

Chapter 3 / **Example 17****Operations with complex numbers**

Storing values of complex numbers for ease of calculation.

Given the complex numbers $z_1 = 2 + i$, $z_2 = 2 - 5i$ and $z_3 = -1 + 2i$, find the following.

a $\frac{z_1}{z_2} - 3z_3$

b $\frac{z_1^2}{z_2 \cdot z_3}$

c $\frac{2z_1 - 3z_2}{z_1 \cdot z_3}$

Check your answers on your GDC.

Press **MENU** 1 **RUN-MAT** to display the Run-Matrix screen for arithmetical calculations.

To store a value press **→**.

Type $2 + i$ and store it as P .

To enter i press **SHIFT** 0 **i**

Press **EXE**.

2+i→P
2+i
JUMP DELETE ▶ MAT/VCT MATH

In the same way, store $2 - 5i$ as Q and $-1 + 2i$ as R .

2+i→P
2+i
2-5i→Q
2-5i
-1+2i→R
-1+2i
JUMP DELETE ▶ MAT/VCT MATH

To calculate $\frac{z_1}{z_2} - 3z_3$ type $P \div Q - 3 \times R$, press **EXE** and press **S↔D** to change the decimal result to fractions.

$$\frac{z_1}{z_2} - 3z_3 = \frac{86}{29} - \frac{162}{29}i$$

2-5i
-1+2i→R
-1+2i
P÷Q-3×R
86/29 - 162/29 i
JUMP DELETE ▶ MAT/VCT MATH

To calculate $\frac{z_1^2}{z_2 \cdot z_3}$ type $P^2 \div (Q \times R)$, press **EXE** and press **S↔D** to change the decimal result to fractions.

$$\frac{z_1^2}{z_2 \cdot z_3} = \frac{12}{29} + \frac{1}{29}i$$

86/29 - 162/29 i
P^2÷(Q×R)
12/29 + 1/29 i
JUMP DELETE ▶ MAT/VCT MATH

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To calculate $\frac{2z_1 - 3z_2}{z_1 \cdot z_3}$ type $(2 \times P - 3 \times Q) \div (P \times R)$, press **EXE** and press **S+D** to change the decimal result to fractions.

$$\frac{2z_1 - 3z_2}{z_1 \cdot z_3} = \frac{59}{25} - \frac{62}{25}i$$

The calculator screen shows the following steps:

- Top line: $P \div (Q \wedge R)$
- Second line: $\frac{12}{29} + \frac{1}{29}i$
- Third line: $(2 \times P - 3 \times Q) \div (P \times R)$
- Fourth line: $\frac{59}{25} - \frac{62}{25}i$
- Bottom line: **JUMP** **DELETE** **MAT/VCT** **MATH**