

mmyau Solutions Manual

Charles Yang

Last updated: May 26, 2022

Contents

I	Math on the Complex Plane	3
	Solutions to Chapter 1	5
	Solutions to Chapter 2	7
	Solutions to Chapter 3	9
	Solutions to Chapter 4	11
II	Linear Algebra	13
	Solutions to Chapter 5	15
	Solutions to Chapter 5.4	17
	Solutions to Chapter 6	19
	Solutions to Chapter 7	21
III	Advanced Topics	23
	Solutions to Chapter 8	25
	Solutions to Chapter 9	27
	Solutions to Chapter 10	29
	Solutions to Chapter 11	31

Solutions to Chapter 12	33
Solutions to Chapter 13	35
 IV Miscellaneous Topics	 37
Solutions to Chapter 14	39
Solutions to Chapter 15	41
 V Appendices	 43

Part I

Math on the Complex Plane

Solutions to Chapter 1

Solution 1.1.1 (a) I'm too lazy to compute these rn

Note that they do not equal.

Solution 1.1.2 Too lazy, but follows from commutation in reals.

Solution 1.1.3 (a) Let $z = a + ib$. Then, $z^* = a - ib$ and $(z^*)^* = a - (-ib) = a + ib = z$.

(b) (i) too lazy

Solution 1.2.1

$$e^{-i\theta} = \boxed{\cos \theta - i \sin \theta}$$

Thus, they are $\boxed{\text{conjugates}}$.

Solution 1.2.2 just do it

Solution 1.3.1

$$\operatorname{Re}(z) = \frac{z + z^*}{2} \qquad \operatorname{Im}(z) = \frac{z - z^*}{2}$$

Solution 1.3.2 (a) Let $z = a + ib$ where $a, b \in \mathbb{R}$. Substituting and cancelling,

$$z = z^*$$

$$a + ib = a - ib$$

$$ib = -ib$$

$$b = -b$$

$$b = 0$$

thus,

$$z = a \in \mathbb{R}$$

(b) We have

$$(z^*z)^* = (z^*)^*z^* = zz^* = z^*z$$

by commutativity. Thus, since z^*z is its own conjugate, it must be purely real.

Solution 1.3.3

$$e^{i\theta} = \cos \theta + i \sin \theta$$

Solution 1.3.4 (a) too lazy

Solution 1.3.5 (a) i don't want to

Solution 1.3.6 $\boxed{1, i, -1, -i}$

Solution 1.3.7 $\boxed{1, \frac{1}{2} + i\frac{\sqrt{3}}{2}, -\frac{1}{2} + i\frac{\sqrt{3}}{2}, -1, -\frac{1}{2} - i\frac{\sqrt{3}}{2}, \frac{1}{2} - i\frac{\sqrt{3}}{2}}$

Solutions to Chapter 2

Solution 2.1.1 literally just do what I said

Solution 2.1.2 again, just do what I said.

Solutions to Chapter 3

Solutions to Chapter 4

Part II

Linear Algebra

Solutions to Chapter 5

Solutions to Chapter 5.4

Solutions to Chapter 6

Solutions to Chapter 7

Part III

Advanced Topics

Solutions to Chapter 8

Solutions to Chapter 9

Solutions to Chapter 10

Solutions to Chapter 11

Solutions to Chapter 12

Solutions to Chapter 13

Part IV

Miscellaneous Topics

Solutions to Chapter 14

Solutions to Chapter 15

Part V

Appendices

