

Panel 12

Homework

① Identify the order of the specified zero:

a) $\sin(z^2)$, $c=0$

b) $(1+z^2)^4$, $c=i$

c) $z^3 e^z$, $c=0$

d) $z^8 + z^4$, $c=0$

e) $z^3 e^{z-1}$, $c=0$

f) $1 + e^z$, $c=\pi i$

② Classify the specified singularities:

a) $(z^2+1)^{-3}(z-1)^{-4}$, $c=1$

b) $(z^4+z^3-2z^2)^{-1}$, $c=0$

c) $z^{-5} \sin(z)$, $c=0$

d) $(z^2 \sin(z))^{-1}$, $c=0$

e) $z^{-2}(\cos(z)-1)$, $c=0$

f) $z e^{1/z}$, $c=0$

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Panel 13

Homework, cont.

③ Let f be analytic with a zero of order k at z_0 .

Show that f' has a zero of order $k-1$ at z_0 .

④ Let f be analytic with a zero of order k at z_0 .

Show that f'/f has a simple pole at z_0 .

⑤ Let f have a pole of order k at z_0 . Show that

f' has a pole of order $k+1$ at z_0 .

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