

# Acharya's Outline of Complex Variables

First Edition  
or  
Second Edition

HW1 ( $\operatorname{Re} z$ ,  $\operatorname{Im} z$ ,  $|z|$ ,  $\bar{z}$ ,  $+$ ,  $-$ ,  $\times$ ,  $\div$ , vector interpretation)

Chapter 1, # 4a,b, 7a,c, 53a,b,c,e,i, 54b,c,j  
55a, 56a,b, 58, 59, 61a, 72a, 73b

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HW2 ( $e^z$ ,  $\cos z$ ,  $\sin z$ , polar form, arg, de Moivre formula, roots)

Chapter 2, # 8c, 9a,c, 10b, 11a, 58a,b, 60, 61b, 68c

Chapter 1, # 81a,b, 84e, 89b, 90a,b, 93b, 95c, 105a,b

Cain: Chapter 1, # 9a,b

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HW3 (Functions, log, complex exponents, subsets of  $\mathbb{C}$ )

Chapter 2, # 74a,b, 81a,b, 82a,b, 15a,b,c

Cain: Chapter 3, # 12, 13, 15

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HW4 (Cauchy-Riemann eqs, Harmonic functions,  $(e^z)' = e^z$ ,  $(\log z)' = \frac{1}{z}$ )

Chapter 3, # 12a,b, 48, 50, 53b,c

Cain: Chapter 2, # 9, 10, 11, 12, 14

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HW5 (Curves,  $x'(t)$ ,  $\int_a^b x(t) dt$ . Line integrals  $\int_C f(z) dz$ ,  $\int_C M dx + N dy$ )

Chapter 4, # 32a,b,c, 33a,b, 36a,b,c, 38a,b

Cain: Chapter 2, # 13, 15

HW 6 (Green's theorem)

Chapter 4, # 45, 47, 48, 50, 51a

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HW 7 (Cauchy's thm, Path independence,  $\int_a^b f(z) dz = F(b) - F(a)$ )

Chapter 4, # 60a, 62, 63, 64, 73, 74, 75

Cain: Chapter 5, # 8

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HW 8 (Cauchy Integral Formula,  $f^{(n)}(a) = \frac{n!}{2\pi i} \int_C \frac{f(z)}{(z-a)^{n+1}} dz$ )

Chapter 5, # 30, 33, 34, 35, 38, 39

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HW 9 (Taylor's thm, Power series)

Chapter 6, # 71a, b, 78, 79a, b, c, d, e, 80, 81, 90

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HW 10 (Laurent series)

Chapter 6, # 91a, b, 92a, b, c, d, e, 94

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HW 11 (Classification of singularities)

Chapter 6, # 96a, b, 98b, e, 99

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HW 12 (Evaluation of residues)

Chapter 7, # 4a, 39a, b, c, d, e, 43, 44, 47

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HW 13 (Evaluation of integrals) Chapter 7, # 7, 8, 9, 10, 11

16, 20, 37, 49, 53, 84. Cain-Hitzyenko, # 4