

教 p38 ~ 40 練習問題 解答

練習3

$$(1) (2+3i) + (4+i) = (2+4) + (3+1)i \\ = 6 + 4i //$$

$$(2) (-1+2i) + (3-4i) = (-1+3) + \{2+(-4)\}i \\ = 2 - 2i //$$

$$(3) (6+4i) - (3+2i) = (6-3) + (4-2)i \\ = 3 + 2i //$$

$$(4) (2-3i) - (4-2i) = (2-4) + \{-3-(-2)\}i \\ = -2 - i //$$

練習4

$$(1) (1+2i)(4+3i) = 4 + 3i + 8i + 6i^2 \\ = 4 + 3i + 8i + 6 \times (-1) = -2 + 11i //$$

$$(2) (2-i)(3+4i) = 6 + 8i - 3i - 4i^2 \\ = 6 + 8i - 3i - 4 \times (-1) = 10 + 5i //$$

$$(3) (3+4i)(3-4i) = 3^2 - (4i)^2 = 9 - 16i^2 \\ = 9 - 16 \times (-1) = 25 //$$

$$(4) (2+3i)^2 = 2^2 + 2 \times 2 \times 3i + (3i)^2 \\ = 4 + 12i + 9i^2 = 4 + 12i + 9 \times (-1) \\ = -5 + 12i //$$

練習5

(1) $2 - 3i$

(2) $1 + i$

(3) $-\sqrt{3}i$

(4) $\frac{-1 - \sqrt{3}i}{2}$

練習6

$$(1) \frac{1 + 2i}{2 + 3i} = \frac{(1 + 2i)(2 - 3i)}{(2 + 3i)(2 - 3i)} = \frac{2 - 3i + 4i + 6}{2^2 + 3^2}$$

$$= \frac{8 + i}{13} //$$

← $1 + 2i(2 - 3i)$ としない!

← 実部と虚部を明確にして

 $\frac{8}{13} + \frac{i}{13}$ だと OK!

$$(2) \frac{1 - i}{1 + i} = \frac{(1 - i)(1 - i)}{(1 + i)(1 - i)} = \frac{(1 - i)^2}{1^2 + 1^2}$$

$$= \frac{1 - 2i - 1}{2} = \frac{-2i}{2} = -i //$$

$$(3) \frac{5i}{2 - i} = \frac{5i(2 + i)}{(2 - i)(2 + i)} = \frac{5i(2 + i)}{2^2 + 1^2}$$

$$= \frac{5i(2 + i)}{5} = i(2 + i) = -1 + 2i //$$

$$(4) \frac{1}{i} = \frac{i}{i^2} = \frac{i}{-1} = -i //$$

← 分母が i の単項式なら- i ではなく、 i をかけて計算

することもできる。もちろん

- i をかけてもいい。

$$\frac{1}{i} = \frac{-i}{i \times (-i)} = \frac{-i}{-(-1)}$$

$$= -i //$$

練習7

(1) $\sqrt{-5} = \sqrt{5}i //$

(2) $\sqrt{-9} = \sqrt{9}i = 3i //$

(3) $\pm\sqrt{-27} = \pm\sqrt{27}i = \pm 3\sqrt{3}i //$

← 「~の平方根」は2つ
あるのだ。注意!

練習8

(1) $\sqrt{-2}\sqrt{-6} = \sqrt{2}i \times \sqrt{6}i = \sqrt{12}i^2 = -\sqrt{12} = -2\sqrt{3} //$

$$\leftarrow \sqrt{-2}\sqrt{-6} = \sqrt{(-2) \times (-6)}$$

$$= \sqrt{12} \text{ は絶対的} \times !!$$

(2) $\sqrt{-6}\sqrt{3} = \sqrt{6}i \times \sqrt{3} = \sqrt{18}i = 3\sqrt{2}i //$

iに通すのが最優先!

(3) $\frac{\sqrt{-8}}{\sqrt{2}} = \frac{\sqrt{8}i}{\sqrt{2}} = \sqrt{\frac{8}{2}}i = \sqrt{4}i = 2i //$

(4) $\frac{\sqrt{-3}}{\sqrt{-2}} = \frac{\sqrt{3}i}{\sqrt{2}i} = \frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{6}}{2} //$

← iは約分できる。