

Homework 1

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Problem 1

```
%poles(1/(1-exp(-a*s)))
```

Problem 2

Problem 3

```
num = [1 5 6 9 30];  
den = [1 6 21 46 30];  
[r,p,k] = residue(num,den);  
poly2sym(r,s)
```

```
syms s  
F = (s^4+5*s^3+6*s^2+9*s+30)/(s^4+6*s^3+21*s^2+46*s+30);  
ilaplace(F)
```

```
ans =
```

```
s^3*((133*i)/78 - 253/234) + s^2*(- (133*i)/78 - 253/234) - (3*s)/26 + 23/18
```

```
ans =
```

```
(23*exp(-t))/18 - (3*exp(-3*t))/26 + dirac(t) - (253*exp(-t)*(cos(3*t) + (399*sin(3*t))/253)
```

Problem 4

```
z = [-1; -2];  
p = [0; -4; -6; 2+3i; 2-3i];  
k = 5;  
[num,den] = zp2tf(z,p,k);  
printsys(num,den,'s')
```

num/den =

$$\frac{5s^2 + 15s + 10}{s^5 + 6s^4 - 3s^3 + 34s^2 + 312s}$$

Problem 5

Problem 6