**Action Plan**

**Create a clear, detailed action plan that is fully replicable and addresses all aspects of a problem/prompt in an efficient way. This action plan should have labels/instructions for each step of the process, and include a rationale/justification for each step. Steps should be the creation/combination of equations or analysis applied to equations. Individual calculations or simplification of equations should be included in the “work” section, not listed as a new “Step.” See the example below:**

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| --- |
| **Step 1: Create optimization equation from constraint equations** |
| **Constraints**  **V = ½ b\*h\*L, V = 12b\*h**  **b = 2x**  **w2 = x2 + h2, 36 = x2 + h2**  **Substitution**  **h2 = 36 - x2**  **h = (36 - x2)½**  **Optimization Equation**  **V = 24x\*(36 - x2)½** |
| **Justification:** *The constraint equations give the equation for volume of the butterfly roof. In this case, half of the base (labeled as “x”) makes a right triangle with the width of the metal sheet and the height of the end of the roof. The Pythagorean Theorem links this “x” variable and height, which links base and height. By substituting this relationship in for height, the volume equation is given with only one variable (x).* |

**The single step above was a process to combine equations and constraints to develop one single optimization equation. You should outline the steps necessary to solve your problem before doing any calculations. This will then be checked by a peer to make sure your plan is solid enough for another student to agree on its success. There may be similarities between steps of different problems. You can start identifying steps below. Make copies of tables as needed.**

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| --- |
| **Step 1:** |
|  |
| **Justification:** |

|  |
| --- |
| **Step 2:** |
|  |
| **Justification:** |

**...**

|  |
| --- |
| **Step n:** |
|  |
| **Justification:** |

**Peer Check #1**

When your steps are identified, have another student look over them. The following questions should guide their feedback:

Do the constraint equations match the proposal diagram?

Are their any other relevant equations that might help?

Check the optimization equation. See if you can derive the same equation from the constraints. A small mistake here can snowball as calculus is introduced. Did you get the same result?

Do the Steps in the action plan make sense, given the value that needs to be optimized?

**Peer Check #2**

Once you have completed your calculations, you will receive additional feedback from another student before you write your analysis. These questions should guide their feedback:

Calculate the derivative of their optimization equation independently. Did you get the same result?

Do the critical points make sense? Do they seem to match the graph of the original optimization equation?

Is the identified extreme a maximum or minimum? How can you tell? Does this match the goal in the proposal?

Are their any critical points or values in either graph that don’t make sense, given the problem?