Panel 1

HW #22 - Complex

(1) Find the residues for the functions as given:

a) $\text{Res}(f, 0)$, $f(z) = z^5 \cos\left(\frac{1}{z}\right)$.

b) $\text{Res}(f, 0)$, $f(z) = z^2 e^{\frac{1}{z}}$

c) $\text{Res}(f, 0)$, $f(z) = \frac{3}{z(z+2)}$

d) $\text{Res}(f, -2)$, $f(z) = \frac{3}{z(z+2)}$

e) $\text{Res}(f, 3)$, $f(z) = \frac{3}{z(z+2)}$

f) $\text{Res}(f, 0)$, $f(z) = \frac{1}{z^3(z-2)}$

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Panel 2

(2) Use the Residue thm 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) $\int_C \frac{1}{z^4(z-3)} dz$, C circle, center -1, radius 2

=)

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Panel 3

(3) Identify and classify all singularities for:

a) $\frac{e^z}{z^4}$

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

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

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

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

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