Exercise Guide for *Complex Analysis* by Lars Ahlfors

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About

> *"One of the jewels in the crown of mathematics is complex analysis..."* - Tim Gowers, *The Princeton Companion to Mathematics*

I believe some solutions for this book are available here. What follows are some of my solutions to some exercises in the book.

1 Complex Numbers

1.1 Arithmetic Operations

1.1.1 Exercise 3

This exercise is much easier if we represent the complex numbers in polar form (which has not been introduced yet). We see that

$$\frac{-1 \pm i\sqrt{3}}{2} = e^{i\frac{2\pi}{3}},\ e^{i\frac{4\pi}{3}}$$
$$\frac{\pm 1 \pm i\sqrt{3}}{2} = e^{i\frac{2\pi}{3}},\ e^{i\frac{4\pi}{3}},\ e^{i\frac{\pi}{3}},\ e^{i\frac{5\pi}{3}}$$

which gives us the desired equality since $e^{i2\pi} = 1$.