Cannot be compared (this is the first year for this assessment)</th>
</tr>
</thead>
</table>

Describe the **direct measure(s)** used to assess student learning in this domain (e.g., answers to questions included on an exam, performance on a paper or project scored with a rubric, etc.). Include information about any additional measures used to assess learning in this domain.

The fully synchronous online MS program in math is offered by the department. It is the only one in US. According to a study, the program is of high quality. This provided the opportunity for distance students to take the courses at the location that is convenient to them. The students did not have to come to the campus. They have more time to study so many of them did considerable well.

Exit Surveys, and Proseminars  
(capstone course)

**Student Learning Outcome (Critical Thinking):**

- Analyze the essentials of a problem logically  
- Choose and execute calculation and manipulation strategies that are relevant to mathematics  
- Select and apply appropriate mathematical tools and techniques  
- Solve mathematical problems  
- Use information technology appropriately to conduct research  
- Transfer knowledge from one context to another

**Student Learning Outcome (Communication):**
• Write coherent and accurate reports of mathematical processes and problems
• Deliver oral presentations that explain math concepts or defend mathematical arguments effectively and accurately

If you observed changes in student performance on this measure when comparing the two years, briefly describe (in one or two sentences) the nature of these changes.

Use of Assessment Data for Making Decisions. Describe the process used in your department to evaluate assessment evidence and make decisions (include dates of relevant department meetings if known). Describe the decisions made to improve student learning in your program. Describe how these decisions are related to the assessment evidence collected by your department.

A student will register for one credit hour proseminar (capstone course) usually in the last semester in his/her program. The student will conduct research under a faculty’s guidance for one semester. The faculty will choose a topic for the student in mathematics or statistics. The student will meet with the faculty regularly to report the progress and seek advice. By the end of the semester, the student will give an oral presentation to students and faculty, and submit a written report based on the research and findings. The Proseminar Committee will evaluate student’s presentation and report.

Eleven (11) students took the proseminar in 2009/2010 and three (3) retook it. The students gave oral presentations and submitted written reports. The committees evaluated the proseminars according to “Student Learning Outcomes in the domain of the Critical Thinking and Communication of the MS program” and recommended 10 of 11 students pass the proseminars and one (1) retake it. Those three who retook it in 2009/2010 were recommended to pass.

The students have done well in their research under faculty’s guidance. Three students participated in the SEA STARS and one of received the Department Award. Surveys of all exit students were done. Eight (8) surveys were collected. Results were positive.

Use of Assessment Data for Improvement of Assessment Procedures. Describe any changes made to assessment methods. Explain the relation between these changes and the information obtained from previous assessments.

1. The committee made a recommendation that students should not be allowed to give oral presentations of the proseminar unless they get approval from their faculty advisors. This has enhanced the quality of the proseminar.

2. During a department meeting, how to improve the teaching and learning was discussed. Suggestions were made according to the study.

3. The committee made a recommendation that students must use UWF’s thesis/dissertation format for their written reports. The committee also made a recommendation that students need to pay attention on how to present their research findings to abroad audiences.
Describe the Department’s Commitment to Assessment Activities in 2010-2011

<table>
<thead>
<tr>
<th>Domain(s) to be examined in assessment plan in 2010-2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>We will continue to use the same two domains <strong>Critical Thinking</strong>, and <strong>Communication</strong> in following year.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment question(s) to be addressed in 2010-2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Analyze the essentials of a problem logically</td>
</tr>
<tr>
<td>• Choose and execute calculation and manipulation strategies that are relevant to mathematics</td>
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<tr>
<td>• Select and apply appropriate mathematical tools and techniques</td>
</tr>
<tr>
<td>• Use information technology appropriately to conduct research</td>
</tr>
<tr>
<td>• Write coherent and accurate reports of mathematical processes and problems</td>
</tr>
<tr>
<td>• Deliver oral presentations that explain math concepts or defend mathematical arguments effectively and accurately</td>
</tr>
</tbody>
</table>
I-AFP. Academic Foundations / General Education - To be completed by academic units offering courses related to General Studies.

Annual Report, 2009-2010

Department/Division: Mathematics and Statistics

College: Arts and Sciences

Part I-AFP, Summary Report on Assessment, Academic Foundations Plan

General Studies Courses*: STA2023 and MAC1105

*Prepare separate summary table for each course assessed.

- Departments offering Academic Foundations/General Education courses are required to report on at least two student learning outcomes.
- Based on direct measures of student learning in the domain(s) your department assessed, compare your students’ performance this year to their performance last year. Duplicate this section when reporting assessments for more than one domain for a given course.

Indicate the Academic Foundations learning domain assessed (check one):

- Critical Thinking
- Integrity/Values
- Communication
- Project Management

Based on departmental assessments, student learning in this domain was (check one):

- Worse than last year
- Equivalent to last year
- Slightly better than last year
- Moderately better than last year
- Dramatically better than last year
- Cannot be compared (this is the first year for this assessment)

Describe the direct measure(s) used to assess student learning in this domain (e.g., answers to questions included on an exam, performance on a paper or project scored with a rubric, etc.). Include information about any additional measures used to assess learning in this domain.

A uniform and comprehensive final exam is the method of assessment. The final exam MAC1105 (Appendix A) and STA2023 (Appendix B) contains questions that address directly to the specified student learning outcomes. Uniform syllabi were created in the beginning of the semester.

Uniform syllabi and final exams for all sections of MAC1105 and STA2023 were prepared by a committee consisting of faculty and Lower Division Coordinator. The uniform finals were evaluated by the same committee.

If you observed changes in student performance on this measure when comparing the two years, briefly describe (in one or two sentences) the nature of these changes.

According to this year’s assessments, the students’ performance is improved. The reason is that we used the assessments from last year to make changes in teaching and learning.
Use of Assessment Data for Making Decisions. Describe the process used in your department to evaluate assessment evidence and make decisions (include dates of relevant department meetings if known). Describe the decisions made to improve student learning in your program. Describe how these decisions are related to the assessment evidence collected by your department.

Assessment data collected consists of the number of questions that students missed within the set of questions for each learning outcome. It is used to build tables to see the relative frequency of missed questions. They provide measures of relative achievement related to the learning outcomes.

Student Learning Outcomes (Qualitative Reasoning)

1. Identify functions and their properties.
2. Analyze and graph polynomial, rational, radical, exponential, and logarithmic functions.
3. Perform operations on algebraic and transcendental functions.
4. Compute measures of centrality, dispersion, and location for data sets.
5. Apply probability rules and calculate probabilities for discrete and continuous random variables.

Following are the questions addressing each SLO.

<table>
<thead>
<tr>
<th>SLO</th>
<th>Question Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MAC1105: 2,3,4,14,16,18,19,21,22,23,25,29</td>
</tr>
<tr>
<td>2</td>
<td>MAC1105: 9,10,11,15,17,20,24,26,30</td>
</tr>
<tr>
<td>3</td>
<td>MAC1105: 1,5,6,7,12,28,31,32,33,34</td>
</tr>
<tr>
<td>4</td>
<td>STA2023: 1.1,1.2,2.1,2.2,3.1,3.2,4.1,4.2,7.1,7.2</td>
</tr>
<tr>
<td>5</td>
<td>STA2023: 7.3,8.1,8.2,9,10</td>
</tr>
</tbody>
</table>

Collected assessment data consist of the number of questions that students missed within the set of questions for each learning outcome. It is used to build tables to see the relative frequency of missed questions. They provide measures of relative achievement related to the learning outcomes. Appendix C contains data for MAC1105 and Appendix D contains data for STA2023.

According to the table in Appendix C, students did not do well (more than 35% missed) on the following MAC1105 question numbers: 1, 9, 10, 14, 25, 26, 28.

According to the table in Appendix D, student did not do well (more than 35% missed) on the following STA2023 question numbers: 7.1, 8.2, 11.

Appendix E and F are a list of the “over 35%” missed questions for MAC1105 and STA2023.

Student Learning Outcomes (Problem Solving):

1. Solve problems involving application of algebraic and transcendental functions.
2. Solve problems involving application of discrete and continuous random variables.
3. Solve exponential and logarithmic equations.
4. Solve systems of linear equations.
5. Use probabilities rules in solving problems.
6. Estimate parameters
7. Perform hypotheses tests

Following are the questions addressing each SLO.

<table>
<thead>
<tr>
<th>SLO</th>
<th>Question Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MAC1105: 8,16,38,39</td>
</tr>
<tr>
<td>2</td>
<td>STA2023: 5.1,5.2,6.1,6.2,</td>
</tr>
<tr>
<td>3</td>
<td>MAC1105: 27,35,36,37,40</td>
</tr>
<tr>
<td>4</td>
<td>STA2023: 13.1,13.2,14,15,16.1,16.2,17.1,17.2</td>
</tr>
</tbody>
</table>

Collected assessment data consist of the number of questions that students missed within the set of questions for each learning outcome. It is used to build tables to see the relative frequency of missed questions. They provide measures of relative achievement related to the learning outcomes. Appendix C contains data for MAC1105 and Appendix D contains data for STA2023.

According to the table in Appendix C, students did not do well (more than 35% missed) on the following MAC1105 question numbers: 27,36,37,38.

According to the table in Appendix D, students did not do well (more than 35% missed) on the following STA2023 question numbers: 14, 15, 16.1, 16.2, 17.1, 19.2, 20.1, 20.2, 20.3

Appendix E and F are a list of the “over 35%” missed questions for MAC1105 and STA2023.

Use of Assessment Data for Improvement of Assessment Procedures. Describe any changes made to assessment methods. Explain the relation between these changes and the information obtained from previous assessments.

1. Assessment results were presented to the committee consisting of faculty and Lower Division Coordinator in the department. Based on the results, the committee recommended that instructors should spend more time with the students on the topics related to the questions with high missed answers rates. It is also recommended to review clarity and precision of those questions with high missed answers rates. The students in all MAC1105 sections were taught with the help of My-Math-Lab software. The assessment data and the students’ comments showed that it has enhanced students’ learning. Therefore, the Committee recommended continuing to use My-Math-Lab.

2. The department had meetings on January 22, 2010 and April 2, 2010 to discuss the assessment result and made decision based on the committee’s recommendations.
and faculty’s inputs on how to improve the learning process.

-To improve the MAC1105 learning process it was decided that all instructors teaching the course would concentrate on improving the score of questions for which low achievement was recorded by devoting extra time in instruction and practice. It was decided that all Teaching Assistants teaching the course would follow a training/instructional seminar that would prepare them for effective teaching. Teaching Assistants would be closely supervised by senior faculty and the Lower Division Coordinator.

-The faculty also made suggestions on how to improve and manage the redesigned format for all STA2023 classes. The redesigned format will be centered more on student learning, with the help of an intelligent tutoring system called Hawkes learning system (HLS). The system features teaching statistical concepts interactively by computer and letting students set their own pace by practicing problems and receiving feedback according to their skill level. According to the assessment, some changes will be made. For example, TAs will be put in the lab to assist STA2023 students with HLS.

3. The committee consisting of faculty and Lower Division Coordinator will monitor the implementation across semesters to perform some quality control on the measures themselves. The Undergraduate Committee and the three faculty members who teach STA2023 in spring 2010 will collect new assessment data for STA2023. Assessment will be done in the summer.

Describe the Department’s Commitment to Assessment Activities in 2010-2011

<table>
<thead>
<tr>
<th>Domain(s) to be examined in assessment plan in 2010-2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>We will continue to use the same two domains Critical Thinking, and Communication in following year.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment question(s) to be addressed in 2010-2011</th>
</tr>
</thead>
</table>

**Qualitative Reasoning**

1. Identify functions and their properties.
2. Analyze and graph polynomial, rational, radical, exponential, and logarithmic functions.
3. Perform operations on algebraic and transcendental functions.
4. Compute measures of centrality, dispersion, and location for data sets.
5. Apply probability rules and calculate probabilities for discrete and continuous random variables.

**Problem Solving**

1. Solve problems involving application of algebraic and transcendental functions.
2. Solve problems involving application of discrete and continuous random variables.
3. Solve exponential and logarithmic equations.
4. Solve systems of linear equations.
5. Use probabilities rules in solving problems.
6. Estimate parameters
7. Perform hypotheses tests
Part II-A, Major Unit Accomplishments and Changes in Programs and Services

List major department/division accomplishments and changes in programs and services for 2009-2010. (Add lines as needed.)

1. The data for our BS program and MS program were collected and analyzed. Assessments were done for BS and MS programs, and MAC1105 and STA2023 the two general studies courses most students take. The results were presented in a conference. According to the assessment results, suggestions have been made by the department to improve teaching and learning for 2010/2011. The department published three research articles in assessments.

2. The department held MAA Florida local Chapter annual meeting in November 2009. More than eighty (80) scholars and students attended the meeting.

3. The department successfully hosted the AMC 10 and AMC12 “American Math Competitions” in February 2010 at UWF that more than 249 local area high school students participated in.

4. The MS program is offered fully online with Elluminate. We are the first one in Florida offering the entire MS program in mathematical sciences fully online with the Elluminate.

5. Thirteen (13) graduate students graduated in 2009-2010. Nineteen (19) undergraduate students and 5 minors also graduated in 2009-2010.

6. UWF students’ performance in gatekeeper math courses ranked #1 in Florida State University System (FSUS) by ENLACE Florida (ENLACE Florida Volume 111, Issue 5, October 2009).

7. The department’s FTEs were ranked on the top in CAS.
Part II-B, Distinguished Individual (Faculty, Staff, and Student) Accomplishments

List college/departmental distinctions earned by faculty, staff, and students during 2009-2010

A. Faculty
   1. Promotions:  
      Dr. J. Uvah to the rank of professor
      Dr. J. Kuhl to the rank of associate professor
   2. Tenure:  
      Dr. J. Kuhl
   3. Awards:
      Mrs. Bushway received “Excellence in Undergraduate Teaching and Advising” Award.
      Dr. Kuhl received “Excellence in Undergraduate Teaching and Advising” Award.
      Dr. Li received “Distinguished University Professor” award.
   4. Other Distinctions
      Dr. Amin worked on the geographical mapping of cancer rates in Florida. His research in cancer cluster has brought the attentions from the state and the nation.
      Dr. Bagui was elected as Vice-President of Florida chapter of ASA.

B. Staff

C. Students:
Part III-A, Strategic Planning Goals/Objectives for 2010-2011
List strategic plan goals/objectives and planned method of assessment (if applicable).

<table>
<thead>
<tr>
<th>Strategic Goal/Objective</th>
<th>Related UWF Strategic Goal</th>
<th>Method of Assessment</th>
</tr>
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<tbody>
<tr>
<td>We will collect necessary data to do analysis and assessment on our programs and General Studies courses (STA2023 and MAC1105). According to the assessments, we will make changes to improve our programs.</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check if the assessments are done or not and what the department plans to do according to the assessments.</td>
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<tr>
<td>We will make efforts to recruit students into our programs. Recruiting materials for math and statistics majors will be distributed to prospective students during open houses and freshmen orientation sessions</td>
<td>2. Strategic Focus: Purposeful Enrollment Growth</td>
<td>Check if recruiting materials are distributed, if the department representatives attend the open house or orientations or not.</td>
</tr>
<tr>
<td>Our faculty members will continue to visit/contact local high schools and community colleges to make our program known and to recruit students.</td>
<td>2. Strategic Focus: Purposeful Enrollment Growth</td>
<td>Check how many high schools were visited/contacted.</td>
</tr>
<tr>
<td>We will offer non-traditional online courses with Elluminate for our MS program students.</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check how many sections are offered.</td>
</tr>
<tr>
<td>We will offer all STA2023 sections with the new teaching method. The sections will be taught with HAWKES. This student centered teaching method will not only improve teaching</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check if all sections are taught with this new method. Check if the assessment is done or not.</td>
</tr>
</tbody>
</table>
and learning, but also reduce the cost for delivery the courses. We will use my-math-lab in lower division courses to enhance teaching and learning.

<table>
<thead>
<tr>
<th>Action</th>
<th>Focus Area</th>
<th>Action/Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>We will hold a local math conference in Fall 2008. Math instructors in nearby colleges will be invited. We will use this as a recruitment opportunity. We will hold AMC math competitions for local high school students.</td>
<td>4. Strategic Focus: Partnership &amp; Collaboration</td>
<td>Check if the conference and AMC are held or not.</td>
</tr>
<tr>
<td>We will have uniform syllabi, assignments, tests, and final exams for MAC1105, MGF 1106, MAC1114, and MAC1140. Assessment data for these courses will be collected.</td>
<td>1. Strategic Focus: High Quality Academic Programs</td>
<td>Check if the uniform tests are given and how well students have done.</td>
</tr>
<tr>
<td>Recruit a math faculty. The department is short of three math faculty. It is difficult to deliver the upper level math courses.</td>
<td>5. Strategic Focus: Investment in People</td>
<td>Check if a faculty is recruited or not.</td>
</tr>
<tr>
<td>Provide Junior faculty members release time to do research.</td>
<td>5. Strategic Focus: Investment in People</td>
<td>Check how many junior faculty received release time.</td>
</tr>
</tbody>
</table>

*a Add lines as needed.

*b Insert Focus/Goal number/letter from the UWF Strategic Priorities and Measurable Achievements, 2008-2012.

*c If applicable.
Part III-B, Strategic Planning Goals/Objectives for 2011-2015

<table>
<thead>
<tr>
<th>Strategic Goal/Objective&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Method of Assessment&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a short term plan as well as a long term plan for the programs according to the program review team’s recommendations.</td>
<td>Check if the plans are done or not.</td>
</tr>
<tr>
<td>Make changes to improve teaching and learning according to the short term and the long term plans.</td>
<td>Check in how many areas the improvement has been made.</td>
</tr>
<tr>
<td>Revamp the general studies courses as needed.</td>
<td>Check how many courses are done.</td>
</tr>
<tr>
<td>Recruit faculty</td>
<td>Check how many new faculty members are hired.</td>
</tr>
<tr>
<td>Recruit undergraduate and graduate students in the programs</td>
<td>Check how many students are recruited in the programs and if the enrollments are up or not.</td>
</tr>
<tr>
<td>Assess general studies courses and all programs.</td>
<td>Check if the programs are assessed. Check how many general studies courses are assessed.</td>
</tr>
<tr>
<td>Hold the American Mathematics Competition annually. Use this opportunity to recruit undergraduate students to SSE programs.</td>
<td>Check if the competition is held or not.</td>
</tr>
<tr>
<td>Hold MAA Florida local chapter conference annually. Use this opportunity to recruit students to our MS program.</td>
<td>Check if the conference is held or not.</td>
</tr>
</tbody>
</table>

<sup>a</sup>Add lines as needed. <sup>b</sup>If applicable.
Annual Report, 2009-2010

Department/Division: **Mathematics and Statistics**

College: **Arts and Sciences**

**Part III-B, New Degree Program Projections**

This section **to be completed only by the Dean** for the college-level annual report.

List new degree programs and specializations under consideration and planned year of implementation.

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Level(^a)</th>
<th>New Degree(^b)</th>
<th>New Specialization(^c)</th>
<th>Implementation Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

\(^a\)For example, BA, BSBA, MEd.

\(^b\)For degrees not currently offered as stand-alone programs; will require submission of requests to Faculty Senate and Board of Trustees.

\(^c\)For new specializations within an existing degree program; will require submission of request to Faculty Senate but not to Board of Trustees.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate as requested.

1) Given that \( h(x) = 6x - \sqrt{x^2 - 2} \), find \( h(-x) \).
   A) \( 6x - \sqrt{x^2 - 2} \)  
   B) \( -6x - \sqrt{2 - x^2} \)  
   C) \( -6x + \sqrt{x^2 - 2} \)  
   D) \( -6x - \sqrt{2 - x^2} \)

Find the domain of the function.

2) \( f(x) = \frac{x}{x - 9} \)
   A) \( \{x \mid x \neq 9\}, \text{ or } (-\infty, 9) \cup (9, \infty) \)  
   B) \( \{x \mid x < 0\}, \text{ or } (-\infty, 0) \)  
   C) \( \{x \mid x \neq -9\}, \text{ or } (-\infty, -9) \cup (-9, \infty) \)  
   D) \( \{x \mid x > 0\}, \text{ or } (0, \infty) \)

Provide an appropriate response.

3) Write a slope-intercept equation for a line that passes through \((-6, -8)\) and \((9, -8)\).
   A) \( y = 3x + 16 \)  
   B) \( y = 2x + 10 \)  
   C) \( y = -8 \)  
   D) \( y = -6x - 38 \)

Determine the equation of the line described. Put answer in the slope-intercept form, if possible.

4) Through \((6, 1)\), perpendicular to \(-3x - 8y = -10\).
   A) \( y = -\frac{8}{3}x - 15 \)  
   B) \( y = -\frac{3}{4}x - \frac{5}{4} \)  
   C) \( y = \frac{3}{8}x + \frac{3}{8} \)  
   D) \( y = \frac{8}{3}x - 15 \)

For the pair of functions, find the indicated sum, difference, product, or quotient.

5) Find \( (f/g)(-2) \) when \( f(x) = 5x - 4 \) and \( g(x) = 2x^2 + 14x + 4 \).
   A) \( \frac{7}{8} \)  
   B) \( -\frac{1}{8} \)  
   C) \( -\frac{5}{16} \)  
   D) \( \frac{1}{3} \)

For each function \( f \), construct and simplify the difference quotient \( \frac{f(x + h) - f(x)}{h} \).

6) \( f(x) = 8x^2 + 3x \)
   A) \( 16x + 8h + 3 \)  
   B) \( 16x + 3 \)  
   C) \( 24x - 10h + 6 \)  
   D) \( 16x^2 + 8h + 3x \)

Find the requested composition of functions.

7) Given \( f(x) = \sqrt{x + 5} \) and \( g(x) = 8x - 9 \), find \( (f \circ g)(x) \).
   A) \( 2\sqrt{2x - 1} \)  
   B) \( 8\sqrt{x - 4} \)  
   C) \( 2\sqrt{2x + 1} \)  
   D) \( 8\sqrt{x + 5} - 9 \)

Solve the problem.

8) At Allied Electronics, production has begun on the X-15 Computer Chip. The total revenue function is given by \( R(x) = 42x - 0.3x^2 \) and the total cost function is given by \( C(x) = 9x + 9 \), where \( x \) represents the number of boxes of computer chips produced. The total profit function, \( P(x) \), is such that \( P(x) = R(x) - C(x) \). Find \( P(x) \).
   A) \( P(x) = -0.3x^2 + 33x - 9 \)  
   B) \( P(x) = 0.3x^2 + 33x - 18 \) 
   C) \( P(x) = 0.3x^2 + 24x - 27 \)  
   D) \( P(x) = -0.3x^2 + 24x + 9 \)
Match the correct function to a given graph.

9) 

A) \( f(x) = 2x \)  
B) \( f(x) = 1 - 2x \)  
C) \( f(x) = 2x + 1 \)  
D) \( f(x) = 2x - 1 \)

10) 

A) \( f(x) = \sqrt{x + 1} \)  
B) \( f(x) = x - 2 \)  
C) \( f(x) = \sqrt{x + 2} \)  
D) \( f(x) = \sqrt{x - 2} \)

Find the function that is finally graphed after the following transformations are applied to the graph of \( y = \sqrt{x} \).

11) i) Shift up 3 units  
ii) Reflect about the y-axis  
iii) Shift right 2 units  

A) \( y = \sqrt{-x} + 2 - 3 \)  
B) \( y = \sqrt{x - 2} - 3 \)  
C) \( y = \sqrt{-x + 2} - 3 \)  
D) \( y = -\sqrt{x - 2} + 3 \)

Use the quadratic formula to find the exact solution.

12) \( x^2 + 11x = -28 \)  
A) 4, 7  
B) -4, 7  
C) -4, -7  
D) 4, -7

Solve the problem.

13) Your company uses the quadratic model \( y = -11x^2 + 350x \) to represent how many units (y) of a new product will be sold (x) weeks after its release. How many units can you expect to sell in week 17?  
A) 9129 units  
B) 2771 units  
C) 6137 units  
D) 5763 units

Find the vertex and axis of symmetry of the graph of the function.

14) \( f(x) = x^2 + 4x - 5 \)  
A) \((-2, 9) \); \( x = -2 \)  
B) \((-2, -9) \); \( x = -2 \)  
C) \((2, 9) \); \( x = 2 \)  
D) \((2, -9) \); \( x = 2 \)
Graph the function using its vertex, axis of symmetry, and intercepts.

15) \( f(x) = -x^2 - 6x - 5 \)

A) vertex \((3, 4)\)
intercepts \((1, 0), (5, 0), (0, -5)\)

B) vertex \((3, -4)\)
intercepts \((1, 0), (5, 0), (0, 5)\)

C) vertex \((-3, -4)\)
intercepts \((-1, 0), (-5, 0), (0, 5)\)

D) vertex \((-3, 4)\)
intercepts \((-1, 0), (-5, 0), (0, -5)\)

Solve the problem.

16) The owner of a video store has determined that the cost \( C \), in dollars, of operating the store is approximately given by \( C(x) = 2x^2 - 28x + 560 \), where \( x \) is the number of videos rented daily. Find the lowest cost to the nearest dollar.

A) $462  
B) $168  
C) $658  
D) $364

Use the leading-term test to match the function with the correct graph.

17) \( f(x) = -0.7x^6 - x^5 + 5x^4 - 3x^3 - 7x^2 + x - 3 \)

A)  
B)  
C)  
D)
Use the polynomial division to factor \( f(x) \), knowing that one factor is \((x - 2)\).

18) \( f(x) = x^3 - 3x^2 - 18x + 40 \)
   A) \( f(x) = (x + 2)(x - 4)(x + 5) \)  
   B) \( f(x) = (x - 2)(x + 4)(x - 5) \)  
   C) \( f(x) = (x - 2)(x + 4)(x - 6) \)  
   D) \( f(x) = (x - 2)(x + 4)(x - 5) \)

Find the zeros of the polynomial function and state the multiplicity of each.

19) \( f(x) = -5x^2(x - 9)(x + 3)^3 \)
   A) \(-3\), multiplicity 3; \(9\), multiplicity 1  
   B) \(-3\), multiplicity 3; \(0\), multiplicity 2; \(3\), multiplicity 1; \(9\), multiplicity 1  
   C) \(-3\), multiplicity 1; \(3\), multiplicity 1; \(9\), multiplicity 1  
   D) \(-3\), multiplicity 3; \(0\), multiplicity 2; \(9\), multiplicity 1

Graph the function.

20) \( f(x) = x(x + 3)(x - 2)(x + 1) \)

Find the vertical asymptote(s) of the graph of the given function.

21) \( g(x) = \frac{x + 8}{x - 4} \)
   A) \( y = 4 \)  
   B) \( x = -4 \)  
   C) \( x = 4 \)  
   D) \( x = -8 \)

Find the horizontal asymptote, if any, of the rational function.

22) \( f(x) = \frac{(x - 4)(x + 5)}{x^2 - 1} \)
   A) \( y = 1 \)  
   B) \( x = 1, x = -1 \)  
   C) \( y = 4, y = -5 \)  
   D) None

Find the indicated intercept(s) of the graph of the function.

23) \( x\)-intercepts of \( f(x) = \frac{x - 6}{x^2 + 4x - 2} \)
   A) \( (3, 0) \)  
   B) \( (4, 0) \)  
   C) \( (6, 0) \)  
   D) none
Solve the problem.
24) Decide which of the rational functions might have the given graph.

\[
\begin{align*}
A) \ R(x) &= \frac{x - 2}{(x + 2)(x - 3)} \\
B) \ R(x) &= \frac{2 - x}{(x + 2)(x - 3)} \\
C) \ R(x) &= \frac{x + 2}{(x - 2)(x + 3)} \\
D) \ R(x) &= \frac{x - 2}{(x + 2)^2(x - 3)^2}
\end{align*}
\]

Determine whether the given function is one-to-one. If it is one-to-one, find a formula for the inverse.
25) \( f(x) = \frac{3}{x + 3} \)

\[
\begin{align*}
A) \ f^{-1}(x) &= \frac{x}{3 + 3x} \\
B) \text{Not one-to-one} \\
C) \ f^{-1}(x) &= \frac{-3x + 3}{x} \\
D) \ f^{-1}(x) &= \frac{3 + 3x}{x}
\end{align*}
\]

Use transformations to graph the function. Determine the domain and range.
26) Graph the function \( f(x) = -1 + e^x \). Determine the domain and range.

\[
\begin{align*}
A) \text{domain: } (-\infty, \infty) \\
\text{range: } (-1, \infty) \\
B) \text{domain: } (-\infty, \infty) \\
\text{range: } (-1, \infty) \\
C) \text{domain: } (-\infty, \infty) \\
\text{range: } (-1, \infty) \\
D) \text{domain: } (-\infty, \infty) \\
\text{range: } (-1, \infty)
\end{align*}
\]
Solve the equation.

27) \(2^x = \frac{1}{8}\)  
   A) -3  
   B) \(\frac{1}{3}\)  
   C) 3  
   D) \(\frac{1}{4}\)

Change the exponential expression to an equivalent expression involving a logarithm.

28) \(4^x = 64\)  
   A) \(\log_4 64 = x\)  
   B) \(\log_{64} x = 4\)  
   C) \(\log_{64} 4 = x\)  
   D) \(\log_x 64 = 4\)

Find the domain of the function.

29) \(f(x) = \log (x - 5)\)  
   A) \(x > 0\)  
   B) \(x > 5\)  
   C) \(x > -5\)  
   D) \(x > 1\)

The graph of a logarithmic function is shown. Select the function which matches the graph.

30)  

A) \(y = \log (1 - x)\)  
   B) \(y = \log (x - 1)\)  
   C) \(y = \log (x - 1)\)  
   D) \(y = 1 - \log (x)\)

Solve the equation.

31) \(\log_4 x = 3\)  
   A) 12  
   B) 7  
   C) 64  
   D) 81

Express as a sum of logarithms.

32) \(\log_{10} xy\)  
   A) \(\log_5 x + \log_5 y\)  
   B) \(\log_5 x - \log_5 y\)  
   C) \(\log_5 x + \log_5 y\)  
   D) \(\log_{10} x - \log_{10} y\)

Solve.

33) Given \(\log_b 6 = 1.3695\) and \(\log_b 7 = 1.4873\), evaluate \(\log_b 6b\).  
   A) 1.1956 + b  
   B) 2.8568  
   C) 1.3695  
   D) 2.3695
Express as a single logarithm and, if possible, simplify.

34) \( \log_b 2x + 6(\log_b x - \log_b y) \)

A) \( \log_b \frac{12x^2}{y^6} \)  
B) \( \frac{(\log_b 2x)(\log_b x^6)}{\log_b y^6} \)  
C) \( \log_b \frac{2x^7}{y^6} \)  
D) \( \log_b (2x + x^6 - y^6) \)

Solve the logarithmic equation.

35) \( \ln x - \ln (x - 4) = \ln 3 \)

A) \( \frac{4 \ln 3}{\ln 3 - 1} \)  
B) No solution  
C) 6  
D) -1

Solve the exponential equation.

36) \( e^{-x} = 1^x \)

A) 0  
B) No solution  
C) \( \frac{1}{2} \ln 5 \)  
D) 5

Solve the problem.

37) Solve the equation \( 4^x + 4 = 5^2x + 5 \) and express the answer in terms of natural logarithms.

A) \( x = \frac{5 \ln 5 - 4 \ln 4}{\ln 4 - 2 \ln 5} \)  
B) \( x = \ln \left[ \frac{5^5 - 4}{4^4 - 5^2} \right] \) 
C) \( x = 7 \ln 5 - 5 \ln 4 \)  
D) \( x = \ln 5 - \ln 4 \)

38) The size \( P \) of a certain insect population at time \( t \) (in days) obeys the function \( P = 700e^{0.03t} \). What is the size after 30 days?

A) 3000  
B) 1722  
C) 2051  
D) 2221

39) The population of a particular city is increasing at a rate proportional to its size. It follows the function \( P(t) = P(0)e^{0.08t} \) where \( t \) is the time in years. If the current population is 14,000, in how many years is the population expected to be 28,000? (Round to the nearest year.)

A) 5 yr  
B) 9 yr  
C) 71 yr  
D) 6 yr

Use any method to solve the system.

40) \[
\begin{align*}
5x - 2y &= 1 \\
x + 2y &= 5 
\end{align*}
\]

A) \( x = 2, y = 8 \)  
B) \( x = 2, y = 1 \)  
C) \( x = 13, y = 9 \)  
D) \( x = 1, y = 2 \)
1. Consider the following frequency table representing the distribution of hours students watch TV in a week.

<table>
<thead>
<tr>
<th>Hours Students Watch TV in a Week</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>3–13</td>
<td>14</td>
</tr>
<tr>
<td>14–24</td>
<td>3</td>
</tr>
<tr>
<td>25–35</td>
<td>4</td>
</tr>
<tr>
<td>36–46</td>
<td>8</td>
</tr>
<tr>
<td>47–57</td>
<td>11</td>
</tr>
</tbody>
</table>

**Step 1.** Enter the relative frequency for the third class as a simplified fraction.

Answer: __________

**Step 2.** Enter the cumulative frequency for the second class.

Answer: __________

2. Consider the following data:

\[2, 2, 4, 4, 4, 5, 7, 7, 9, 9\]

**Step 1.** Enter the value of the mean.

Answer: __________

**Step 2.** Enter the value of the median.

Answer: __________

3. Consider the following data:

\[2, 4, 4, 5, 7, 9, 9\]

**Step 1.** Enter the value of the sample standard deviation. Round your answer to one decimal place.

Answer: __________
Step 2. Enter the value of the Range.

Answer: 

4. The mean salary at a local bank is $28,200 with a standard deviation of $4900. The median salary is $26,800.

Step 1. Mary's salary of $38,010 is 1.20 standard deviations above the mean.

☐ True  ☐ False

Step 2. If Tom's salary has a z-score of 1.0, how much does he earn (in dollars)?

Answer: $ 

5. A box contains 20 red marbles, 25 white marbles, and 5 blue marbles.

Step 1. If a marble is randomly selected from the box, what is the probability that it is not white? Enter your answer as a fraction or a decimal number rounded to three decimal places.

Answer: 

Step 2. If two marbles are randomly selected from the box (without replacement of the first one), what is the probability that both are white? Enter your answer as a fraction or a decimal number rounded to three decimal places.

Answer: 
6. There are 89 students in a science class. The instructor must choose two students at random.

<table>
<thead>
<tr>
<th>Students in a Science Class</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshmen</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Sophomores</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Juniors</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Seniors</td>
<td>5</td>
<td>17</td>
</tr>
</tbody>
</table>

**Step 1.** What is the probability that a senior female is chosen at random? Enter your answer as a fraction or a decimal number rounded to three decimal places.

Answer: 

**Step 2.** What is the probability that a junior male and then a sophomore male are chosen at random (without replacement)? Enter your answer as a fraction or a decimal number rounded to three decimal places.

Answer: 

7. Consider the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(x)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**Step 1.** Enter the expected value $E(X)$. Round your answer to one decimal place.

Answer: 

**Step 2.** Enter the variance. Round your answer to one decimal place.

Answer: 

**Step 3.** Enter the value of $P(X<1)$. Round your answer to one decimal place.
8. A researcher wishes to conduct a study of the color preferences of new car buyers. Suppose that 40% of this population prefers the color green.

**Step 1.** Use the binomial formula to find the probability that exactly 4 buyers out of 8 would prefer green.

Answer: 
(Round your answer to 3 decimal places)

**Step 2.** Use the binomial tables to find the probability that at most 5 buyers out of 8 would prefer green.

Answer: 
(Round your answer to 3 decimal places)

9. Find the area under the normal curve to the right of $z = -1.45$

Please enter your answer in the box below.

Answer: 

10. Find the value of $z$ such that 0.1 of the area lies to the right of $z$.

Enter your answer in the box below.

Answer: 
(Round your answer to 2 decimal places)

11. Weekly students’ expenditures for food have a mean of $50 with a standard deviation of $20. The expenditures per week have a normal distribution.

Find the probability that a student spends more than $75 per week.

Answer: 
(Round your answer to 4 decimal places)
13. A consumer affairs investigator records the repair cost for 20 randomly selected cars. A sample mean of $220 and standard deviation of $110 are subsequently computed. Determine the 99% confidence interval for the mean repair cost for the cars. Assume the population is approximately normal.

Step 1. Find the value of $t_{\alpha/2}$ to be used in constructing the confidence interval.

Answer: \[ \text{Round answer to 3 decimal places} \]

Step 2. Construct the 99% confidence interval.

Lower: \[ \text{Round answer to 2 decimal places} \]

Upper: \[ \text{ } \]

14. An investigator wants to estimate the mean weight of a certain species of fish in a lake. He thinks the mean weight is 1.2 lbs. with a standard deviation of 1.1 lbs.

How large a sample would be required in order to estimate the mean weight at the 95% confidence level with an error of at most 0.05?

Answer: \[ \text{Round your answer up to the next integer} \]

15. Suppose a sample of 1291 tenth graders is drawn. Of the students sampled, 998 read above the eighth grade level. Using the data, construct the 98% confidence interval for the population proportion students reading above the eighth grade level

Lower: \[ \text{Round your answers to 3 decimal places} \]

Upper: \[ \text{ } \]
16. A researcher compares the effectiveness of two different instructional methods for teaching pharmacology. A sample of 207 students using Method 1 produces a testing average of 54.5 with a standard deviation of 8.22. A sample of 206 students using Method 2 produces a testing average of 52.3 with a standard deviation of 11.77. Determine the 95% confidence interval for the true difference between testing average using Method 1 and Method 2.

**Step 1.** Find the value of $Z_{\alpha/2}$ to be used in constructing the confidence interval.

**Step 2.** Construct the 95% confidence interval.

**Answer:**

<table>
<thead>
<tr>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
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(Round your answers to the nearest whole number.)

17. Given two independent random samples with the following results

\[ n_1 = 169 \quad n_2 = 376 \]
\[ \hat{p}_1 = 0.15 \quad \hat{p}_2 = 0.37 \]

Use this data to find the 99% confidence interval for the true difference between the population proportions.

**Step 1.** Find the value of $Z_{\alpha/2}$ to be used in constructing the confidence interval.

**Answer:**

( Round your answer to 2 decimals. )

**Step 2.** Construct the 99% confidence interval.

**Answer:**

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( Round your answers to 3 decimals. )
18. A researcher wants to test if the elementary school children spend less than 30 minutes per day on homework. A sample of 24 children selected from this school showed that they spend an average of 25.6 minutes per day on home work with a standard deviation of 4 minutes. Test at a significance level of \( \alpha = 0.01 \).

**Step 1. Enter the hypotheses:**

\[ H_0 : \]  
\[ H_a : \]

**Step 2. Enter the value of the \( t \) test statistic.**

Answer: 

(Round your answer to 3 decimal places.)

**Step 3. Enter the decision rule.**

Reject \( H_0 \) if \( t < \) 

(Round your answer to 3 decimal places.)

**Step 4. Enter the conclusion.**

- Reject Null Hypothesis
- Fail to Reject Null
19. A hospital director believes that less than 32% of the test tubes contain errors. A sample of 300 tubes found 75 errors. Test whether there is sufficient evidence at the 0.10 level to substantiate the hospital director's claim.

**Step 1.** Enter the hypotheses:

- \( H_0: \)
- \( H_a: \)

**Step 2.** Enter the value of the \( z \) test statistic.

Answer: (Round your answer to 2 decimal places.)

**Step 3.** Enter the \( p \) value of the \( z \) test statistic.

Answer: (Round your answer to 4 decimal places.)

**Step 4.** Make a decision.

- Reject Null Hypothesis
- Fail to Reject Null
20. A researcher wants to test whether job related stress for corporate managers is greater than for college professors. A sample of 200 corporate managers produced the mean job-related stress score of 7.9 with a standard deviation of 0.65. Another sample of 300 college professors produced the mean job-related stress score of 5.4 with a standard deviation of 0.90. Use a significance level of \( \alpha = 0.01 \) for the test.

**Step 1.** State the null and alternative hypotheses for the test.

\[
H_0: \mu_1 = \mu_2 \\
H_a: \mu_1 > \mu_2
\]

**Step 2.** Compute the value of the \( z \) test statistic.

Answer: [Round your answer to 2 decimals.]

**Step 3.** Determine the decision rule for rejecting the null hypothesis \( H_0 \).

\[
\text{Reject } H_0 \text{ if } |z| > z_{\alpha} \quad \text{ (Round your answer to 3 decimals.)}
\]

**Step 4.** State the test's conclusion.

- [ ] Fail to Reject Null
- [ ] Reject Null Hypothesis
## APPENDIX C

### MAC1105

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Evaluate as requested.

1) Given that \( h(x) = 6x - \sqrt{x^2 - 2} \), find \( h(-x) \).
   - A) \( 6x - \sqrt{x^2 - 2} \)
   - B) \( -6x - \sqrt{x^2 - 2} \)
   - C) \( -6x + \sqrt{x^2 - 2} \)
   - D) \( -6x - \sqrt{2 - x^2} \)

For each function \( f \), construct and simplify the difference quotient \( \frac{f(x + h) - f(x)}{h} \).

2) \( f(x) = 8x^2 + 3x \)
   - A) \( 24x - 10h + 6 \)
   - B) \( 16x + 3 \)
   - C) \( 16x^2 + 8h + 3x \)
   - D) \( 16x + 8h + 3 \)

Find the requested composition of functions.

3) Given \( f(x) = \sqrt{x + 5} \) and \( g(x) = 8x - 9 \), find \( f \circ g(x) \).
   - A) \( 2\sqrt{2x + 1} \)
   - B) \( 8\sqrt{x + 5} - 9 \)
   - C) \( 8\sqrt{x - 4} \)
   - D) \( 2\sqrt{2x - 1} \)

Find the function that is finally graphed after the following transformations are applied to the graph of \( y = \sqrt{x} \).

4) i) Shift up 3 units
   - ii) Reflect about the y-axis
   - iii) Shift right 2 units
   - A) \( y = \sqrt{-x + 2} - 3 \)
   - B) \( y = -\sqrt{x - 2} + 3 \)
   - C) \( y = \sqrt{x + 2} + 3 \)
   - D) \( y = -\sqrt{x - 2} - 3 \)

Find the horizontal asymptote, if any, of the rational function.

5) \( f(x) = \frac{(x - 4)(x + 5)}{x^2 - 1} \)
   - A) \( y = 4, y = -5 \)
   - B) \( y = 1 \)
   - C) \( x = 1, x = -1 \)
   - D) None

Find the indicated intercept(s) of the graph of the function.

6) \( x \)-intercepts of \( f(x) = \frac{x - 6}{x^2 + 4x - 2} \)
   - A) \( (3, 0) \)
   - B) \( (6, 0) \)
   - C) \( (4, 0) \)
   - D) none

Solve the problem.

7) Decide which of the rational functions might have the given graph.
Determine whether the given function is one-to-one. If it is one-to-one, find a formula for the inverse.

8) \( f(x) = \frac{3}{x+3} \)

A) \( f^{-1}(x) = \frac{3 + 3x}{x} \)  
B) \( f^{-1}(x) = \frac{x}{3 + 3x} \)  
C) \( f^{-1}(x) = \frac{-3x + 3}{x} \)  
D) Not one-to-one

Solve.

9) Given \( \log_b 6 = 1.3695 \) and \( \log_b 7 = 1.4873 \), evaluate \( \log_b 6b \).

A) 1.3695  
B) 1.1956 + b  
C) 2.3695  
D) 2.8568

Express as a single logarithm and, if possible, simplify.

10) \( \log_b 2x + 6(\log_b x - \log_b y) \)

A) \( \frac{(\log_b 2x)(\log_b x^6)}{\log_b y^6} \)  
B) \( \log_b (2x + x^6 - y^6) \)  
C) \( \log_b \frac{2x^7}{y^6} \)  
D) \( \log_b \frac{12x^2}{y^6} \)

Solve the logarithmic equation.

11) \( \ln x - \ln (x - 4) = \ln 3 \)

A) \( \frac{4 \ln 3}{\ln 3 - 1} \)  
B) No solution  
C) -1  
D) 6
APPENDIX F

(10) If two marbles are randomly selected from the box (without replacement of the first one), what is the probability that both are white?

(14) Consider the following data:
Enter the variance. Round your answer to one decimal place.

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(17). A researcher wishes to conduct a study of the color preferences of new car buyers. Suppose that 40% of this population prefers the color green. Use the binomial tables to find the probability that at most 5 buyers out of 8 would prefer green.

(20) Weekly students’ expenditures for food have a mean of $50 with a standard deviation of $20. The expenditures per week have a normal distribution. Find the probability that a student spends more than $75 per week.

(21-22) A consumer affairs investigator records the repair cost for 20 randomly selected cars. A sample mean of $220 and standard deviation of $110 are subsequently computed. Determine the 99% confidence interval for the mean repair cost for the cars. Assume the population is approximately normal.

- Find the value of $t_{0.025}$ to be used in constructing the confidence interval
- Construct the 99% confidence interval

(23) An investigator wants to estimate the mean weight of a certain species of fish in a lake. He thinks the mean weight is 1.2 lbs. with a standard deviation of 1.1 lbs. How large a sample would be required in order to estimate the mean weight at the 95% confidence level with an error of at most 0.05?

(24) Suppose a sample of 1291 tenth graders is drawn. Of the students sampled, 998 read above the eighth grade level. Using the data, construct the 98% confidence interval for the population proportion students reading above the eighth grade level.

(31) A researcher wants to test if the elementary school children spend less than 30 minutes per day on homework. A sample of 24 children selected from this school showed that they spend an average of 25.6 minutes per day on home work with a standard deviation of 4 minutes. Test at a significance level of $\alpha = 0.01$.

Enter the decision rule

(34-35-36) A hospital director believes that less than 32% of the test tubes contain errors. A sample of 300 tubes found 75 errors. Test whether there is sufficient evidence at the 0.10 level to substantiate the hospital director’s claim.

- Enter the value of the $z$ test statistic.
- Enter the $P$ value of the $z$ test statistic
- Make a decision