Mission Prime Mission Solutions

<u>Problem 1</u>

Drag the "Area of a Rectangle" tool to the Workbench.

Drag the solved for "A" formula to the Solution box: A=lw.

Drag the "Perimeter of a Rectangle" (three sides) tool to the Workbench.

Drag the constant "100m" to the solved for "P" formula.

Drag the solved for "l" formula to the Solution: l=-2w + 100.

Drag the "First Derivative" tool to the Solution.

Drag the " Find Critical Points " tool to the Solution.

Submit the Solution: w=25, l=50.

<u>Problem 2</u>

Drag the "Volume of a Rectangular Prism" tool to the Workbench.

Drag the constant "9m" to the solved for "h" formula.

Drag the solved for "V" formula to the Solution: V=9lw.

Drag the "Surface Area of a Rectangular Prism" tool to the Workbench.

Drag the constant "1000u" to the solved for "S" formula.

Drag the constant "10u" to the solved for "c" formula.

Drag the constant "6u" to the solved for "d" formula.

Drag the solved for "w" formula to the Solution: $w = -\frac{18l + 1000}{16l+18}$.

Drag the "First Derivative" tool to the Solution.

Drag the "Find Critical Points" tool to the Solution.

Submit the solution: l=6.860338, w=6.860338.

Problem 3

Drag the "Volume of a Cylinder" tool to the Workbench.

Drag the solved for "V" formula to the Solution: V=πhr².

Drag the "Similar Triangles" tool to the Workbench.

Drag the constant "10m" to the solved for "H" formula.

Drag the constant "6m" to the solved for "R" formula.

Drag the solved for "r" formula to the Solution.

Drag the "First Derivative" tool to the Solution.

Drag the "Find Critical Points" tool to the Solution.

Submit the solution: $F(h) = \frac{9}{25}\pi h^3 - \frac{36}{5}\pi h^2 + 36\pi h$.

Problem 4

Drag the "Pythagorean Theorem" tool to the Workbench.

Drag the constant 50m to the solved for "a" formula.

Drag the "Unit Cost" tool to the Workbench.

Drag the constant "7kg" to the solved for "L" formula.

Drag the constant "10kg" to the solved for "W" formula.

Drag the solved for "C" formula to the Solution: C=10c + 7l.

Drag the "Pythagorean Theorem" solved for "c" formula to the Solution: $c=(b^2 + 2500)^{\frac{1}{2}}$.

Drag the "Distance Between Structures" tool to the Workbench.

Drag the constant "100m" to the solved for "T" formula.

Drag the solved for "b" formula to the Solution: b=-l+100.

Drag the "First Derivative" tool to the Solution.

Drag the "Find Critical Points" tool to the Solution.

Submit the solution: l=50.9902, c=70.01401.