ME EN 6200
Homework 7
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Problem 3

a)

```
sys = tf([1 -4 20], [1 6 8]);
start_line = 0;
end_line = -4.5 + 8.93i;
damp_line = linspace(start_line, end_line);

figure;
[r,~] = rlocus(sys);
rlocus(sys);
hold on;
plot(damp_line);

upper_line = r(2,:);

[real_inter,
imag_inter]=polyxpoly(real(upper_line),imag(upper_line),real(damp_line),ima
g(damp_line));

s0 = real_inter + imag_inter*1i;

mag_G_hat = abs(((s0-(2+4i))*(s0-(2-4i)))/((s0+2)*(s0+4)));

k = 1/mag_G_hat;

fprintf('Intersection at: %.2f + %.2fj where   k=%.4f \n', real_inter,
imag_inter, k);
```

```
Intersection at: -1.53 + 3.03j and k=0.4171
```