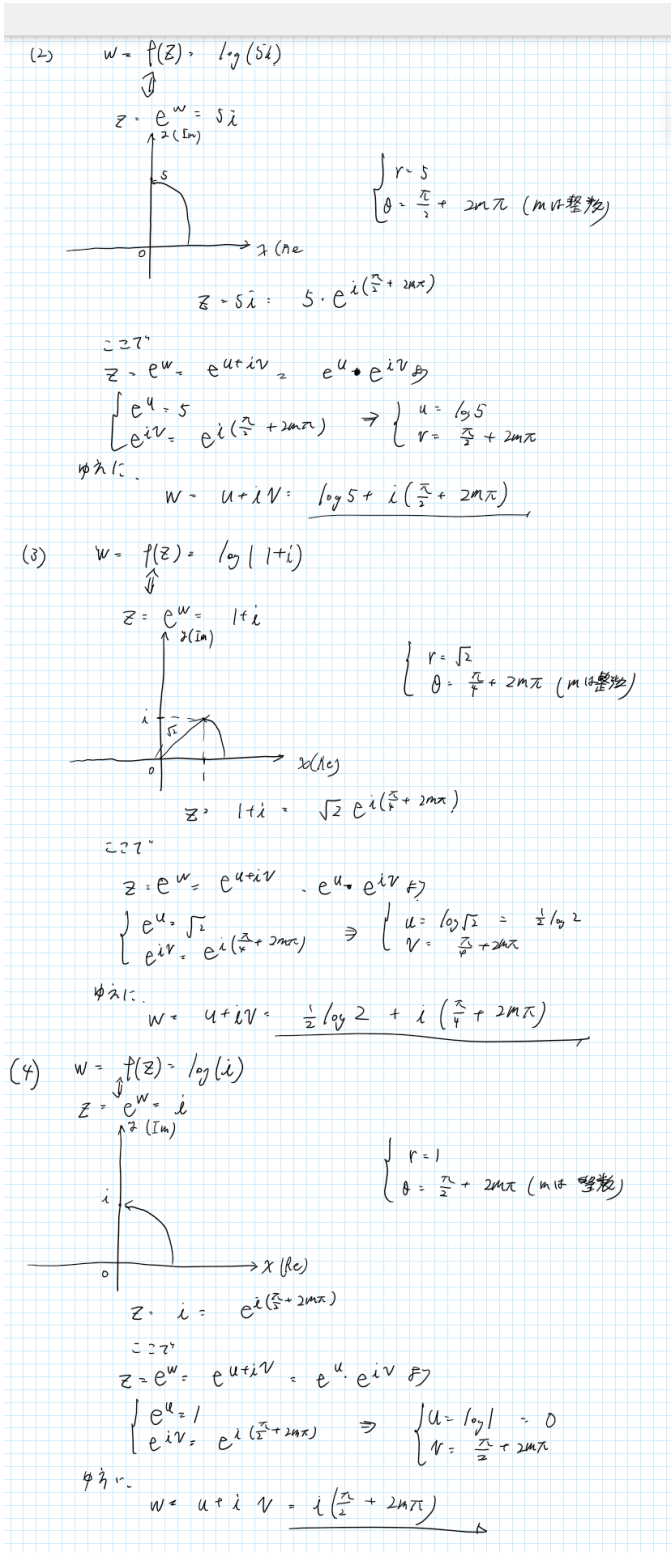
8223036　栗山淳


(2) w = f(z) = log(5i)
z = e^w = 5i
z (Im)
5
0
x (Re)
r = 5
θ = π/2 + 2mπ (m は整数)
z = 5i = 5 · e^{i(π/2 + 2mπ)}
ここで
z = e^w = e^{u+iv} = e^u · e^{iv} より
e^u = 5, e^{iv} = e^{i(π/2 + 2mπ)} ⇒ u = log 5, v = π/2 + 2mπ
よって
w = u + iv = log 5 + i(π/2 + 2mπ)
(3) w = f(z) = log(1+i)
z = e^w = 1+i
z (Im)
1
√2
π/4
0
x (Re)
r = √2
θ = π/4 + 2mπ (m は整数)
z = 1+i = √2 e^{i(π/4 + 2mπ)}
ここで
z = e^w = e^{u+iv} = e^u · e^{iv} より
e^u = √2, e^{iv} = e^{i(π/4 + 2mπ)} ⇒ u = log √2 = (1/2) log 2, v = π/4 + 2mπ
よって
w = u + iv = (1/2) log 2 + i(π/4 + 2mπ)
(4) w = f(z) = log(i)
z = e^w = i
z (Im)
i
0
x (Re)
r = 1
θ = π/2 + 2mπ (m は整数)
z = i = e^{i(π/2 + 2mπ)}
ここで
z = e^w = e^{u+iv} = e^u · e^{iv} より
e^u = 1, e^{iv} = e^{i(π/2 + 2mπ)} ⇒ u = log 1 = 0, v = π/2 + 2mπ
よって
w = u + iv = i(π/2 + 2mπ)