Modulus

The modulus means the 'absolute value' or 'positive size' of a number.

by definition $|-a| = a$

eg. $|-2| = 2$

and $|2| = 2$

Absolute Value

Investigate which of the following is true?

Is $|m.n| = |m|.|n|$? true

eg. $|(-3)(-2)| = |(-3)|.|(-2)|$

$6 = 6$ ✓

Is $\left|\frac{m}{n}\right| = \frac{|m|}{|n|}$? true

eg. $\left|\frac{-3}{-2}\right| = \frac{|-3|}{|-2|}$

$\frac{3}{2} = \frac{3}{2}$ ✓

Is $|m+n| = |m|+|n|$ not true

$|3-2| \neq |3|+|2|$

$1 \neq 5$ X

Is $m|n| = |m.n|$? not true

eg. $(-3)|-2| = |(-3)(-2)|$

$-6 \neq 6$ X

Argand Diagram

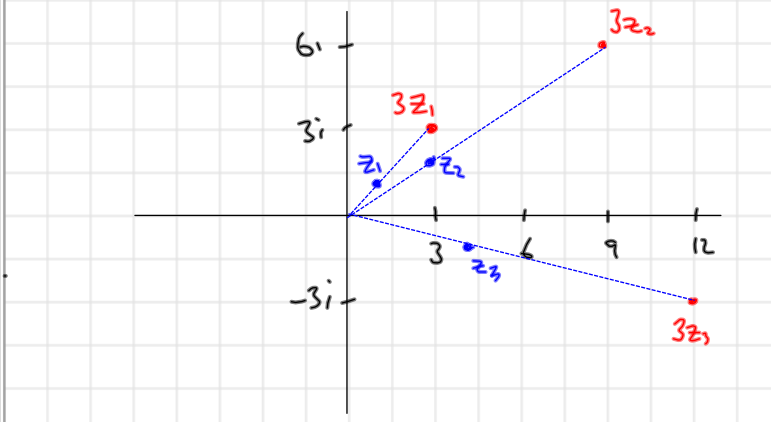
Exercise 3.5

1. Plot the complex numbers $z_1 = 1 + i, z_2 = 3 + 2i, z_3 = 4 - i$ on an Argand diagram. On the same diagram, plot the complex numbers $3z_1, 3z_2, 3z_3$.

multiply

$3z_1 = 3(1+i) = 3 + 3i$
$3z_2 = 3(3+2i) = 9 + 6i$
$3z_3 = 3(4-i) = 12 - 3i$

Plot numbers

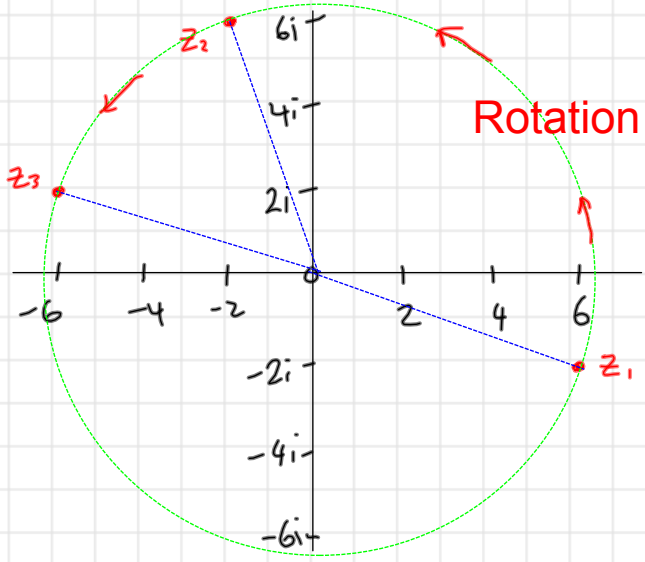


Multiplication

5. Plot the complex number (i) $z_1 = 6 - 2i$ (ii) $z_2 = (z_1)i$ (iii) $z_3 = (z_1)i^2$. What transformation is created by this multiplication?

$z_1 = 6 - 2i$
$z_2 = (z_1)i = 6i \pm 2i^2 = -2 + 6i$
$z_3 = (z_1)i^2 = (z_1)(-1) = -6 + 2i$

Plot points to see transformation



We see that it is a Rotation