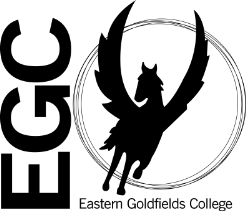
**

**MATHEMATICS:**

**SPECIALIST 1 & 2**

**SEMESTER 2 2017**

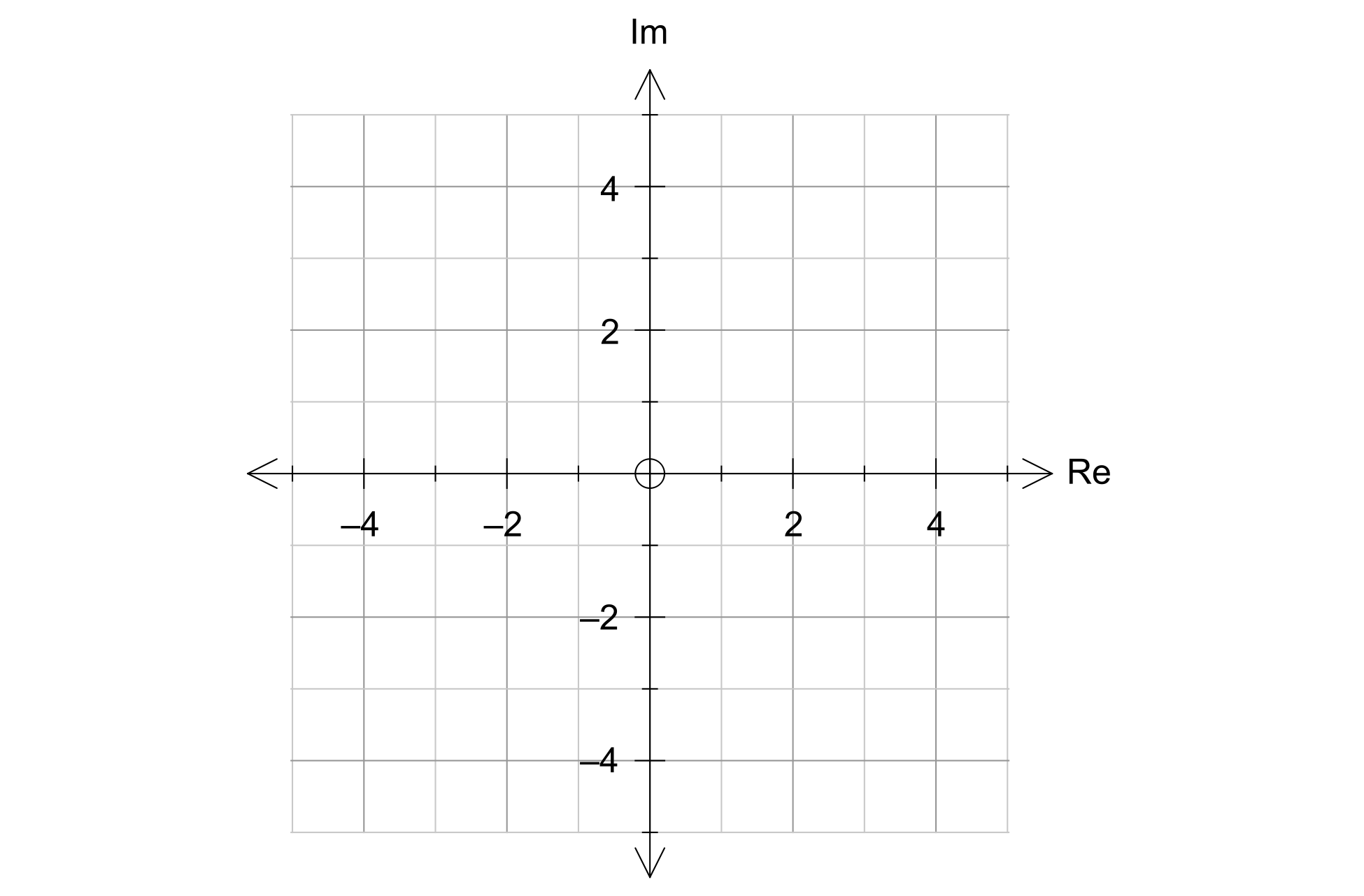
**TEST 6**

Reading Time: 4 minutes

Time Allowed: 51 minutes Total Marks: 51

**1.** [1, 1, 1 marks]

Given that , plot (and label) the following points on the Argand diagram below.

(a) (b) (c)

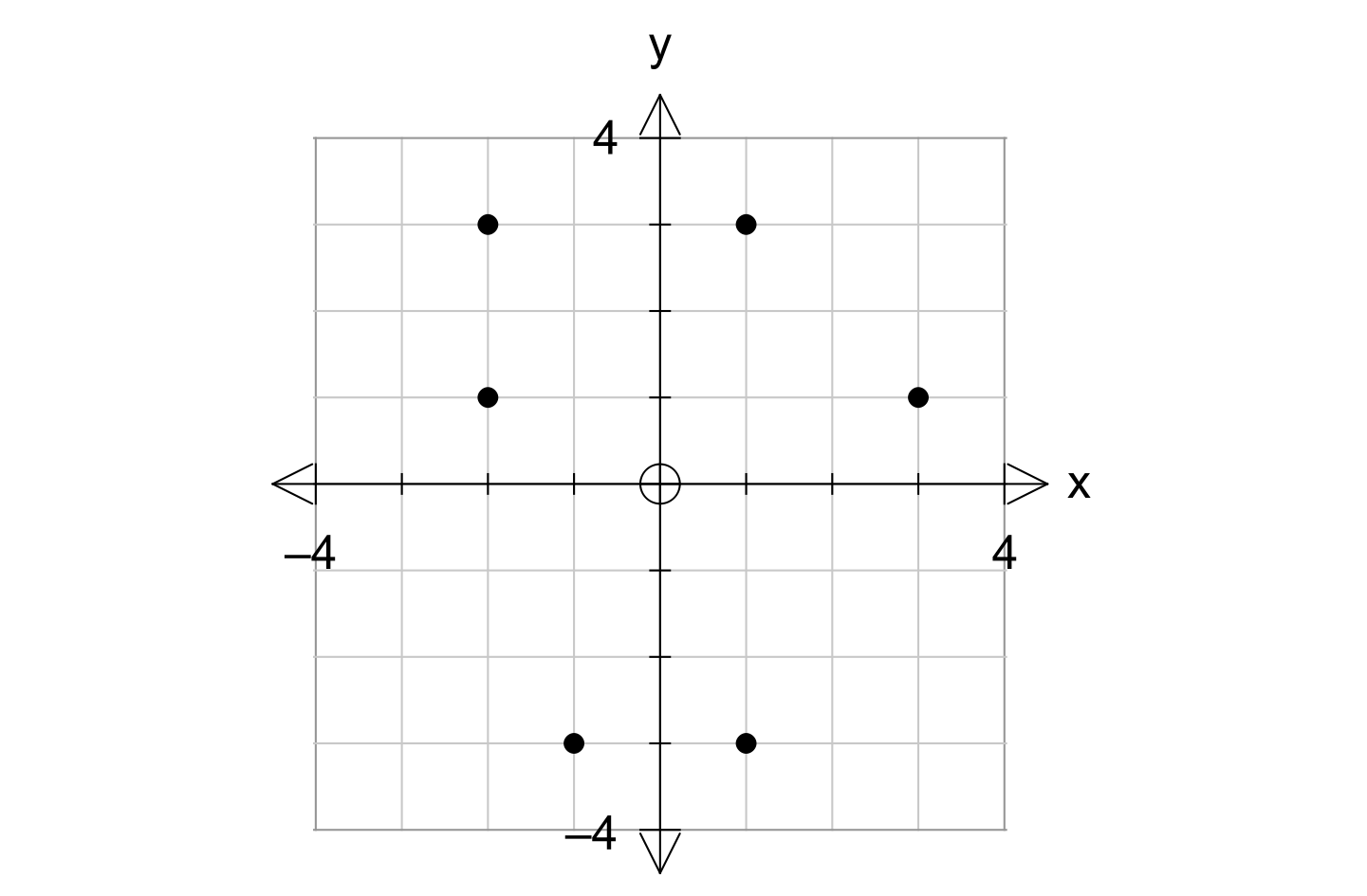
**2.** [3 marks]

The transformation matrix is such that it doubles the area of any shape that it transforms.

Determine the value(s) of .

**3.** [4 marks]

The Argand diagram on the right shows six complex numbers, and . Four complex numbers, and have the following information known about them.



Complete the table below by allocating one of and to each of the complex numbers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Complex Number |  |  |  |  |
| Point |  |  |  |  |

**4.** [4 marks]

The points and are transformed to the points and by the matrix . Determine .

**5.** [5 marks]

By considering two rotations of angle about the origin, prove the following identities:

and

**6.** [5 marks]

Determine the equation of the image line formed when all points on the line are transformed by the matrix .

**7.** [3, 3 marks]

(a) Determine the value of the real constants and if is a solution of the equation .

(b) Determine the complex solutions to the equation:

**8.** [6 marks]

Let and be complex numbers such that and .

Determine and in the form , where .

**9.** [1, 2, 2, 3 marks]

Given that and , determine

(a) (b)

(c) (d) in the form

**10.** [2, 3, 2 marks]

A triangle has vertices , and .

(a) Triangle is transformed to , and . Describe this transformation geometrically and state the matrix that will transform to .

Triangle is dilated by a scale factor of parallel to the -axis and then rotated clockwise about the origin to form triangle .

(b) Determine the single matrix that will transform to .

(c) Determine the single matrix that will transform back to

.