Note: Make sure the Bode Plots in P3-P4 are labeled with all critical frequencies and dB for gain plots. That is, if you can't figure out what the numerical gain is for a particular value of ω from the plot, then it isn't a Bode Plot. You may use the blank sheets on the next page for your plots or you may use engineering paper.

P1 **Concept:** Be able to convert from linear gain to decibel gains by hand

Do: Convert the following linear system gains to dB gains

a. x1
b. x10 000
c. x40
d. 0.01
e. $\sqrt{2}/2$

Hints:
- 40 = 10 x 2 x 2
- try multiplying the last problem by $\sqrt{2}/\sqrt{2}$

P2 **Concept:** Be able to convert decibel gains to linear gains by hand

Do: Convert the following dB gains to linear gains

a. 6 dB
b. 40 dB
c. -40 dB
d. 14 dB

Hint: 14 = 20 - 6

P3 **Concept:** Be able to sketch a Bode magnitude plot by hand

Do: Sketch the Bode plot between ω = 0.1 and 10k rad/s (magnitude only) of

$$H(s) = \frac{20(s+100)}{(s+10)(s+1000)}$$

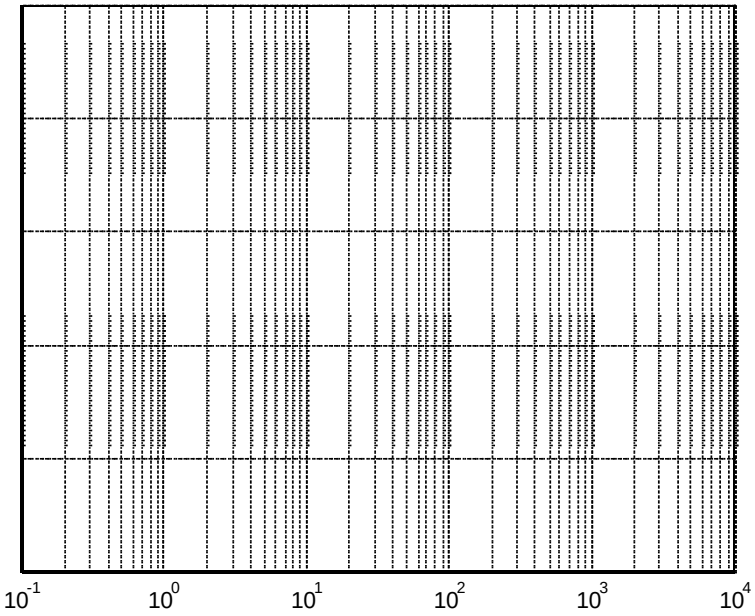
Hint: It should have two flat regions

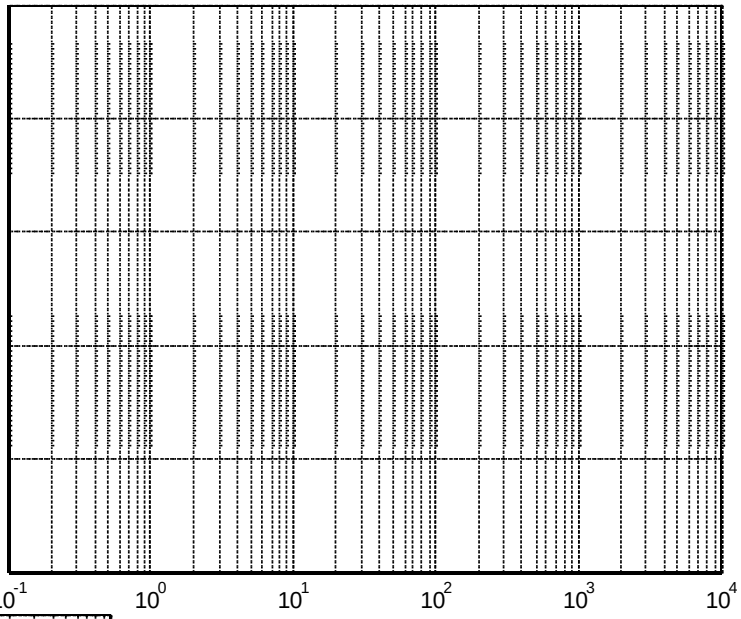
P4 **Concept:** Be able to sketch a Bode magnitude plot by hand

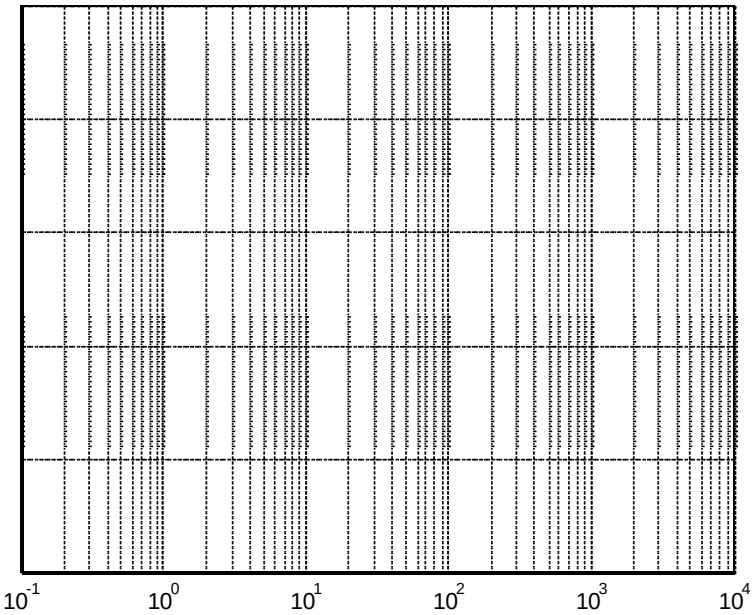
Do: Sketch the Bode plot between ω = 0.1 and 10k rad/s (magnitude only) of

$$H(s) = \frac{s}{(s+10)(s+200)}$$

Hint: It should be a passband filter (stops low and high frequencies)


10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}


10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}


10^{-1}
10^{0}
10^{1}
10^{2}
10^{3}
10^{4}