0.1 Arithmetic on complex numbers

For each of these we have:

$x = a + bi$

$y = c + di$

Addition is defined as:

$x + y = a + bi + c + di$

$x + y = (a + c) + (b + d)i$

Subtraction is defined as:

$x - y = a + bi - c - di$

$x - y = (a - c) + (b - d)i$

Multiplication is defined as:

$xy = (a + bi)(c + di)$

$xy = ac - bd + adi + bci$

$xy = (ac - bd) + (ad + bc)i$

Division is defined as:

$$\frac{x}{y} = \frac{a + bi}{c + di}$$

$$\frac{x}{y} = \frac{(a + bi)(c - di)}{(c + di)(c - di)}$$

$$\frac{x}{y} = \frac{(ac + bd) + (bc - ad)i}{c^2 + d^2}$$