Unit 3

Essential Investigation #3

Ramps

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| **Name** | **Solutions** |

1. The size of the angle of inclination θ of the ramp in Diagram 1 is 2.9° to one decimal place. Compare the size of this angle to the angle of inclination α of the ramp in Diagram 2.

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| **Solution** | | | |
|  | The angle of inclination is bigger in the second diagram by 1.2°. | | |
| **Specific behaviours** | | **Marks** | **Rating** |
| Uses the correct ratio to determine size of the other angle | | 1 | simple |
| Determines the size of the angle | | 1 | simple |
| Compares the two angles | | 1 | simple |
| **Total** | | **/3** |  |

1. If a ramp with the minimum gradient is needed to reach a height of 60 cm, how long would the ramp need to be?

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| **Solution** | | | |
|  | The ramp would need to be 11.86 m long. | | |
| **Specific behaviours** | | **Marks** | **Rating** |
| Uses the correct ratio | | 1 | simple |
| Calculates the length of the ramp | | 1 | simple |
| Assigns correct units | | 1 | simple |
| **Total** | | **/3** |  |

1. A planner wants to decide the most appropriate horizontal length to be taken up by a ramp leading to the entrance of a building. The ramp needs to reach a vertical height of 0.6 m. Compare the length of the horizontal distance of the two ramps, one with minimum slope and one with maximum slope.

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| **Solution** | | | |
|  | Length of horizontal for the minimum slope    Length of horizontal for the maximum slope    The ramp with the minimum slope would take up 3.47 m more than the ramp with the greatest slope. | | |
| **Specific behaviours** | | **Marks** | **Rating** |
| Determines the horizontal distance for one ramp | | 1 | simple |
| Correctly determines the horizontal distance for both ramps | | 1 | simple |
| Writes a correct concluding statement | | 1 | simple |
| Writes a correct concluding statement referring to results of calculations | | 1 | complex |
| **Total** | | **/4** |  |

1. Would either of the ramps in question 3 need to include a level landing to comply with the Building Code of Australia? Explain your answer.

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| --- | --- | --- | --- | --- |
| **Solution** | | | | |
|  | Or |  | | |
| Slant length for the steepest ramp is 8.39 m  Slant height for the other ramp is 11.86 m  A level landing only needs to be included for the ramp with the minimum slope. | | | |
| **Specific behaviours** | | | **Marks** | **Rating** |
| Identifies the slant length is involved in the comparison | | | 1 | complex |
| Identifies the slant length of the ramp from question 2 | | | 1 | complex |
| Chooses an appropriate method to determine the slant length of the steepest ramp | | | 1 | simple |
| Determines the slant length of the steepest ramp | | | 1 | simple |
| Links results of previous calculations to make a comparison | | | 1 | complex |
| States the conclusion | | | 1 | simple |
| **Total** | | | **/6** |  |