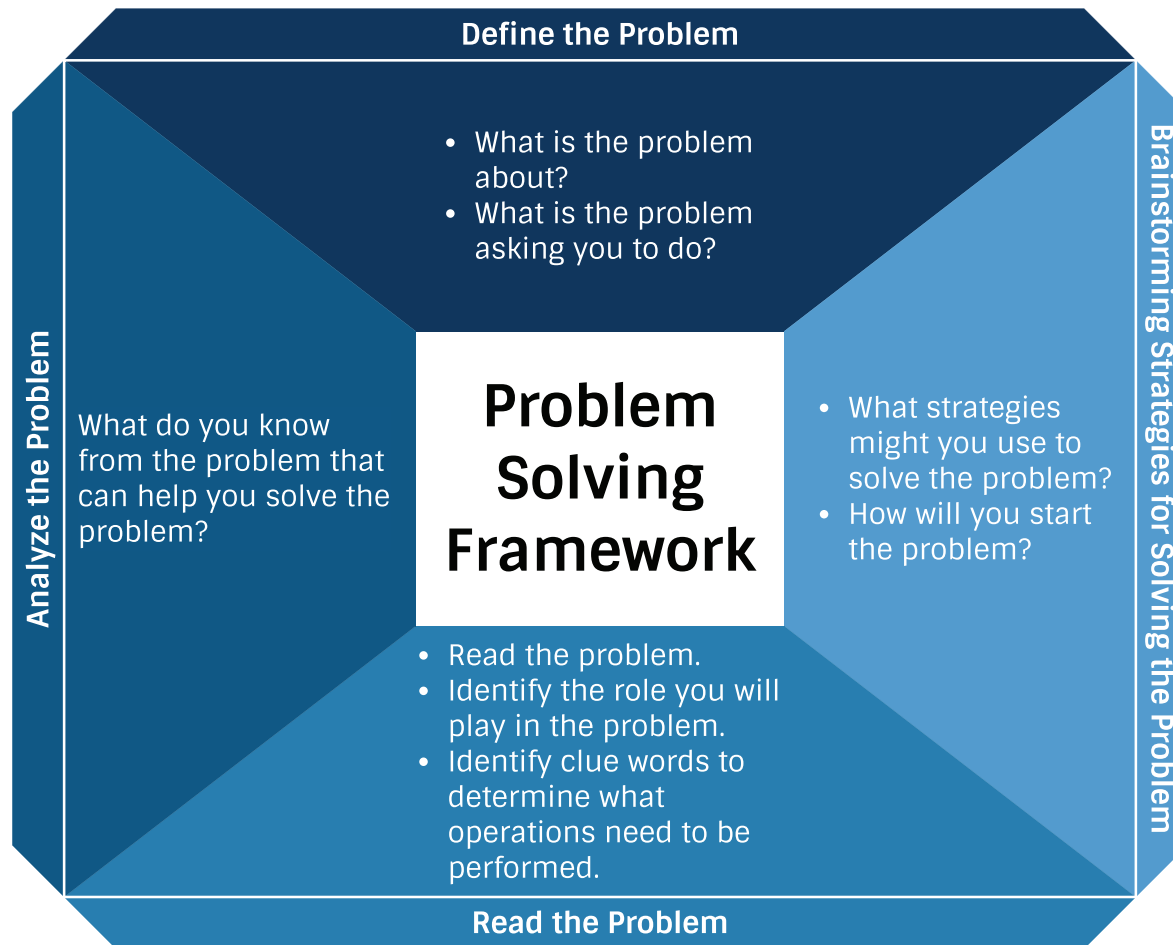


Pirates of the Pythagorean

Problem Solving Framework



Pirates of the Pythagorean

Performance Task Rubric



Skill: Apply the Pythagorean Theorem and its converse.

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none">• Shows complete understanding of the embedded skill and applies the skill beyond the parameters of the task. | <ul style="list-style-type: none">• Shows complete understanding of required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows some understanding of the required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows limited or no understanding of the mathematical knowledge for the specific skill. |
|---|---|---|---|

Skill: Prove if a right triangle is a Pythagorean Triple.

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none">• Shows complete understanding of the embedded skill and applies the skill beyond the parameters of the task. | <ul style="list-style-type: none">• Shows complete understanding of required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows some understanding of the required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows limited or no understanding of the mathematical knowledge for the specific skill. |
|---|---|---|---|

Skill: Apply the Pythagorean Theorem to find the distance between two points on a coordinate plane.

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none">• Shows complete understanding of the embedded skill and applies the skill beyond the parameters of the task. | <ul style="list-style-type: none">• Shows complete understanding of required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows some understanding of the required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows limited or no understanding of the mathematical knowledge for the specific skill. |
|---|---|---|---|

Skill: Calculate square roots and squares.

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none">• Shows complete understanding of the embedded skill and applies the skill beyond the parameters of the task. | <ul style="list-style-type: none">• Shows complete understanding of required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows some understanding of the required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">• Shows limited or no understanding of the mathematical knowledge for the specific skill. |
|---|---|---|---|

Pirates of the Pythagorean

Performance Task Rubric



Skill: Explain a proof of the Pythagorean Theorem and its converse.

- | 4: Exceeds | 3: Meets | 2: Approaching | 1: Beginning |
|--|--|--|--|
| <ul style="list-style-type: none">Shows complete understanding of the embedded skill and applies the skill beyond the parameters of the task. | <ul style="list-style-type: none">Shows complete understanding of required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">Shows some understanding of the required mathematical knowledge for the specific skill. | <ul style="list-style-type: none">Shows limited or no understanding of the mathematical knowledge for the specific skill. |
| Planning and Execution | | | |
| <ul style="list-style-type: none">Uses an appropriate and complete strategy for solving the problem.Uses clear and effective diagrams, tables, charts or graphs if required. | <ul style="list-style-type: none">Uses an appropriate but incomplete strategy for solving the problem.Appropriate but incomplete use of diagrams, tables, charts, and graphs if required. | <ul style="list-style-type: none">Uses an inappropriate strategy or application of strategy is unclear.Limited use or misuse of diagrams, tables, charts or graphs if required. | <ul style="list-style-type: none">Works haphazardly with no particular strategy for solving the problem.Does not show use of diagrams, tables, charts, or graphs if required. |
| Persistence | | | |
| <ul style="list-style-type: none">Works hard on the task and doesn't need much helpStudents may extend their thinking beyond the problem and make new connections or make new problems. | <ul style="list-style-type: none">Works hard on the task and only gets help after attempting many strategies.Completes the task and works diligently at the harder parts. | <ul style="list-style-type: none">Can do less difficult parts of the problem with little help.Begins work on the harder parts, but unless help is provided gives up. | <ul style="list-style-type: none">Needs help, even for the simple parts of the task.Gives up quickly, often just wanted the answer giving. |

Planning and Execution

Persistence

Pirates of the Pythagorean

Performance Task Rubric



Communication:

- | | | | |
|--|--|--|--|
| <ul style="list-style-type: none">• There are clear effective explanations for the solutions when prompted to explain or describe.• Mathematical representations are actively used as means of communicating ideas.• There is precise and appropriate mathematical terminology used. | <ul style="list-style-type: none">• There is clear explanation• There is appropriate use of accurate mathematical representation.• There is effective use of mathematical terminology. | <ul style="list-style-type: none">• There are incomplete explanations.• There is some use of appropriate mathematical representations.• There is some use of appropriate mathematical terminology. | <ul style="list-style-type: none">• There are no explanations for the solutions. The explanations cannot be understood or is unrelated to the task.• There is no use or inappropriate use of mathematical representations.• There is no use or mostly inappropriate use of mathematical terminology. |
|--|--|--|--|

Pirates of the Pythagorean

Critical Thinking/ Creative Thinking Rubric



Ideation/Brainstorming:

- The learner frequently sees the links between unrelated ideas. The learner is able to produce well-developed results that are fresh and new with no support.
- The learner often produces new and unique ideas with little or no support.
- The learner occasionally produces new and unique ideas but only with guidance.
- The learner is unable to produce new and unique ideas without significant guidance and encouragement.

Realization

- The learner actively seeks out and follows through with new ideas or approaches to a problem. The risk of failure is a real possibility but does not constrain the learner.
- The learner is willing to consider and follow through on ideas or approaches to a problem. The risk of failure is a possibility and puts some constraint on the learner.
- The learner considers new ideas or approaches to a problem only with strong encouragement. The risk of failure constrains the learner.
- The learner will not consider new ideas. The learner strictly stays within the constraints of the problem, which ensures that there is little risk of failure.

Communication

- The learner identifies the main idea of the problem with numerous supporting details and examples, which are organized logically and coherently within the Problem Solving Framework with no assistance.
- The learner identifies the main idea of the problem with some supporting details and examples in an organized manner within the Problem Solving Framework with little assistance.
- The learner identifies the main idea of the problem with few details or examples in a somewhat organized manner within the Problem Solving Framework with assistance.
- The learner is unable to identify the key elements of the problem without a great deal of assistance.



Pirates of the Pythagorean

Critical Thinking/ Creative Thinking Rubric



Process:

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|--|--|---|---|
| <ul style="list-style-type: none">• The learner develops strategies that are insightful and uses logical reasoning to reach accurate results with no assistance. | <ul style="list-style-type: none">• The learner develops strategies that are insightful and uses logical reasoning to reach accurate results with little assistance. | <ul style="list-style-type: none">• The learner develops strategies that are insightful and uses logical reasoning to reach accurate results with assistance. | <ul style="list-style-type: none">• The learner is unable to develop strategies that are insightful and logical without a great deal of assistance. |
|--|--|---|---|

Justification

- | | | | |
|---|---|---|--|
| <ul style="list-style-type: none">• The learner clearly justifies the choices made for solving the problem.• The learner can clearly explain new understandings gained from the problem. | <ul style="list-style-type: none">• The learner justifies the choices made for solving the problem.• The learner can explain new understandings gained from the problem. | <ul style="list-style-type: none">• The learner attempts to justify the choices made for solving the problem.• The learner can explain some things learned in the problem but are not entirely clear about new understandings. | <ul style="list-style-type: none">• The learner shows limited attempts to justify the choices made for solving the problem.• The learner struggles to explain important new understandings gained from the problem. |
|---|---|---|--|

Reflection

- | | | | |
|---|---|--|---|
| <ul style="list-style-type: none">• The learner clearly identifies strengths and weaknesses in their thinking.• The learner clearly identifies improvements that would be made to solve the problem. | <ul style="list-style-type: none">• The learner identifies strengths and weaknesses in their thinking.• The learner identifies improvements that would be made to solve the problem. | <ul style="list-style-type: none">• The learner attempts to identify strengths and weaknesses in their thinking.• The learner attempts to demonstrate the improvements that would be made to solve the problem. | <ul style="list-style-type: none">• The learner shows little attempt to identify strengths and weaknesses in their thinking.• The learner shows little attempt to identify the improvements that would be made to solve the problem. |
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Pirates of the Pythagorean

Collaboration Rubric



Participation:

- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> • The group member participated fully and was on task. | <ul style="list-style-type: none"> • The group member participated and was on task most of the time. | <ul style="list-style-type: none"> • The group member participated but did not take full advantage of the time to work on the problem/task. | <ul style="list-style-type: none"> • The group member did not participate and worked on other material during the problem/task. |
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Leadership

- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> • The group member assumed a leadership role by: <ul style="list-style-type: none"> • helping keep the group on task • encouraging group participation • posing solutions to the problem • portraying a positive attitude | <ul style="list-style-type: none"> • The group member sometimes assumed a leadership role in an appropriate way. | <ul style="list-style-type: none"> • The group member usually allowed other members to assume a leadership role or often attempted to dominate the group. | <ul style="list-style-type: none"> • The group member did not assume a leadership role or assumed it in a non-productive manner. |
|--|---|--|---|

Listening:

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|---|---|---|---|
| <ul style="list-style-type: none"> • The group member listened carefully to others' ideas and contributions. | <ul style="list-style-type: none"> • The group member usually listened to others' ideas and contributions. | <ul style="list-style-type: none"> • The group member sometimes did not listen to others' ideas and contributions. | <ul style="list-style-type: none"> • The group member did not listen to others' ideas and contributions. |
|---|---|---|---|

Feedback

- | | | | |
|--|--|---|---|
| <ul style="list-style-type: none"> • The group member offered detailed, constructive, and specific feedback when appropriate. | <ul style="list-style-type: none"> • The group member offered constructive feedback when appropriate. | <ul style="list-style-type: none"> • The group member sometimes offered constructive feedback but sometimes the comments were inappropriate or not useful. | <ul style="list-style-type: none"> • The group member did not offer constructive or useful feedback. |
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Pirates of the Pythagorean

Collaboration Rubric



Cooperation:

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|--|--|---|--|
| • The group member treated others respectfully and shared the workload fairly. | • The group member usually treated others respectfully and shared the workload fairly. | • The group member sometimes treated other group members disrespectfully or did not share the workload. | • The group member often treated other members disrespectfully or did not share the workload fairly. |
|--|--|---|--|

Time Management

- | | | | |
|---|--|--|---|
| • The group member completed assigned parts of the problem on time. | • The group member usually completed assigned parts of the problem and did not hold up progress on the problem due to incomplete work. | • The group member often did not complete parts of the problem on time and held up the completion of work for the group. | • The group member did not complete most of the assigned parts of the problem and often forced the group to make last minute adjustments to accommodate missing work. |
|---|--|--|---|



Pirates of the Pythagorean

Writing in Math Rubric



Mathematical Correctness:

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| • Demonstrates complete understanding of the mathematical concept. | • Demonstrates adequate understanding of the mathematical concept. | • Demonstrates partial understanding of the mathematical concept. | • Demonstrates unsatisfactory understanding of the mathematical concept. |
|--|--|---|--|

Language and Vocabulary:

- | | | | |
|---|---|---|---|
| • Skillful and accurate math vocabulary is utilized within the writing. | • Adequate and appropriate use of math vocabulary is utilized within the writing. | • Vague and weak use of math vocabulary is utilized within the writing. | • Ineffective or incorrect use of math vocabulary is utilized within the writing. |
|---|---|---|---|

Organization and Fluency:

- | | | | |
|---|---|---|--|
| • Writing is easy to follow after initial reading and all the following are incorporated: <ul style="list-style-type: none">• Clarify topic in introduction• Proper transitions are utilized• Elaborate paragraphs with supporting details• Appropriate word choice• Strong concluding sentence | • Writing is generally easy to follow after one reading and most of the following are incorporated: <ul style="list-style-type: none">• Clarify topic in introduction• Proper transitions are utilized• Elaborate paragraphs with supporting details• Appropriate word choice• Strong concluding sentence | • Writing is difficult to understand after one reading and limited use of the following are incorporated: <ul style="list-style-type: none">• Clarify topic in introduction• Proper transitions are utilized• Elaborate paragraphs with supporting details• Appropriate word choice• Strong concluding sentence | • Writing is very difficult to read and understand and none of the following are incorporated: <ul style="list-style-type: none">• Clarify topic in introduction• Proper transitions are utilized• Elaborate paragraphs with supporting details• Appropriate word choice• Strong concluding sentence |
|---|---|---|--|

Explanation

- | | | | |
|---|--|---|---|
| • Writing clearly translates computational strategies into written language with very limited use of numerals with no errors. | • Writing translates computational strategies into written language with some use of numerals with few errors. | • Writing translates some computational strategies into written language with the use of numerals and few errors. | • Writing translates some computational strategies into written language with the use of numerals and few errors. |
|---|--|---|---|