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%Homework 4/19
%Problem 1
%Functions given in problem
ex1=sym('x^2-1');
EX1=sym('X^2 - 1');
eq1=sym('x^2=1');
EQ1=sym('X^2 = 1');
%Substitute 4 for each equation
ex1sub4=subs(ex1, 'x', 4)
subs(EX1, 'X', 4);  %Result is 15, since it is 4^2-1=16-1=15
eq1sub4=subs(eq1, 'x',4)
subs(EQ1,'X',4); %Result shows 16==1
%Problem 2
%Define vector of even numbers from 0 to 10
v=[0:2:10];
ex1subv=subs(ex1, 'x', v)
subs(EX1, 'X', v);
eqlsubv=subs(eql,'x',v)
subs(EQ1, 'X', v);
This works for all four version of the expressions
%Problem 3
%Expressions/Equations given
ex4=sym('a*x^2 +b*x+c');
EX4 = sym('A*X^2 + B*X + C');
eq4=sym('a*x^2 +b*x+c=0');
EQ4=sym('A*X^2 +B*X +C=0');
%Substituting values
ex4sub=subs(ex4,{'a','b','c','x'},{3,4,5,(1:0.5:5)})
subs(EX4, {'A', 'B', 'C', 'X'}, {3,4,5, (1:0.5:5)});
eq4sub=subs(eq4,\{a',b',c',x'\}, \{3,4,5,(1:0.5:5)\})
subs(EQ4, {'A', 'B', 'C', 'X'}, {3,4,5, (1:0.5:5)});
%Results are symbolic
Warning: Support of character vectors that are not valid variable
names or
define a number will be removed in a future release. To create
 symbolic
expressions, first create symbolic variables and then use operations
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ex1sub4 =

15

eq1sub4 =

16 == 1

ex1subv =

[-1, 3, 15, 35, 63, 99]

eq1subv =

[0 == 1, 4 == 1, 16 == 1, 36 == 1, 64 == 1, 100 == 1]

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ex4sub =
[ 12, 71/4, 25, 135/4, 44, 223/4, 69, 335/4, 100]
eq4sub =
[ 12 == 0, 71/4 == 0, 25 == 0, 135/4 == 0, 44 == 0, 223/4 == 0, 69 == 0, 23/4 == 0, 69 == 0, 23/4 == 0, 69 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 == 0, 69/4 =
  0, 335/4 == 0, 100 == 0
%Chemical Processes
%Equations for each material balance
water=sym('0.2*mtop + 0.65*mbottom=50');
ethanol=sym('0.35*mtop + 0.25*mbottom - 100*x=0');
methanol=sym('0.45*mtop + 0.1*mbottom + 100*x = 50');
%Solve the system of equations for the three unknowns
solution=solve(water,ethanol,methanol);
%Solutions show up as a structure array, so to access them, I need to
  index
%the array
mtop=solution.mtop
mbottom=solution.mbottom
x=solution.x
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mtop =
33.3333333333333333333333333333333
```

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