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**CHURCHLANDS SENIOR HIGH SCHOOL**

**MATHEMATICS SPECIALIST 3, 4 TEST ONE 2017**

**Calculator Section**

**Chapters 1, 2,**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Time: 40 minutes**

**Total: 36 marks**

1. [5 marks:3,2]

a) State the complex relationship represented by the shaded region.



b) Sketch the following regions in the complex plane.



2. [3 marks]

If , find expressing your answer in exact polar form.

3. [6 marks]

Find the 4 fourth roots of -4 in the form where and You need to show evidence of having used De Moivre’s theorem to gain full marks.

4.[10 marks: 2,5,3]

a) State the exact value of in Cartesian form.

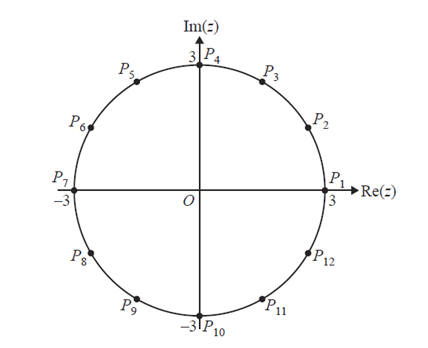
b) Hence, determine exact values for all the roots of

c) Sketch all the solutions from your answer above on the Argand diagram below.



5.[3 marks]

On the argand diagram below, the 12 points p1, p2, p3, …p12 are evenly spaced around the circle of radius 3.



Find the points which represent complex numbers such that

6.[3marks]

Consider .

Given , factorize over .

7. [6marks:3,3]

a) Sketch in the complex plane the region defined by .



b) Determine in polar form , , the complex number that satisfies

and has the minimum argument.