Problem 2.7

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2 points possible (ungraded)

Find all the isolated singularities of the functions and define their type (assuming n is an integer).

1) $f(z) = \frac{\sin z}{1-\tan z}$

- simple poles at $z = \frac{\pi}{4} + 2\pi n$
- simple poles at $z = \frac{\pi}{4} + \pi n$
- simple poles at $z = \frac{\pi}{4} + 2\pi n$ and higher order poles at $z = \frac{3\pi}{4} + 2\pi n$

2) $f(z) = \frac{e^{c/(z-a)}}{e^{z/a}-1}$

- simple poles at $z = 2\pi i n a$ and removable singularity at $z = a$
- simple poles at $z = 2\pi i n a$ and essential non-isolated singularity at $z = a$
- simple poles at $z = 2\pi i n a$ and essential isolated singularity at $z = a$
- simple poles at $z = \pi i n a$ and essential isolated singularity at $z = a$

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