Unit 1 Problem: Design a Play Structure

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Due Date:\_\_\_\_\_\_\_\_\_\_

**Outcomes:**

**N9.3**

Extend understanding square roots to include the square root of positive rational numbers.

**SS9.2**

Extend understanding of area to surface area of right rectangular prisms, right cylinders, right triangular prisms, and composite 3-D objects.

**Problem:**

Your role is to imagine yourself as a designer for a major toy company. Your task is to design a light-weight play structure for young children constructed entirely of nylon fabric and fibreglass poles (similar to a tent).

**Design Constraints / Cost Appropriateness:**

* Your design can onlyinclude the following shapes: **cylinders, rectangular prisms, and triangular prisms**.
* There must be **4 or more** shapes attached face-to-face to create the structure. There must be **1 cylinder, 1 rectangular prism** and **1 triangular prism**. The **fourth shape is your choice** and can be any one of these.
* Cylinders and entryways need to be **large enough** to safely accommodate a small child.
* You may include **windows** if you so wish.
* The **floor** of the structureneeds to be **covered in fabric**.
* Your design needs to be visually appealing for small children and must include **each of the three colours of fabric**.
* Your design must be **cost appropriate**, so keep the size reasonable.

**Cost of materials and labour:**

* Red fabric: $5/m2
* Yellow fabric: $6/m2
* Blue fabric: $7/m2
* Straight fibreglass poles as the skeleton of the structure: $3/m
* Flexible fibreglass circular supports at the ends of each cylinder and every 1 m for reinforcement: $4/m
* These costs include all production and labour costs to sew and assemble your play structure.

\*\*Remember you will be able to eliminate open areas or ‘shared’ when calculating the material to cover surface area\*\* Think back to composite shapes

**You must hand in:**

1. A **written report** with the following headings:

* + *Diagrams of My Play Structure*
		- Show two different views of your structure using graph paper (or Microsoft word) and proper measurements (don’t forget to colour your fabrics)
	+ *Description of My Play Structure*
		- Explain why you choose these shapes for the structure. Examples of areas to include:
			* What are the unique features of your structure?
			* Why did you include them?
			* How is your design reasonable in terms of cost?

2. Complete the included chart to show all dimensions as well as area and cost calculations.