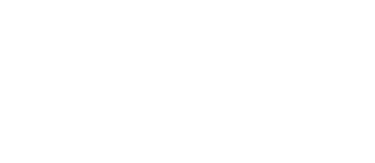
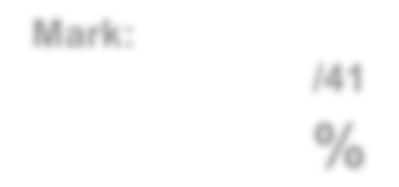
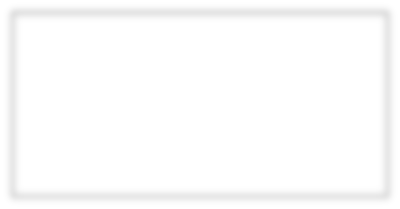
**BALDIVIS SECONDARY COLLEGE**

** Methods Units 1 and 2**

**2021 - Investigation 2**



**Mark:**

**/26**

**%**

Student Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Time allowed for this task:** Handout – Monday 23rd August 2021 (Week 6 Term 3)

Due – Friday 24th September 2021 (Week 10 Term 3)

**Materials required:** **Take-home section** (30 marks)

Standard writing equipment

SCSA Formula Sheet

**Other materials allowed:** Drawing templates

**Marks available:** **26 marks**

**Task Weighting: 4%**

**This is NOT a small task that can be completed in under 2 hours. Do not leave this assessment to the last minute. As all of the assessment can be completed at home, and you have been given 5 weeks to complete and submit, Senior School Assessment policy will be rigorously applied. Any extensions MUST be received a minimum of 7 days prior to the deadline with a valid reason.**

**The marking rubric will not be provided until all tasks have been submitted, however, you may refer to the grade descriptions provided in the SCSA Syllabus document on pages 17 - 19 (a hard copy was provided at the beginning of term and a further copy can be located on Connect in Content: Course Outline).**

A picture containing text

Description automatically generatedEsther is entering a bridge design competition. Her design has a frame of thick steel beams, connected to the bridge by vertical steel cables spaced at regular intervals. The bridge, frame, and **some** of the cables are shown in Diagram 1, (not to scale).

This assessment activity requires you to use **only** sequences and series to investigate the amount of cabling needed.

**Task 1: Bridge Design 1**

On the left part of the bridge, the first cable is 3.5m, and each subsequent cable is 1.75m longer than the previous one. The longest cable is the 11th cable. After this, the length of each cable is 55% of the previous cable’s length. The cabling comes on spools of 100m.

Esther needs to know:

* The length of the longest cable.
* How many of the first few cables could be cut before the first spool runs out.
* How many cables there will be in the second part of the bridge (from the 11th cable onwards) if all the cables are to be at least 1m long.
* The total amount of cabling needed for both parts of the bridge.

**Task 2: Bridge Design 2 (You can decide)**

Esther later decides to alter **Bridge Design 1**. She decides that the shortest cables at the left end should be **5m**, and the longest cable should be (**252**)m. The total sum of the cables should be (**2505**)m. Ensure that the left and right parts from the longest cable have different patterns (constant or proportional change).

Use the above information to devise a new bridge design ensuring to show that the above said conditions are met for Esther.

**Requirements**

**Bridge Design 1**

* Answer all questions which Esther needs to know in Bridge Design 1

**Bridge Design 2**

Your report format should include the following:

* An outline of the task and any assumptions that you make.
* You need to give details for your **Bridge Design 2**. Any sequences used must be clearly described with correct mathematical terms to analyse and interpret your results mathematically.
* Conclusion: The quality of your discussions and reasoning, in particular with respect to any decisions and assumptions that you make will determine your overall mark in this section.

**END OF ASSESSMENT**