**

**MATHEMATICS:**

**SPECIALIST 1 & 2**

**SEMESTER 2 2018**

**TEST 6 - Calculator Free**

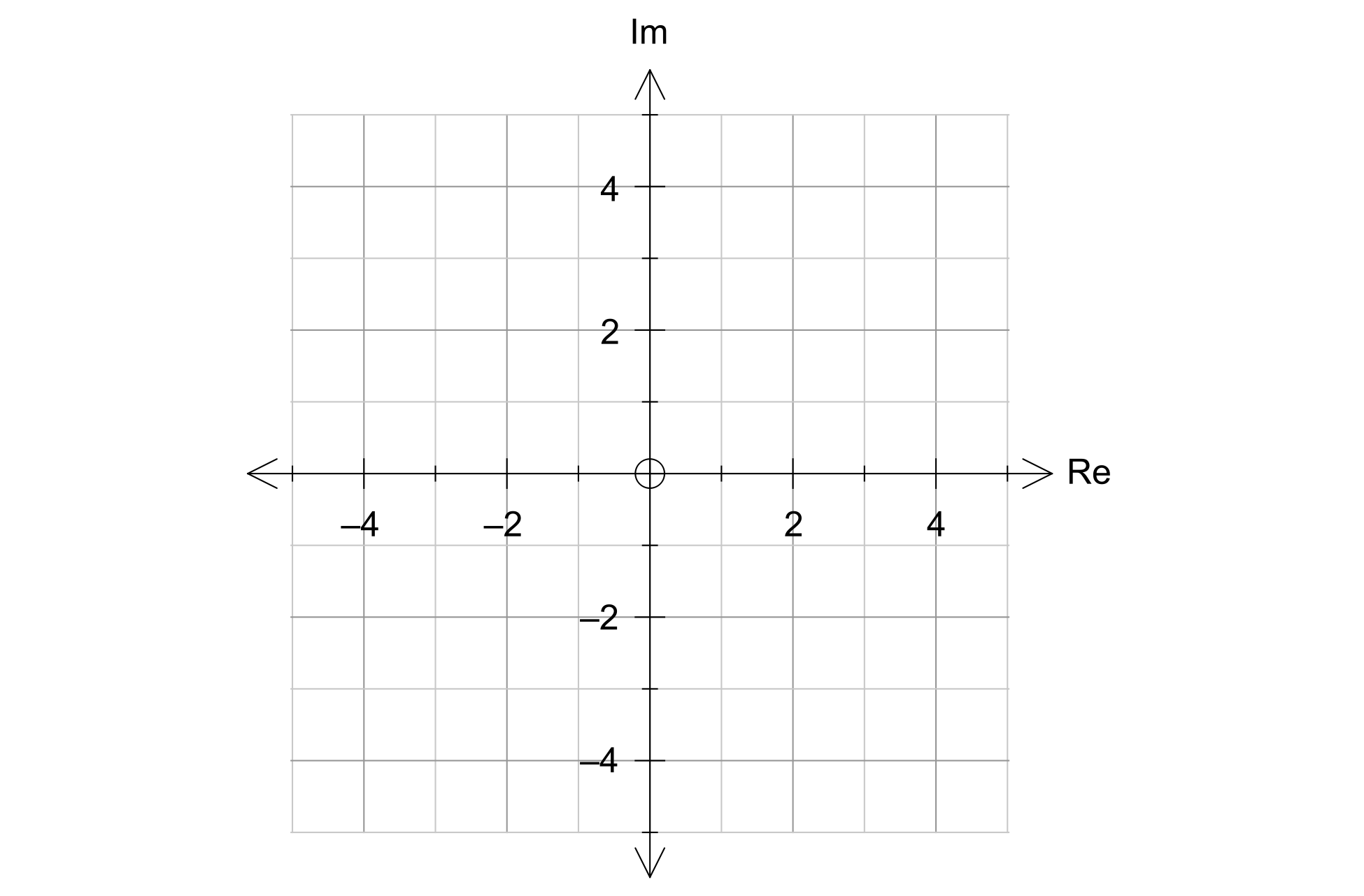
Reading Time: 2 minutes

Time Allowed: 18 minutes Total Marks: 18

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

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

(a) (b) (c) (d)



**2.** [3 marks]

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

Determine the value(s) of .

**3.** [1, 5, 4 marks]

(a) One factor of is . State the second factor.

(b) Solve the following quadratic equations.

(i)

(ii)

(c) Determine the complex number , given that .

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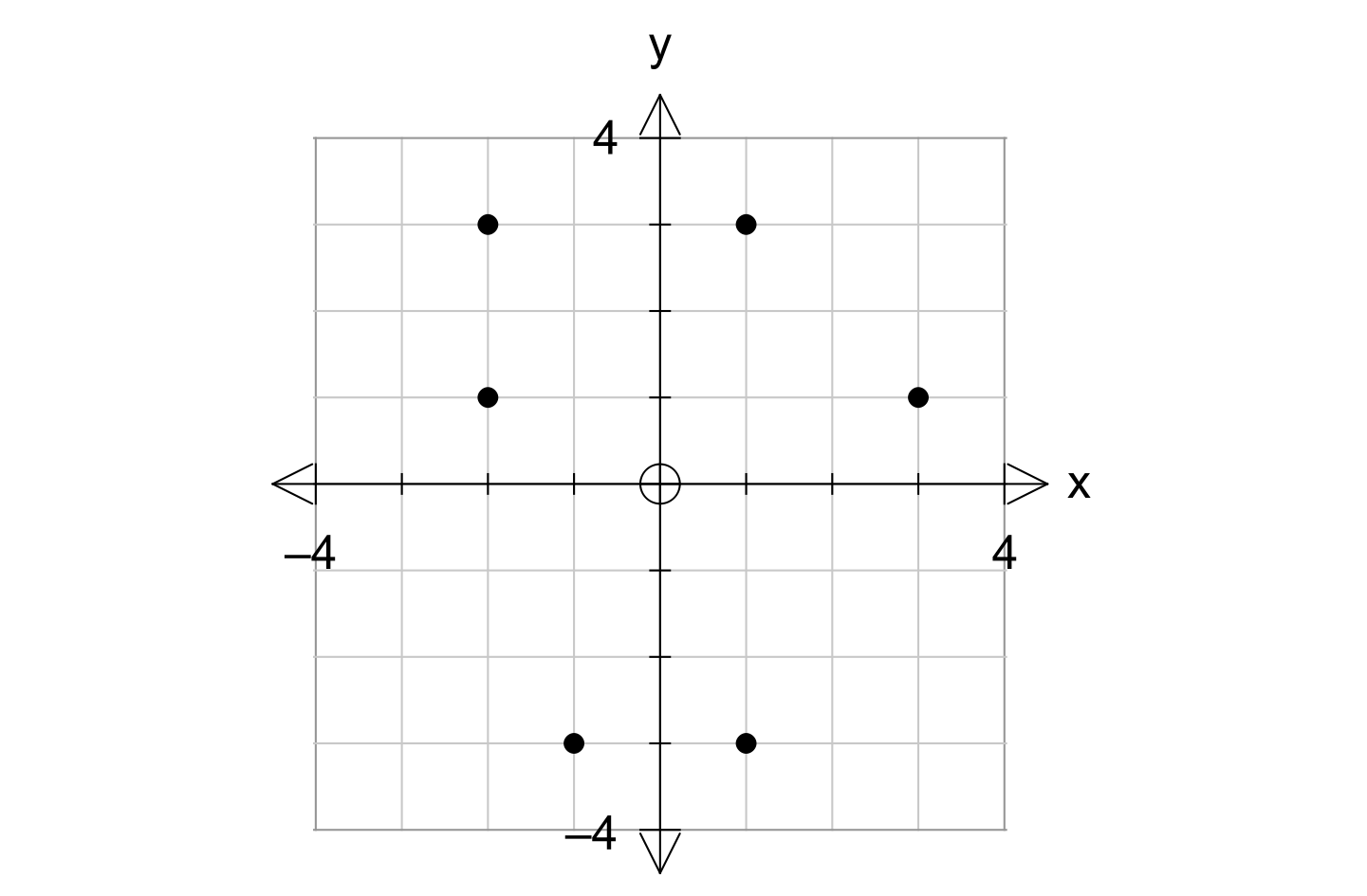
**TEST 6 - Calculator Assumed**

Reading Time: 3 minutes

Time Allowed: 35 minutes Total Marks: 35

**4.** [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 |  |  |  |  |

**5.** [2, 2, 3, 2 marks]

The quadrilateral with vertices and is transformed by the matrix M= onto the quadrilateral.

(a) Determine the coordinates of .

(b) The area of quadrilateral is 26.25units2. What is the area of quadrilateral ?

(c) Matrix M represents the combination of transformation P followed by transformation Q. If the matrix for transformation P = , determine the matrix for transformation Q and describe the geometric transformation Q represents.

(d) The quadrilateral is then transformed by the matrix such that the image of lies on the y-axis. Determine the value of k.

**6.** [1, 1, 3, 2 marks]

A triangle has vertices and .

(a) Triangle is transformed to and .

(i) Describe the transformation geometrically.

(ii) State the 2 x 2 matrix that will transform to .

Triangle is dilated by a scale factor of 3 parallel to the x-axis and then rotated 60° 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 .

**7.** [4 marks]

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

**8.** [3, 3 marks]

(a) Show that the transformation matrix maps all the points in the plane to a line and determine the equation of this line.

(b) Show that the transformation matrix maps all the points on the line to a single point in the plane and determine this point.

**9.** [5 marks]

Find the image of the line after it is reflected in the line