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| Name: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | Date:*\_\_\_\_\_\_\_\_\_\_* |
| Description: pact jpg1 | **Maths Specialist Unit 2, Investigation 4– 2015**  **Powers of Matrices** | | | |  |
| **Important Information:**  *Although the take-home component is not worth any marks, it is essential in preparation for the in-class component. Knowledge and skills gained will be extended in the in-class validation component. This in-class validation will be completed under test conditions on the day in which this take-home component is due. The take-home component may be used when completing the in-class component. Contact may be made to parent(s) if the take-home component is not available for submission (at the start of the lesson).* | | | | | |
| **Date out:** | | *Week \_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_* | **Date Due:** | *Week \_\_\_\_ Date \_\_\_\_\_\_\_\_\_* | |
| **Take home component weighting:** | | *5% of the year* | **In-class component weighting:** | *% of the year.* | |
| **AIM:** *In this assessment, you will be investigating the language and*  *power of the matrix.* | | | | | |

**In-class investigation**

**Question 1** **(3 marks)**

(a) Given *M* = , investigate *M n* where n is an integer power of the matrix.

State *M n*. (1)

(b) Investigate expressions for  and hence write down an expression for  (2)

**Question 2** **(4 marks)**

Investigate *M n* and hence determine an expression for *M n* given

(a) *M* =  (2)

(b) *M* =  (2)

**Question 3** **(3 marks)**

Determine an expression for *M n* given *M* = 

**Question 4** **(3 marks)**

(a) Investigate an expression for *M n* given *M* =  (2)

(b) Use the answer to (a) to express  as a power of *M*. (1)

**Question 5** **(8 marks)**

(a) Investigate an expression for *M n* given *M* =  (6)

(b) Predict . Explain your prediction. (2)

**Question 6** **(2 marks)**

Given *S* =  show that *S-1* = - *S*

**Question 7** **(7 marks)**

*M* is defined as . Given the values of *M n* in the table below, justify the rules described below (for **either** *n* an even number or *n* an odd number). Hence evaluate *a* and *b*

 

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**Question 7 (continued)**

**End of questions**