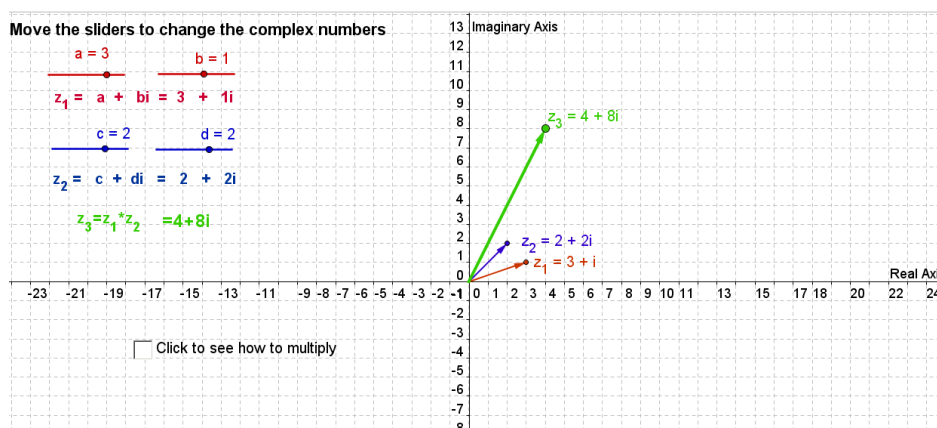


## Student Activity: To investigate the multiplication of complex numbers

Use in connection with the interactive files, 'Multiplication of complex numbers' and 'Multiplication of complex numbers 2', on the Students CD.



- Calculate  $Z_1$  multiplied by  $Z_2$  in each of the following cases and check your answer using the interactive file "Multiplication of complex numbers 1".

		$Z_1 * Z_2$
a.	$z_1 = 3 + 2i$ and $z_2 = 1 + 4i$	
b.	$z_1 = 2 + 4i$ and $z_2 = 1 - 3i$	
c.	$z_1 = -3 + 4i$ and $z_2 = 1 - 2i$	
d.	$z_1 = -1 - 3i$ and $z_2 = -2 - 1i$	
e.	$z_1 = i$ and $z_2 = 2 + i$	

f.	$z_1 = i$ and $z_2 = i$	
g.	$z_1 = i$ and $z_2 = -i$	
h.	$z_1 = 1$ and $z_2 = -1$	
i.	$z_1 = 1$ and $z_2 = -i$	
j.	$z_1 = 1 + \sqrt{25}i$ and $z_2 = -2\sqrt{9}i$	
k.	$Z_1 = -1 - i$ and $Z_2 = -2 - i$	
l.	$Z_1 = -2 - i$ and $Z_2 = -1 - i$	

2. Given  $z_1 = a + ib$  and  $z_2 = c + id$  investigate if  $z_1z_2 = z_2z_1$  for all complex numbers.

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Use the interactive file **Multiplication of complex numbers 2** to answer the following questions.

3. When you multiply a complex number by a real number what is the relationship between the angle that the original complex number made with the Real Axis and the angle the answer makes with the Real Axis?

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4. When you multiply a complex number by a real number what is the relationship between the modulus of the original complex number and the modulus of the product?

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5. When you multiply two complex numbers, what is the relationship between the angles that each of these complex numbers makes with the Real Axis and the angle that their product makes with the Real Axis?

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6. When you multiply two complex numbers, what is the relationship between the modulus of each of these complex numbers and the modulus of their product?

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7. When you multiply a complex number by its complex conjugate, what angle does the solution make with the positive Real Axis?

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8. By how many degrees is the number  $a + bi$  rotated when it is multiplied by  $i$ ?

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9. When you multiply any complex number  $a + bi$  by  $i$  how does the modulus of the initial number relate to the modulus of the product?

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