

MATHEMATICS
Student Learning Outcome Alignment Form

Course Prefix/Number: MATH 2412

Course Title: Pre-Calculus

| Core Objective | Course SLO | General Learning Activities | Assessment |
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| Critical Thinking Skills | Recognize and apply algebraic and transcendental functions and solve related equations. | Students will collect data and use trig functions to create a mathematical model that represents the data. Students will then test their models to verify the validity of the model they created. | <p>The assignment will be to choose and gather two sets of data and construct a scatter plot for each data set then use knowledge of trigonometric functions to create an equation that models each set of data. Students will test their models to evaluate whether their models are valid. They will then analyze their results and make a comparison of the two sets of data.</p> <p>This will be assessed using the Critical Thinking Skills rubric.</p> |
| Communication Skills | Recognize and apply algebraic and transcendental functions and solve related equations. | Students will collect data and use trig functions to create a mathematical model that represents the data. Students will then test their models to verify the validity of the model they created. | <p>The assignment will be to communicate in a written report and class presentation the results of their data collection, analysis and comparison. The report and presentation will include a scatterplot of the data, the mathematical model/equation that represents the data, and a comparison of the data.</p> <p>The Communication Skills rubric will be used to assess communication skills.</p> |

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| Empirical & Quantitative Skills | Recognize and apply algebraic and transcendental functions and solve related equations. | Students will collect data and use trig functions to create a mathematical model that represents the data. Students will then test their models to verify the validity of the model they created. | <p>The assignment will be to use graphing techniques to plot the data on a scatter plot then apply knowledge of trigonometric functions to create a mathematical model/equation that represents the data. Students will then test their model to check its validity.</p> <p>The Empirical and Quantitative Skills rubric will be used to assess empirical and quantitative skills.</p> |
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CRITICAL THINKING VALUE RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
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| Explanation of Issues | Did not state issue. | Issue is stated without clarification or description. | Issue is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined and/or backgrounds unknown. | Issue is stated, described, and clarified so that understanding is not seriously impeded by omissions. | Issue is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding. |
| Evidence | Does not identify the basic components of an issue | Information is taken from sources without any interpretation. Viewpoints of experts are taken as fact, without question | Information is taken from sources with some interpretation but not enough to develop a coherent analysis or synthesis. | Information is taken from sources with enough interpretation to develop a coherent analysis or synthesis. | Information is taken from sources with enough interpretation to develop a comprehensive analysis or synthesis. |
| Influence of Context and Assumptions | Did not show awareness of the issue. | Show an emerging awareness of present assumptions. | Questions some assumptions. Identifies relevant information when presenting a position. | Identifies own and others' assumptions and several relevant contexts when presenting a position. | Thoroughly analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position. |
| Student's Position | Takes no position on issue | Specific position is stated but is simplistic and obvious. | Specific position acknowledges different sides of an issue. | Specific position takes into account the complexities of an issue. Others' points of view are acknowledged within position. | Specific position is imaginative. Limits of position acknowledged. Other points of view are synthesized. |

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| Conclusions and Related Outcomes | Does not use previously learned information in new situations. | Conclusion is inconsistently tied to some of the information discussed; related outcomes are oversimplified. | Conclusion is logically tied to information; some related outcomes are identified. | Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes are identified clearly | Conclusions and related outcomes are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order |
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Communication RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric and Making Learning Real

Definition

Written communication is the development and expression of ideas in writing.

Oral Communication is a prepared, purposeful presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.

Visual Communication is the use of images to persuade, entertain, inform, and enlighten an observing audience of products, ideas, and messages.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
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| Quality of Information and Organization | Presentation lacks main points and related details. Information lacks connection to the presentation topic. Information is not organized. | Main points are not clear and lack significant detail. Some information is linked to the presentation topic. Information is loosely organized. | Main points are somewhat clear but could use more detail. Most information is linked to the presentation topic. Information is organized. | Main points are clear and detailed. Information is linked to presentation topic. Information is well organized. | Main points are very clear and very detailed. Information is directly linked to presentation topic. Information is very organized. |
| Nonverbal Communication | Speaker appears very uneasy and insecure. Speaker faces away from the audience or makes no eye contact. Speaker appears disengaged from the audience. Speaker uses few body motions or gestures or has gestures or movements that distract the audience. | Speaker appears uneasy and somewhat insecure. Speaker rarely faces the audience or makes eye contact. Speaker rarely appears to be engaging with the audience. Speaker uses few body motions or has gestures or movements that distract the audience.. | Speaker appears generally at ease and confident. Speaker sometimes faces the audience and maintains eye contact. Speaker sometimes appears to be engaging with the audience. Speaker's body motions and gestures neither support nor detract from presentation. | Speaker appears fairly comfortable and confident. Speaker generally faces the audience and maintains good eye contact. Speaker generally appears to be engaging with the audience. Speaker uses body motions and gestures well. | Speaker appears very comfortable and confident. Speaker consistently faces the audience and maintains good eye contact. Speaker consistently appears to be engaging with the audience. Speaker uses body motions and gestures very effectively. |
| Quality of Verbal Communication | Speaker's voice is consistently too weak or too strong. Speaker fails to use inflections to emphasize key points and create interest or often uses inflections | Speaker's voice is frequently too weak or too strong. Speaker rarely uses inflections to emphasize key points and create interest or speaker sometimes uses | Speaker's voice is generally steady strong and clear. Speaker sometimes uses inflections to emphasize key points and create interest. | Speaker's voice is steady, strong, and clear. Speaker often uses inflections to emphasize key points and create interest. Speaker's | Speaker's voice is very confident, steady, strong, and clear. Speaker consistently uses inflections to emphasize key points or to create interest. Speaker's |

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| | inappropriately. Speaker's talking paces is consistently too slow or too fast. | inflections inappropriately. Speaker's talking pace is often too slow or too fast. | Speaker's talking pace is appropriate. | talking pace is mostly appropriate. | talking pace is consistently appropriate. |
| Visual Tools | Visual aids demonstrate no creativity or clarity and are often difficult to read. Presentation is weakened by the visual tools. | Visual aids have limited creativity or clarity or are sometimes difficult to read. Presentation is not enhanced by the visual tools. | Visual aids are reasonably creative, clear, and easy to read. Presentation is sometimes enhanced by the visual tools. | Visual aids are usually creative, clear, and easy to read. Presentation is often enhanced by the visual tools. | Visual aids are very creative, clear, and easy to read. Presentation is consistently enhanced by the visual tools. |
| Appropriate Use of Vocabulary | Few or no terms are included in the presentation. May or may not be used appropriately. Lacks context. | Several terms are included in the presentation. May or may not be used appropriately. May lack context. | Most terms are included in the presentation. Generally used appropriately. Generally used in appropriate context. | All terms are included in the presentation. Used effectively. Used in context. | All terms are included in the presentation. Used in unique and creative ways. Used in context |
| Precision and Detail in Documents Produced | Written documents have numerous errors and lack detail. Little care taken in the production. | Documents may have some errors and show some detail. Some care has been taken in production. | Evident that written documents are correct and show a general attention to detail and accuracy. General care has been taken in production. | Clearly evident that written documents are correct, detailed and accurate. Care has been taken in production. | Documents are clear, well-constructed, accurate, and show attention to detail. Extra care has been taken in the production of written documents. |
| Overall Presentational Effectiveness | The presentation was weak and not effective. | The presentation was average and somewhat effective. | The presentation was good and effective. | The presentation was very good and effective. | The presentation was exceptional and extremely effective. |

Empirical and Quantitative Skills RUBRIC

Adapted for Texarkana College from the AAC&U Critical Thinking VALUE Rubric

Definition

The ability to formulate an inquiry that is scientific or mathematical in nature, and then manipulate and analyze numerical data and/or follow an investigative process using empirical and/or quantitative reasoning to satisfy the inquiry and create informed conclusions.

| | Does Not Meet Any Expectations 1 | Meets Few Expectations 2 | Meets Expectations 3 | Exceeds Some Expectations 4 | Exceeds All Expectations 5 |
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| Identification | The purpose, components, and variables of the investigation/project are not identified. | The purpose, components, and variables of the investigation/project are somewhat identified. | The purpose, components, and variables of the investigation/project are mostly identified | The purpose, components, and variables of the investigation/project are clearly identified.. | The purpose, components, and variables of the investigation/project are clearly identified. |
| Assimilation | The information that is required for an analysis of all investigative components is not evident. If applicable, values are incorrectly translated into variables and no necessary formulas are present. | The information that is required for an analysis of all investigative components is somewhat evident. If applicable, values are incorrectly translated into variables and some necessary formulas are present. | The information that is required for an analysis of all investigative components is mostly evident. If applicable, some values are correctly translated into variables and most necessary formulas are present. | The information that is required for an analysis of all investigative components is evident. If applicable, most values are correctly translated into variables and all necessary formulas are present. | The information that is required for an analysis of all investigative components is clearly evident. If applicable, values are correctly translated into variables and all necessary formulas are present. |
| Analysis | Most investigative or quantitative components are not scrutinized. The steps followed are illogical and/or irrelevant to the desired result. The proper tools/ technology were not used and/or integrated | Some investigative or quantitative components are scrutinized. Some steps followed are somewhat logical and relevant to the desired result. The proper tools/ technology were | All investigative or quantitative components are somewhat scrutinized. The steps followed are mostly logical and relevant to the desired result. The proper tools/ technology were mostly | All investigative or quantitative components are scrutinized. The steps followed are logical and relevant to the desired result. The proper tools/ technology were used and mostly integrated into the | All investigative or quantitative components are methodically scrutinized. The steps followed are logical and relevant to the desired result. The proper tools/ technology were used and |

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| | into the final product. Any notation is not consistent and not defined. | somewhat used and not integrated into the final product. Any notation is somewhat consistent but not defined. | used and somewhat integrated into the final product. Any notation is mostly consistent and defined. | final product. Any notation is consistent and well defined. | well integrated into the final product. Any notation is consistent and well defined. |
| Presentation | A summary of the analysis is either inadequately presented or not presented at all. The presented information is mostly incorrect, and/or of poor quality, and/or the terminology/figures are inaccurate and/or hard to understand. Few or no visual representations of evidence are acceptably scaled/ represent the analysis findings. | A partial summary of the analysis is presented. The presented information is somewhat correct, of adequate quality, and the terminology/figures are somewhat accurate and relatively easy to understand. Some visual representations of evidence are acceptably scaled and represent the analysis findings. | A summary of the analysis is presented. The presented information is mostly correct, of good quality, and the terminology/figures are mostly accurate and easy to understand. Most visual representations of evidence are acceptably scaled and represent the analysis findings. | A good summary of the analysis is presented. The presented information is correct, of good quality, and the terminology/figures are accurate and easy to understand. Most visual representations of evidence are well-scaled and/or well represent the analysis findings.. | A concise summary of the analysis is presented. The presented information is correct, of high quality, and the terminology/figures are accurate and easy to understand. All visual representations of evidence are well-scaled and well represent the analysis findings. |
| Application | The integration does not include all steps of the investigation and does not lead to an accurate, nor complete conclusion that relates to the initial investigative argument. | The integration of most steps of the investigation lead to a somewhat accurate, partially complete conclusion that is relative to the initial investigative statement. | The coherent integration of most steps of the investigation lead to an accurate, mostly complete, acceptable conclusion that is relative to the initial investigative statement. | The coherent integration of all steps of the investigation lead to an accurate, mostly complete, relevant conclusion that is relative to the initial investigative statement. | The coherent integration of all steps of the investigation lead to an accurate, complete, relevant conclusion that is relative to the initial investigative statement. |

Student Learning Objectives

MATH 2412: Pre-Calculus

1. Demonstrate and apply knowledge of properties of functions.
2. Recognize and apply algebraic and transcendental functions and solve related equations.
3. Apply graphing techniques to algebraic and transcendental functions.
4. Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.
5. Prove trigonometric identities.
6. Solve right and oblique triangles.