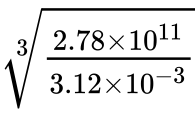
# 1.8 Use of technology to solve systems of linear equations and polynomial equations\_P\_1

**1a.** *[2 marks]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

**OR**     ***(M1)***

**Note:**     Award ***(M1)*** for correct substitution into given expression.

44664.59503     ***(A1)***     ***(C2)***

**Note:**     Award ***(A1)*** for a correct answer with at least 8 digits.

Accept 44664.5950301.

***[2 marks]***

**1b.** *[1 mark]*

## Markscheme

44664.60     ***(A1)*(ft)*****(C1)***

**Note:**     For a follow through mark, the answer to part (a) must be to at least 3 decimal places.

***[1 mark]***

**1c.** *[1 mark]*

## Markscheme

44700     ***(A1)*(ft)*****(C1)***

**Notes:**     Answer to part (a) must be to at least 4 significant figures.

Accept any equivalent notation which is correct to 3 significant figures.

For example  or .

Follow through from part (a).

***[1 mark]***

**1d.** *[2 marks]*

## Markscheme

     ***(A1)*(ft)*(A1)*(ft)**     ***(C2)***

**Notes:**     Award ***(A1)*(ft)** for 4.47 and ***(A1)*(ft)** for .

Award ***(A0)(A0)*** for answers such as .

Follow through from part (b)(ii) **only**.

***[2 marks]***

**2a.** *[2 marks]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

i)           ***(A1)***

ii)              ***(A1)*(ft) *(C2)***

**Note:** Follow through from part (a)(i).

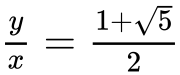
**2b.** *[1 mark]*

## Markscheme

         ***(A1)     (C1)***

**2c.** *[1 mark]*

## Markscheme

  **OR**  **OR** equivalent         ***(A1)    (C1)***

**Note:** Accept   their part (a)(i) or (a)(ii).

**2d.** *[2 marks]*

## Markscheme

 or eqivalent                ***(M1)***

          ***(A1)*(ft) *(C2)***

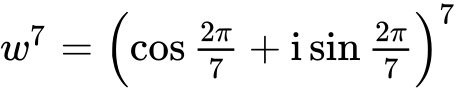
**Note:** Award ***(M1)*** for substituting their part (c) into their equation from part (b). Follow through from parts (a), (b) and (c). Use of  gives 

**3a.** *[3 marks]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

**EITHER**

    ***(M1)***

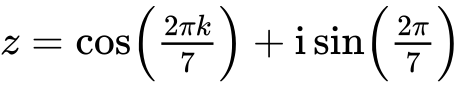
    ***A1***

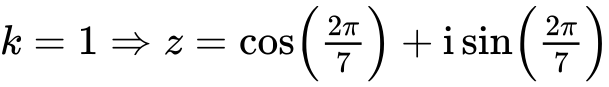
    ***A1***

so  is a root     ***AG***

**OR**

    ***(M1)***

    ***A1***

    ***A1***

so  is a root     ***AG***

***[3 marks]***

**3b.** *[3 marks]*

## Markscheme

(i)     

    ***M1***

    ***A1***

(ii)      and      ***R1***

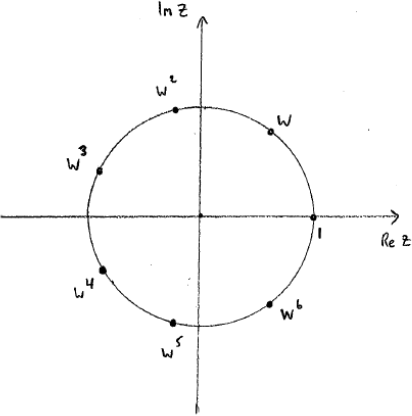
so      ***AG***

***[3 marks]***

**3c.** *[3 marks]*

## Markscheme

the roots are  and 



7 points equidistant from the origin     ***A1***

approximately correct angular positions for  and      ***A1***

**Note:** Condone use of *cis* notation for the final two ***A*** marks.

**Note:** For the final ***A*** mark there should be one root in the first quadrant, two in the second, two in the third, one in the fourth, and one on the real axis.

***[3 marks]***

**3d.** *[10 marks]*

## Markscheme

(i)     

    ***A1***

since  and      ***R1***

    ***AG***

(ii)      (using sum of roots (or otherwise))     ***(M1)***

    ***(A1)***



    ***A1***

 (using product of roots (or otherwise))     ***(M1)***



**EITHER**

    ***A1***

    ***M1***

    ***(A1)***

**OR**

    ***A1***

    ***M1***



    ***(A1)***

**THEN**

    ***A1***

***[10 marks]***

**4a.** *[1 mark]*

## Markscheme

(or equivalent)     ***(A1)     (C1)***

**4b.** *[4 marks]*

## Markscheme

     ***(A1)(A1)*(ft)**

**Note:** Follow through from part (a) and part (b), irrespective of working shown.

     ***(M1)***

**Note:**Award ***(M1)*** for substitution of their , their  and 40 into equation.

     ***(A1)*(ft)     *(C4)***

**Note:** Follow through, within **part (c)**, from their  and  only if working shown.

**5a.** *[1 mark]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

5     ***(A1)     (C1)***

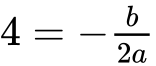
***[1 mark]***

**5b.** *[3 marks]*

## Markscheme

*at least one of the following equations required*





     ***(A2)(A1)     (C3)***

**Note:**Award ***(A2)(A0)*** for one correct equation, or its equivalent, and ***(C3)*** for any two correct equations.

     Follow through from part (a).

     The equation  earns no marks.

***[3 marks]***

**5c.** *[2 marks]*

## Markscheme

     ***(A1)*(ft)*(A1)*(ft)     *(C2)***

**Note:**Follow through from their equations in part (b), but only if their equations lead to unique solutions for  and .

***[2 marks]***

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