Math 411 ASSIGNMENT 20 **Due at 3 PM Friday, February 28th**

- Find and classify the singularities of each function.
- Show work indicating how you get your answer for each, and indicate what definition or part of a theorem you are using.
- If a singularity is a pole, give the order.
- Hint for Exercise 1: $x^3 + 1 = (x+1)(x^2 - x + 1)$
- Hint for Exercise 5: $e^z = 1$ for infinitely many values of $z = x + iy$ (that's more hint).

1. $f(z) = \dfrac{z^3+1}{z^2(z+1)}$
2. $g(z) = \dfrac{e^z}{z^3}$
3. $h(z) = \dfrac{\cos z}{z^2+1} + 4z$
4. $f(z) = z^3 e^{\frac{1}{z}}$
5. $g(z) = \dfrac{1}{e^z - 1}$
6. $h(z) = \tan z$

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