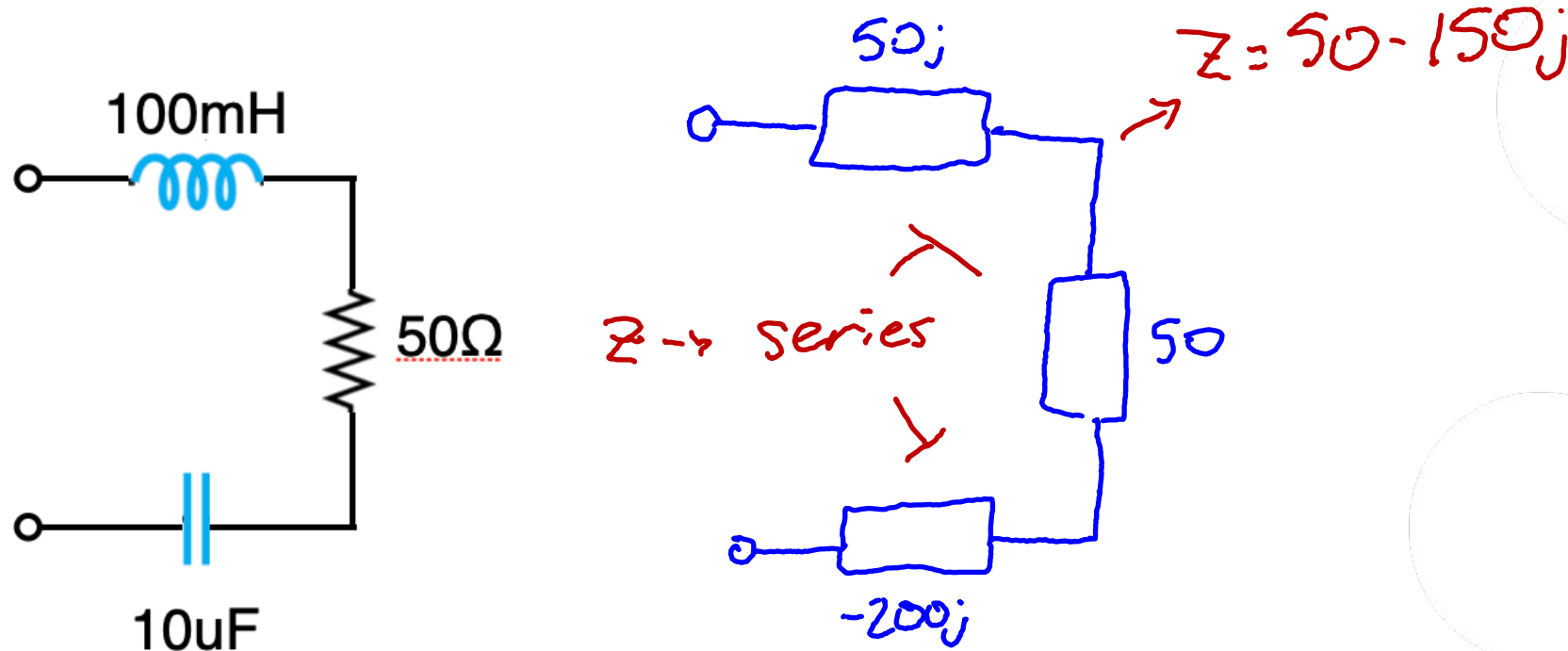




Find the impedance in polar form for each of the components below. Assume $\omega = 500$



$$Z_R = 50\Omega$$

$$Z_L = j\omega L = j(500)(100 \times 10^{-3}) = 50j\Omega$$

$$Z_C = \frac{1}{j\omega C} = \frac{1}{j(500)(10 \times 10^{-6})} = \frac{200}{j} = -200j\Omega$$

$$V_s(t) =$$

1) Ideally ans in polar form 8 degrees

↳ mode \rightarrow complex number $\rightarrow a+bi$ $me^{i\theta}$

↳ angle \rightarrow degrees

$$18e^{45j} = 18e^{45i} + 5i = 22e$$

$$18e^{45i\pi/180}$$

$$\text{ans} = 12.7 + 17.7j$$



THE OHIO STATE UNIVERSITY

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Impedances



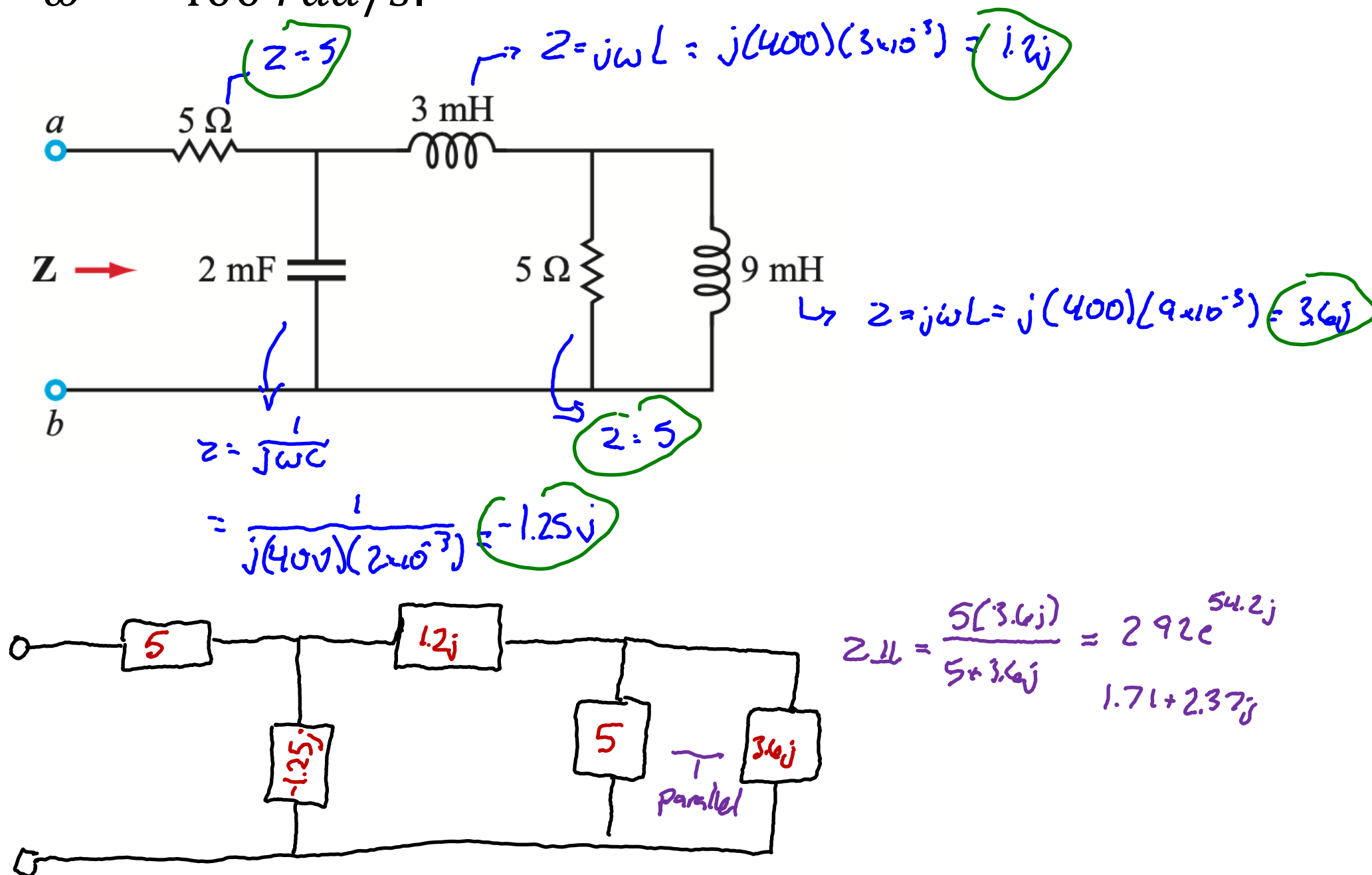
- Learning Objectives:
 - Determine combinations of impedances connected in series or in parallel.

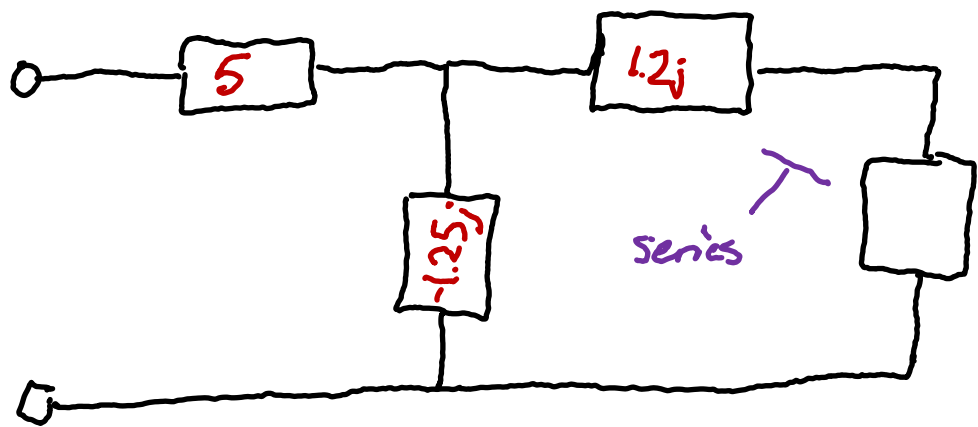






Find the input impedance \mathbf{Z} of the circuit below. Assume that $\omega = 400 \text{ rad/s}$.

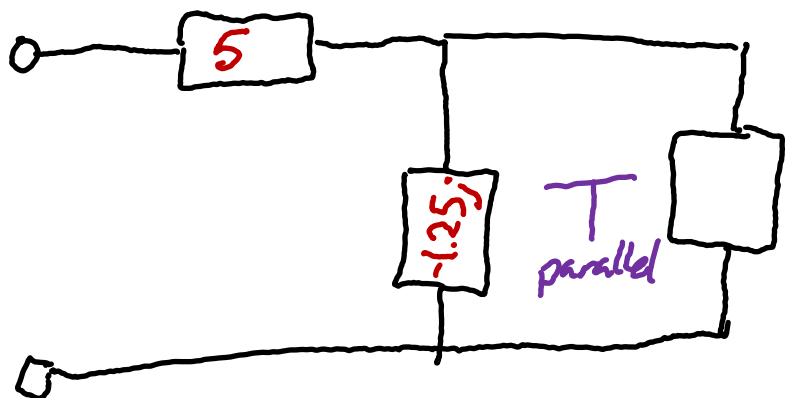




series $2.92e^{54.7j}$

$$Z = 1.2j + 2.92e^{54.7j} = 3.96e^{64.42j}$$

$$1.71 + 3.57j$$

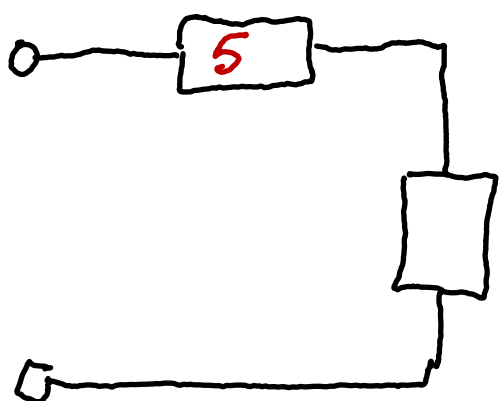


parallel

$3.96e^{64.42j}$

$$Z = \frac{1}{\frac{1}{1.25j} + \frac{1}{3.96e^{64.42j}}} = 0.32 - 1.67j$$

$$1.71e^{-79.2j}$$



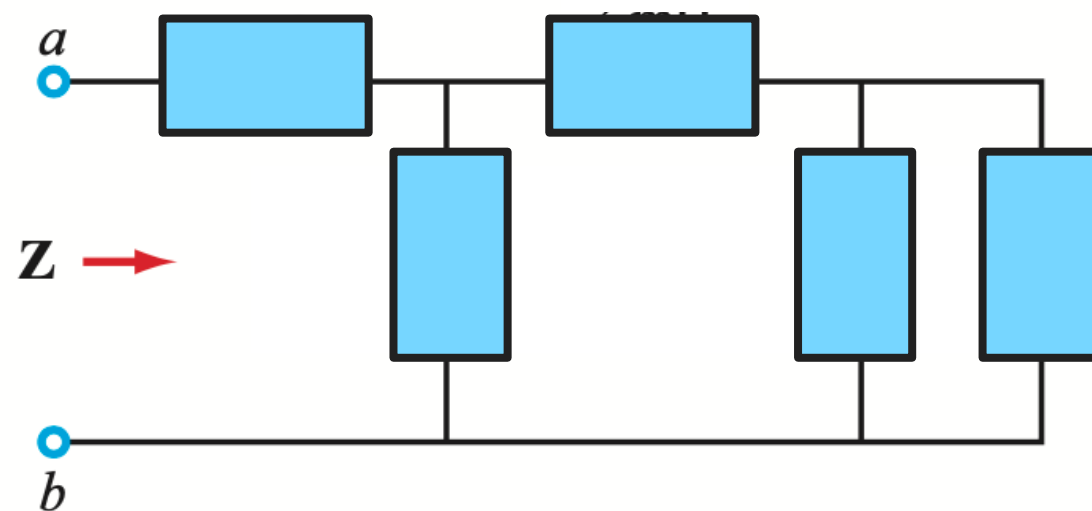
$1.71e^{-79.2j}$

$$Z = 5 + 1.71e^{-79.2j} = 5.02 - 1.67j$$

$$5.58e^{-17.58j}$$

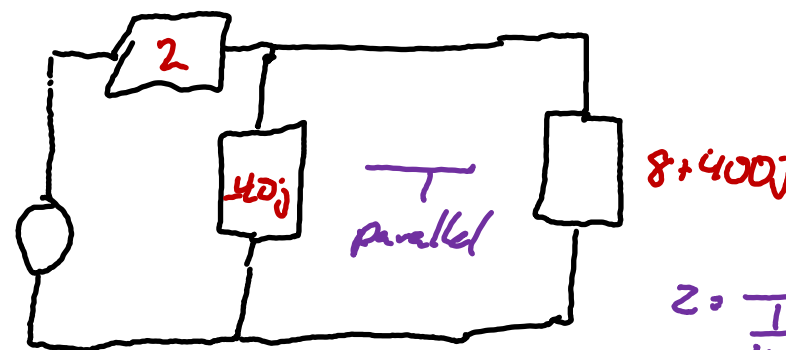
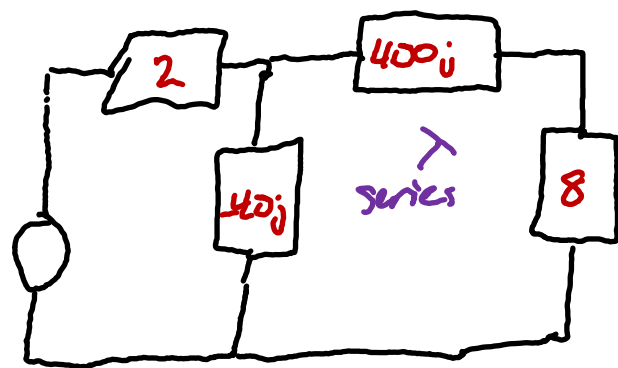
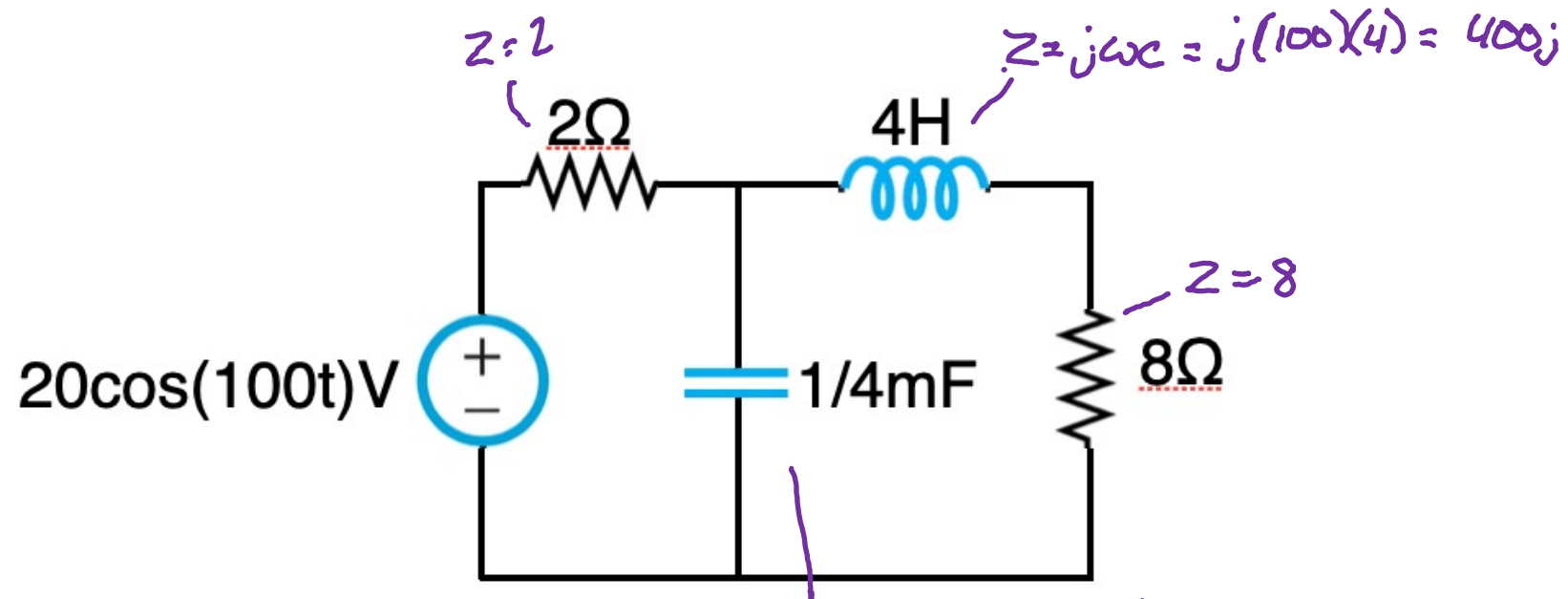


Find the input impedance \mathbf{Z} of the circuit below. Assume that $\omega = 400 \text{ rad/s}$.

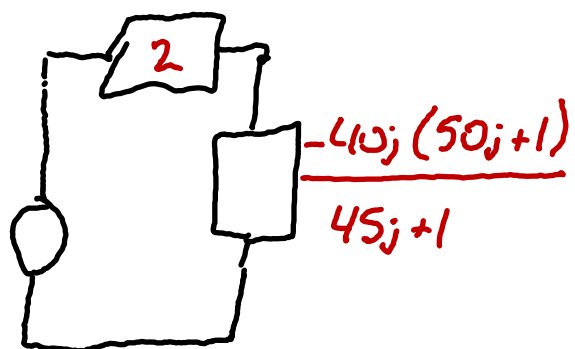




Find the equivalent impedance.



$$Z = \frac{1}{\frac{1}{-40j} + \frac{1}{8+400j}} = \frac{-40j(50j+1)}{45j+1}$$



$$Z = \frac{-40j(50j+1)}{45j+1} + 2 = \frac{-8}{81(45j+1)} - \frac{400j}{9} + \frac{170}{81}$$

idk how to convert