

問題

問題 1. 次の式を計算せよ。

(1) $(\sqrt{3} + i)^7$ (2) $(1 - i)^5$ (3) $(-1 + i)^{-8}$ (4) $(1 - \sqrt{3}i)^{-4}$

問題 2. 次の方程式を解け。

(1) $z^2 = 2 + 2\sqrt{3}i$ (2) $z^2 = -i$

(3) $z^3 = 2\sqrt{2}i$ (4) $z^4 = -2 - 2\sqrt{3}i$

(5) $z^3 = 1$ (6) $z^8 = 1$

練習

練習 1. 次の点は, 点 z をどのように移動した点であるか。

(1) $(1+i)^7$ (2) $(1-\sqrt{3}i)^5$ (3) $(-\sqrt{3}+i)^{-6}$ (4) $(1-i)^{-10}$

練習 2. 次の方程式を解け。

(1) $z^2 = 8 - 8\sqrt{3}i$ (2) $z^2 = 2i$

(3) $z^3 = -27i$ (4) $z^4 = -8 + 8\sqrt{3}i$

(5) $z^4 = 1$ (6) $z^6 = 1$

解答

問題 1.

$$(1) -64\sqrt{3} - 64i \quad (2) -4 + 4i \quad (3) \frac{1}{16} \quad (4) -\frac{1}{32} - \frac{\sqrt{3}}{32}i$$

問題 2.

$$(1) z = \sqrt{3} + i, -\sqrt{3} - i \quad (2) z = -\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i, \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i$$

$$(3) z = \frac{\sqrt{6}}{2} + \frac{\sqrt{2}}{2}i, -\frac{\sqrt{6}}{2} + \frac{\sqrt{2}}{2}i, -\sqrt{2}i$$

$$(4) z = \frac{\sqrt{2}}{2} + \frac{\sqrt{6}}{2}i, -\frac{\sqrt{6}}{2} + \frac{\sqrt{2}}{2}i, -\frac{\sqrt{2}}{2} - \frac{\sqrt{6}}{2}i, \frac{\sqrt{6}}{2} - \frac{\sqrt{2}}{2}i$$

$$(5) z = 1, -\frac{1}{2} + \frac{\sqrt{3}}{2}i, -\frac{1}{2} - \frac{\sqrt{3}}{2}i$$

$$(6) z = 1, \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i, i, -\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i, -1, -\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i, -i, \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i$$

練習 1.

$$(1) 8 - 8i \quad (2) 16 + 16\sqrt{3}i \quad (3) -\frac{1}{64} \quad (4) \frac{i}{32}$$

練習 2.

$$(1) z = -2\sqrt{3} + 2i, 2\sqrt{3} - 2i \quad (2) z = 1 + i, -1 - i$$

$$(3) z = 3i, -\frac{3\sqrt{3}}{2} - \frac{3}{2}i, \frac{3\sqrt{3}}{2} - \frac{3}{2}i$$

$$(4) z = \sqrt{3} + i, -1 + \sqrt{3}i, -\sqrt{3} - i, 1 - \sqrt{3}i$$

$$(5) z = 1, i, -1, -i$$

$$(6) z = 1, \frac{1}{2} + \frac{\sqrt{3}}{2}i, -\frac{1}{2} + \frac{\sqrt{3}}{2}i, -1, -\frac{1}{2} - \frac{\sqrt{3}}{2}i, \frac{1}{2} - \frac{\sqrt{3}}{2}i$$