# Mathematics Standard Year 11

# Sample Assessment Task Measurement

## Applications of Measurement: Parking for Fun

***Sample for implementation for Year 11 from 2018***

### Context

Students have engaged in learning for the topic, Applications of Measurement. They have participated in activities to develop knowledge of the concepts of measurement, and skills to solve a variety of problems.

Students will require approximately three hours of independent preparation, including time during class to discuss the notification and task requirements.

The task notification includes two parts:

* Part A will be handed out with the notification
* Part B and the associated marking criteria will be issued to students on the day they sit for the task.

### Notes to teacher

Throughout the development of Part A, teachers should monitor authorship and the progress of student work.

Part B is a test to be completed in class time and is to be issued on the due date, with the related marking criteria. Part A will be submitted on the same day.

Students should be given some reading time before beginning to write their response so that they have time to understand the scope of the task.

When student feedback is provided after marking, there will be opportunity to discuss the challenges of the task with the class and consider future learning activities to assist student learning.

The marking guidelines provided at the end of this document illustrate an approach for how marks may be allocated to student responses. Discuss the marking guidelines with students as part of the feedback provided upon completion of the task.

# Applications of Measurement – Parking for Fun

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| Task 2 | Weighting: 30% | Timing: Term 2, Week 3 |
| Outcomes assessed  * solves problems involving quantity measurement, including accuracy and the choice of relevant units MS11-3 * performs calculations in relation to two-dimensional and three-dimensional figures MS11-4 * uses appropriate technology to investigate, organise and interpret information in a range of contexts MS11-9 * justifies a response to a given problem using appropriate mathematical terminology and/or calculations MS11-10 | | |
| Nature of the task This assignment involves the use and application of measurement to solve practical problems associated with changing car parking arrangements for a leisure centre. It comprises two parts:   * Part A is attached to this notification. You are required to complete it independently, in your own time. * Part B of the task will be completed in class under the supervision of your classroom teacher on the due date. * Part A of the assignment will be submitted on the day you complete Part B in class. | | |
| Marking criteria You will be assessed on how well you:   * accurately solve a variety of problems based on the scenario * select and use appropriate mathematical processes, technologies and language to investigate, organise and interpret calculations * provide reasoning and justification related to the solved problems. | | |
| Feedback provided  * The teacher will provide feedback outlining strengths and areas for improvement to build on knowledge, understanding and skills for future learning | | |

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| Student Name: | | | |
| Parking for Fun | | | |
| A local community group is planning to make changes to the parking arrangements at their leisure centre.  They have provided the following plan of the car park design.   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | ENTRANCE & EXIT |  |  |  |  |  | L  E  I  S  U  R  E | | | | C  E  N  T  R  E | | | | |  |  |  |  |  |  | CLEARWAY |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  | CLEARWAY |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | FENCE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | 66 000 mm |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | CLEARWAY |  |  | |  |  |  | |  |  |  | CLEARWAY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | CLEARWAY | |  | 30 000 mm |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | FENCE |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  | CLEARWAY |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  | |  |  |  |  |  |  |  |  |  |  | FENCE |  |  |  |  |  |  |  |  |  | |  |  |  | |  | 60 000 mm | | | | | | | | | | | | | | | | | | | |  |  |  |   12 m   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  |  |  |  | | | | |
| Part A – 20 marks Understanding, Fluency and Communication | | | Marks |
| 1. | Using the *Parking for Fun* design given, complete the questions below: | |  |
|  | 1. In the plan what is the maximum number of cars that can be accommodated? |  | **½** |
|  | 1. If each car is allowed 2 squares on the plan, how many square metres does this allow for each car? |  | **1** |
|  | 1. What is the area in square metres of: 2. the car parking spaces? |  | **1** |
|  | 1. the clearways? | | **2** |
| 2. | Because of increased patronage it is necessary to increase the number of parking spaces. Re-draw the car park (on A3 paper) to hold **at least 95** car parking spaces, given the following guidelines:   * The minimum clearway width is 6000 mm * The minimum car park length is 6000 mm and the minimum car park width is 3000 mm. * There are to be 3 spaces for disabled persons with a minimum width of   4000 mm each.   * The Entrance/Exit clearway is to remain in the current position and have a width of 12 000 mm. All other clearways to a minimum of   6000 mm.   * No Dead-End Clearways are allowed. This means that no car should have to reverse or U-turn to exit. * Draw your improved car-park design to a scale of 1:250.   **Note:** The parking bays need to be numbered and the disabled bays specially labelled. | | **8** |
| 3. | On a separate piece of A4 paper answer the following questions. You must show all working*.* | |  |
|  | 1. Write down the number of car park spaces your redesigned car park now holds. | | **½** |
|  | 1. Calculate for your new car park: 2. the total area of all car parking spaces 3. the area of the clearways. | | **4** |
|  | 1. Government regulations stipulate that the average depth of concrete must be 200mm. Calculate the volume in cubic metres of the concrete in the car park. | | **3** |
| Parking for Fun | | | |
| Part B – 20 marks Problem Solving, Reasoning and Justification **Note:** In both questions show all working including justification for your reasoning. | | | Marks |
| 1. | A 4 litre can of car park paint will cover an area of 10 m2.  Calculate the number of paint tins required to  10 cm wide  6 m  paint the parking lines on your car park if the  length of each car park line is 6 m and the  width of the painted line is 10 cm.  **NB:** Assume there is no overlap in paint  occurring at the intersections here: | | **8** |
| 2. | The community group decide to resurface the leisure centre car park with pavers that are 22 cm long, 10 cm wide and 5 cm thick.  What is the minimum number of pavers required to surface the car park?  Include any diagrams that may be useful in describing the pattern with which the pavers will be laid. | | **12** |

**End of task**

### Marking guidelines

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| Part A – Understanding, Fluency and Communication | | Marks |
| 1. | 1. Correct answer | **½** |
|  | 1. Correct answer supported by a correct calculation | **1** |
|  | 1. (i) Correct answer supported by a correct calculation | **1** |
|  | (ii) Correct number of squares | **1** |
|  | (iii) Correct answer supported by a correct calculation | **1** |
| 2. | One mark for evidence that each of the following conditions have been met:   * A minimum of 95 bays, clearly numbered and labelled * Correct number of disabled parking bays * Correct width of clearway * Correct minimum car space length and width * Correct Entrance/Exit clearway * No Dead-End Clearways * Correct scale of 1:250 * Correct overall size | **8** |
| 3. | 1. Correct number of car parks | **½** |
|  | 1. (i) Correct calculation of area of all regular bays   Correct calculation of area of disabled bays | **1**  **1** |
|  | (ii) Correct calculation of total area of car park  Correct subtraction of area of parking bays  AND  correct use of units  OR  a subtraction of incorrect areas AND correct use of units  (Note: Other methods with justification are acceptable) | **1**  **1** |
|  | 1. Correct conversion to consistent units   Correct answer for volume supported by a correct calculation  OR a correct attempt to calculate volume using inconsistent units  Correct indication of units of volume | **1**  **1**  **1** |

**Part A Total: 20 marks**

##### Part B Question 1 – Problem Solving, Reasoning and Justification

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| --- | --- |
| A student: | Mark range |
| * demonstrates a thorough understanding of the mathematics involved in solving the problem * uses appropriate mathematical processes in solving the problem without error * communicates in a concise and systematic manner and justifies conclusions using appropriate mathematical language, notation and symbols | **7–8** |
| * demonstrates understanding of the mathematics involved with appropriate calculations with either a minor arithmetic or calculation error OR all mathematical calculations have been carried out without error but the final conclusion is incorrect * communicates in a concise and systematic manner and justifies conclusions using some mathematical language, notation and symbols | **5–6** |
| * demonstrates progress towards a solution with some error * demonstrates a limited understanding of what it means to work mathematically with some use of mathematical language, notation and/or symbols | **3–4** |
| * demonstrates a limited understanding of the mathematics involved in solving the problem * limited use of mathematical language | **1–2** |

##### Part B Question 2 – Problem Solving, Reasoning and Justification

|  |  |
| --- | --- |
| A student: | Mark range |
| * demonstrates a thorough understanding with full workings of the mathematics involved in solving the problem without error * clearly understands and uses appropriate mathematical processes with no errors or only one or two minor arithmetic errors * communicates in a concise and systematic manner and justifies conclusions using appropriate mathematical language, notation and symbols | **10–12** |
| * demonstrates understanding with appropriate calculations with either a minor calculation error OR all mathematical calculations have been carried out without error but the final conclusion is incorrect * demonstrates a sound understanding and uses appropriate working mathematically processes * communicates in a concise and systematic manner and justifies conclusions using some mathematical language, notation and symbols | **7–9** |
| * demonstrates progress towards a solution with some error * demonstrates a limited understanding of what it means to work mathematically with some use of mathematical language, notation and/or symbols | **4–6** |
| * demonstrates a limited understanding of the mathematics involved in solving the problem * limited use of mathematical language | **1-3** |

**Part B Total: 20 marks**