

Panel 1

Complex HW:

① Use the Residue theorem to evaluate:

a) $\int_C z^6 \sin\left(\frac{1}{z}\right) dz$, C circle, center 0, radius 5

b) $\int_C \frac{3z+2}{z(z-1)} dz$, C circle, center 1, radius 3

c) $\int_C \frac{1}{z+1(z-3)} dz$, C circle, center -1, radius 2

⇒

1

Panel 2

② Identify and classify all singularities for:

a) e^z/z^4

b) $z^4(e^{1/z}-1)$

c) $\frac{\sin(z^2)}{z^4}$

d) $\frac{z}{(z+1)(z-3)^2}$

e) $\frac{z^2+iz+2}{z^2+1}$

Hint for d,e: f has a pole of order m at z_0 iff

$$f(z) = \frac{g(z)}{(z-z_0)^m}$$
 where g is analytic near z_0 and $g(z_0) \neq 0$

2