Australian Curriculum Year 8 Mathematics Sample assessment | Student booklet

Pete’s Paving

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| *9144637_l_cover* |
| Image: *Stock Photo - The walk way surface of concrete blocks*, 123RF stock image 9144637, [www.123rf.com/photo\_9144637\_the-walk-way-surface-of-concrete-blocks.html](http://www.123rf.com/photo_9144637_the-walk-way-surface-of-concrete-blocks.html) |

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| To use algebraic equations and graphs to simplify paving quotes, and to apply and evaluate the methods used. |
| **You will:**   * develop methods to calculate materials and costs quickly and accurately * compare methods * prepare a quote for providing an area of paving. |

# Setting the scene

The owners of Pete’s Paving have decided to update their manual.

They have decided to develop some **reckoners** to quickly and accurately calculate the amount of materials and costs for different jobs, such as building a path or outdoor area.

These reckoners will be used when preparing quotes for customers.

## Section 1. Material reckoners

A **material reckoner** is used to calculate quickly and accurately the number of pavers or the length of timber edging needed for different-sized jobs, without drawing a diagram.

1. Complete Reckoners A and B for Design 1 — Straight path.

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| --- | --- |
| **Design 1 — Straight path** | * 1 m wide, using 500 mm x 500 mm pavers * pavers held together by timber edging |
| Diagram1 | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Reckoner A** | **Number of pavers for Design 1 — Straight path** | | | | | |
| Length of path in metres (l) | 1 | 2 | 3 | 4 | 5 | 20 |
| Number of pavers (n) | 4 |  |  |  |  |  |
| To find the number of pavers from the length of the path without drawing a diagram, you can: | | | | | | |
| Equation: | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Reckoner B** | **Length of timber edging for Design 1 — Straight path** | | | | | |
| Length of path in metres (l) | 1 | 2 | 3 | 4 | 5 | 20 |
| Length of timber edging in metres (e) | 4 | 6 |  |  |  |  |
| To find the length of timber edging from the length of the path without drawing a diagram, you can: | | | | | | |
| Equation: | | | | | | |

1. Complete Reckoners C and D for Design 2 — Square area.

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| --- | --- |
| **Design 2 — Square area** | * square area using 500 mm x 500 mm pavers * pavers held together by timber edging |
| Diagram2 | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Reckoner C** | **Number of pavers for Design 2 — Square area** | | | | |
| Side length in metres (s) | 1 | 2 | 3 | 4 | 20 |
| Number of pavers (n) | 4 |  |  |  |  |
| To find the number of pavers from the side length of a square area without drawing a diagram, you can: | | | | | |
| Equation: | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Reckoner D** | **Length of timber edging for Design 2 — Square area** | | | | |
| Side length in metres (s) | 1 | 2 | 3 | 4 | 20 |
| Length of timber edging in metres (e) | 4 |  |  |  |  |
| To find the length of timber edging from the side length of a square area without drawing a diagram, you can: | | | | | |
| Equation: | | | | | |

## Section 2. Quote reckoners

A **quote reckoner** is used to calculate quickly and accurately the costs for different jobs.

Pete’s Paving charges the following when costing work:

|  |  |  |
| --- | --- | --- |
| **Item** | **Description** | **Cost** |
| Pavers | 500 mm x 500 mm | $12 each |
| Timber edging | sold per metre | $1.70 per metre |
| Delivery costs | delivery of materials incurs a fixed charge | $132 |
| Labour | includes preparing the base and timber edging | $10.50 per paver |

1. Using the equations from Question 1, formulate a single linear equation that describes how to calculate the cost (c) of the work from the length (l) of the straight path.
2. Draw a line graph for the cost of a straight path using the linear equation from Question 3.

* Show your working.
* Label your graph “Reckoner E: Cost for Design 1 — Straight path”.

1. Rule straight lines on the graph to show how to find the cost of a path 15 metres long.
2. Reading from the graph, what is the cost of a 15-metre path?
3. Use a strategy to check your answer to Question 6.

* Hint: Look at your answers to previous questions.
* Show your working.

1. The owners of Pete’s Paving have decided to include just one method for calculating the cost of straight paths in the manual.
   1. Which method would you recommend they use?   
      (Hint: Look at your answers to questions 3 to 6 before answering.)
   2. Give two reasons for recommending this method.   
      In your answer, suggest ways it is better than the other methods considered.
   3. Describe any disadvantages there could be to using this method.

## Section 3. Mrs Kent’s quote

Mrs Kent wants the following paving work carried out on her property (shown on page 6):

* a square, paved BBQ area in the back corner
* a path from the house to the BBQ area (Path 1)
* a path from the house to Solitude St (Path 2)
* timber edging around the outside of paved areas and paths. (Note that this means there is no timber edging where a path connects to another paved area or to the house.)

A plan for the work required is included in the diagram overleaf.

1. Prepare a quote for Mrs Kent, in a format like the one below.

* Use one or more of the reckoners you developed in Sections 1 and 2.
* Show all working.



**Pete’s Paving**

1. What modifications did you need to make when using the reckoners to calculate the materials needed for Mrs Kent’s property?

