

EE 220

Circuits 1

Lecture 27

- 1) Frequency response
from plot
you determine
(today's quiz)
- 2) Phasors

Review for exam
H.W.
Quiz

Quiz #18 EE 220 Spring 2017

Name: _____

Closed book and notes.

Show your work for credit!

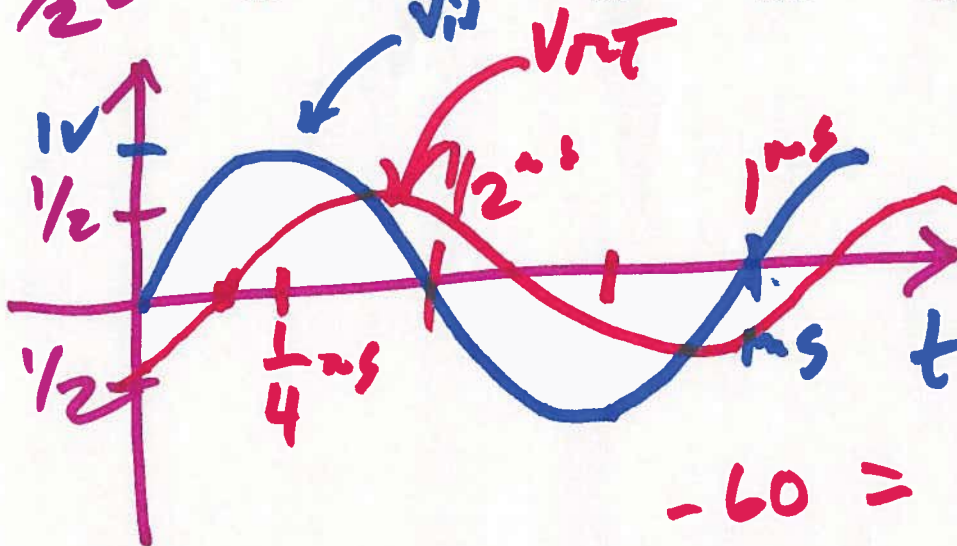
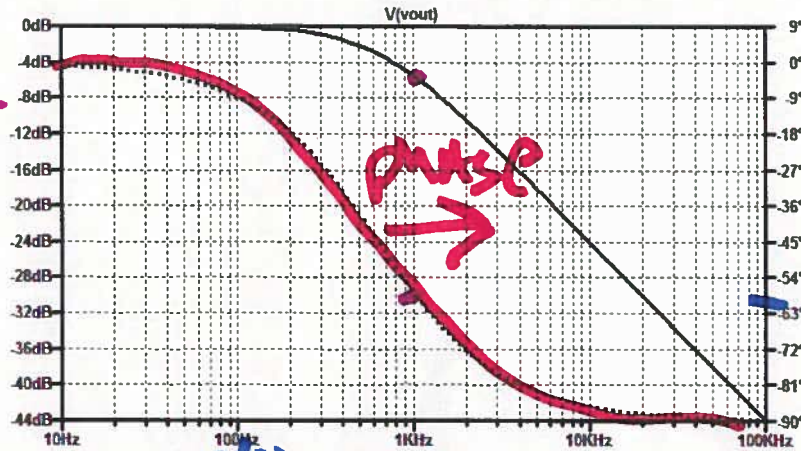
1. If V_{in} is a 1 V peak sinewave with zero degrees phase at 1 kHz sketch both V_{in} and V_{out} in the time-domain if V_{out} has the following frequency response. (5 points)

$$-6\text{dB} =$$

$$20 \log V_{out}/V_{in}$$

$$V_{out}/V_{in} = 10^{-6/20}$$

$$V_{out}/V_{in} = 1/2$$

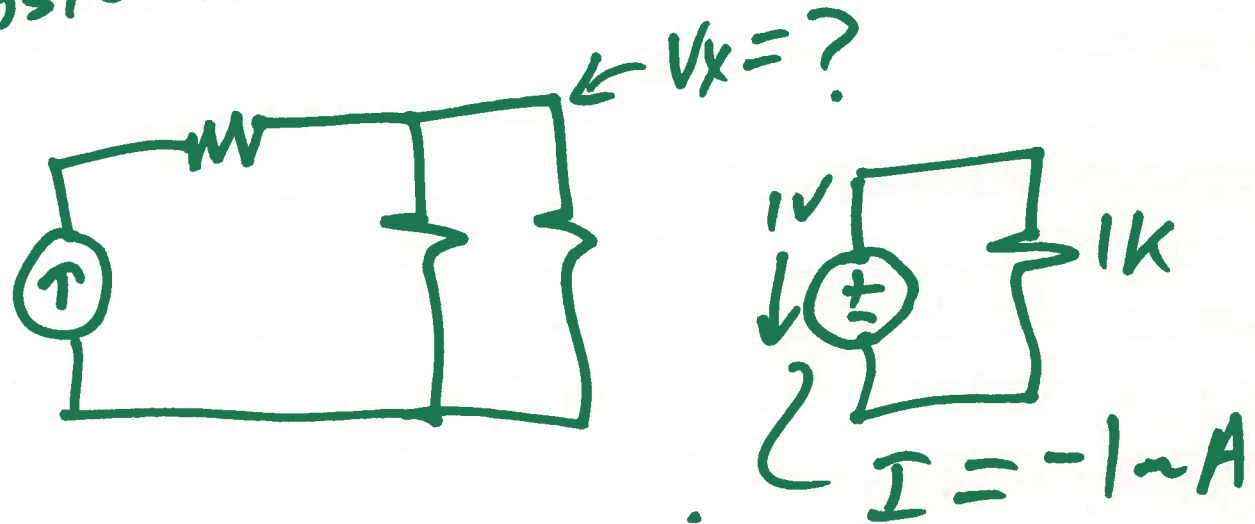


$$-60 = 360 \cdot \frac{t_d}{1\text{ms}}$$

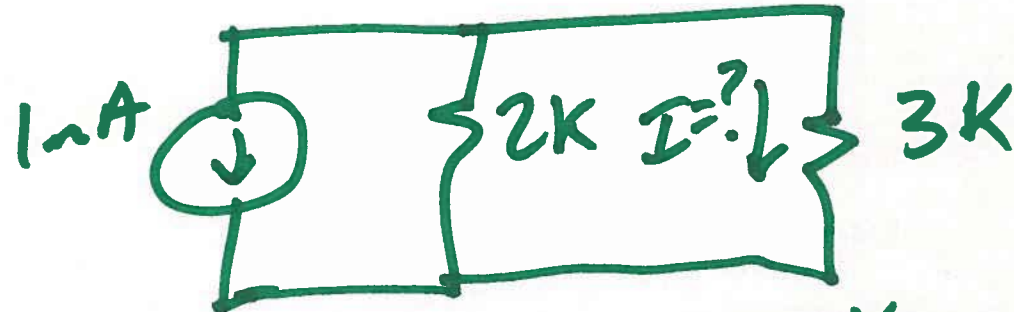
$$t_d = \frac{1}{6} \text{ms}$$

2)

3) BASIC KVL AND OHM'S LAW



4) VOLTAGE/CURRENT DIVISION



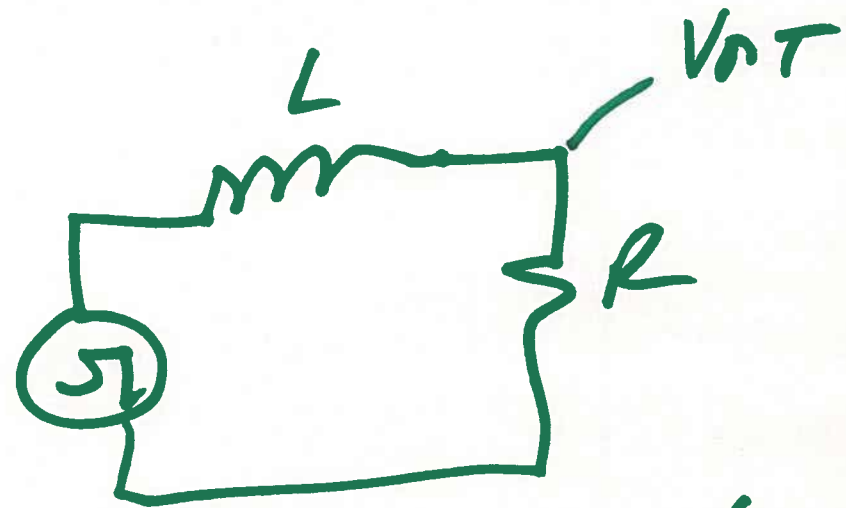
$$I = \frac{2k}{2k+3k} \cdot (-1mA)$$

5) mesh & KCL circuits

6) Thevenin & Norton

7) Dependent Sources

8) Pulses

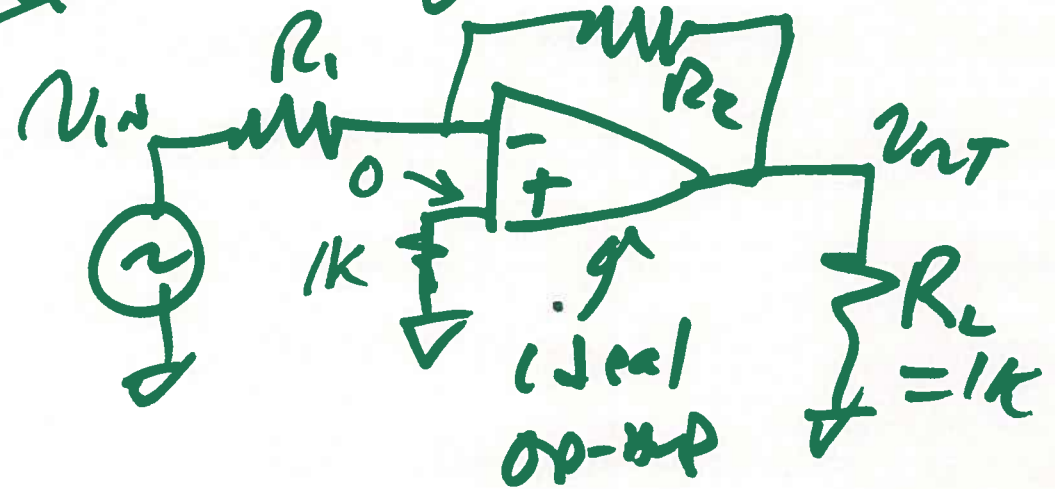


$$V_R(t) = V_f + (V_i - V_f)e^{-t/\tau}$$

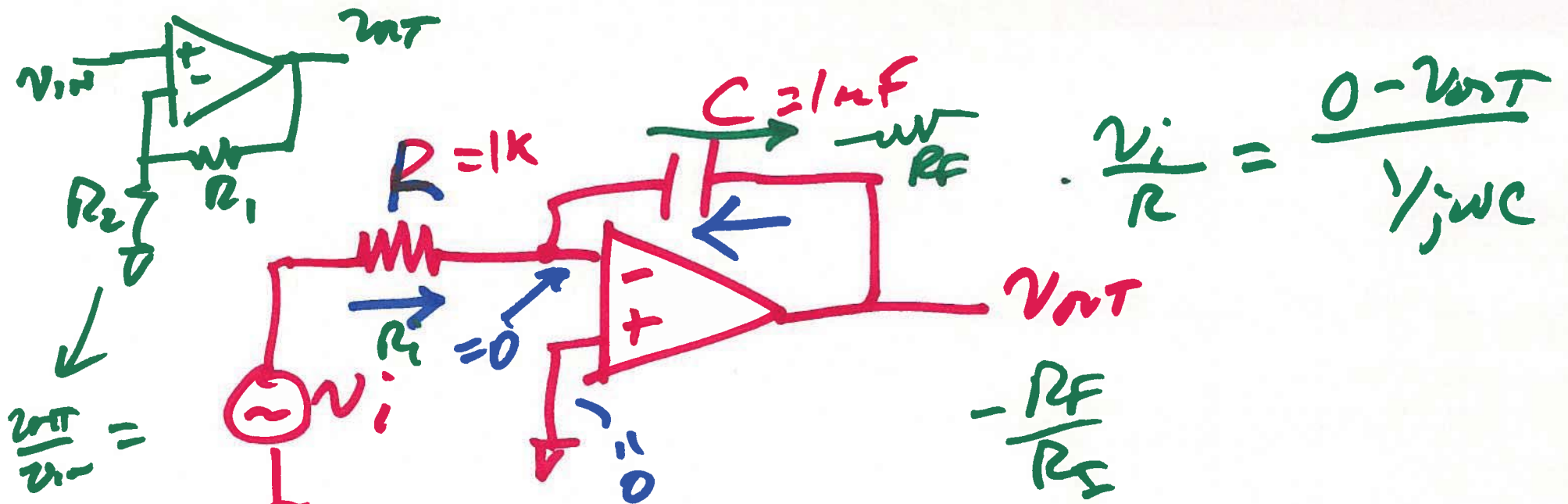
4)

9) OP-Amps

deriving gains



integration frequency



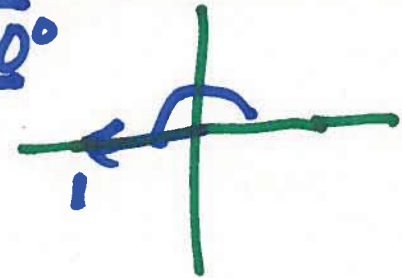
$$\begin{aligned}
 \frac{v_{out}}{v_{in}} &= \frac{R_1 + R_2}{R_2} \\
 &= 1 + \frac{R_1}{R_2}
 \end{aligned}$$

$$\frac{v_i}{R} + \frac{v_{out}}{1/j\omega C} = 0$$

$$\frac{v_{out}}{v_{in}} = \frac{-1/j\omega C}{R} = -\frac{1}{j\omega RC}$$

$$\frac{V_{NT}}{V_{in}} = \frac{-1}{j\omega CR} = \frac{1 \angle 180^\circ}{\omega CR \angle 90^\circ}$$

$$= \frac{159}{f}$$



$$\frac{V_{NT}}{V_{in}} = \frac{1}{2\pi f \cdot RC} \angle 90^\circ$$

TEST!

$20 \log 10^2$
 $40 \log 10$
 $= 40 \text{ dB}$

$$100 = 40 \text{ dB}$$

$$10 = 20 \text{ dB}$$

$$1 = 0 \text{ dB}$$

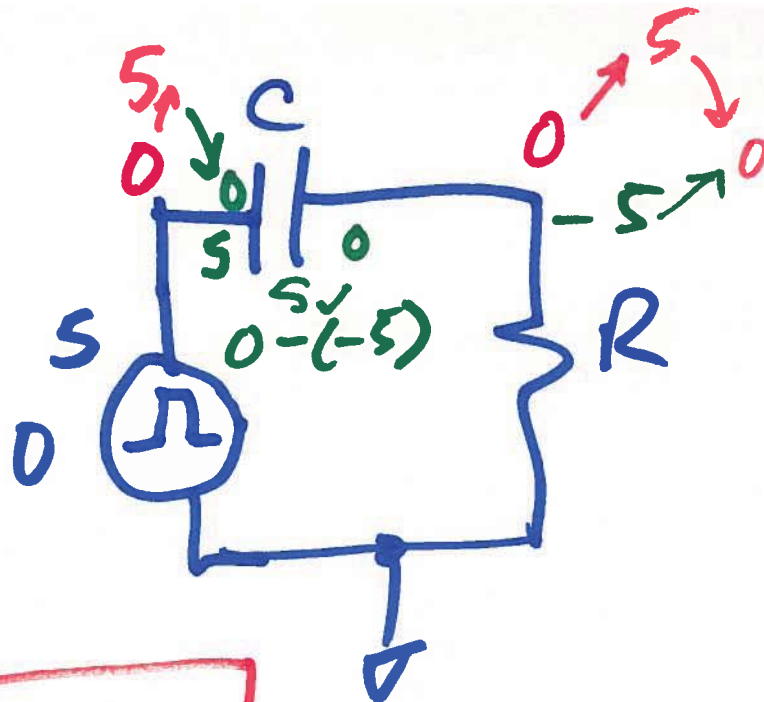
$$\frac{1}{10} = -20 \text{ dB}$$

90°

$-20 \frac{\text{dB}}{\text{dec}}$

$\angle \frac{V_{NT}}{V_{in}}$

$$\left| \frac{V_{NT}}{V_{in}} \right| = \frac{159}{f}$$



$$v_{in}(t) = v_f + (v_i - v_f)e^{-t/\tau}$$

$$= 5e^{-t/\tau}$$

$$v_{out}(t) = -5e^{-t/\tau}$$

