[Problem 1]

format long;

h = 0.001;

hcur = 0;

double x;

sym x;

y = 0.5;

syms equprime(t);

syms final(x);

final(x) = x + (1/6\*(rk1 + 2\*(rk2) + 2\*(rk3) + rk4));

equprime(t) = -4\*(t) + 1;

syms k1(x);

syms k2(x);

syms k3(x);

syms k4(x);

k1(x) = h\*equprime(x);

k2(x) = h\*equprime(x + (k1(x)/2));

k3(x) = h\*equprime(x + (k2(x)/2));

k4(x) = h\*equprime(x + (k3(x)));

while(hcur < 5)

rk4 = k4(x);

rk3 = k3(x);

rk2 = k2(x);

rk1 = k1(x);

disp(double(final(y)));

y = final(y);

hcur = hcur + h;

End

0.500000000000000

[Problem 2]

sym x;

sym y;

sym t;

sym h;

xii=[];

yii=[];

tpA=[];

h = 0.1;

x = 2;

y = 3;

syms xp(t);

syms yp(t);

xp(t) = (t\*x) - (y\*y) + (3\*t);

yp(t) = (x\*x) - (t\*y) - (t\*t);

syms xpp(t);

syms ypp(t);

xpp(t) = (t\*xp(t)) + x - (2\*y\*yp(t)) + 3;

ypp(t) = (2\*x\*xp(t)) - (t\*yp(t)) - y - (2\*t);

syms xppp(t);

syms yppp(t);

xppp(t) = (t\*xpp(t)) + xp(t) + xp(t) -(2\*y\*ypp(t)) - (2\*yp(t)\*yp(t));

yppp(t) = (2\*x\*xpp(t)) + (2\*xp(t)\*xp(t)) - yp(t) - (t\*ypp(t)) - yp(t) - 2;

tp = 5;

while tp <= 6

xi = x + h\*xp(tp) + (h\*xpp(tp))/2 + (h\*xppp(tp))/6;

yi = y + h\*yp(tp) + (h\*ypp(tp))/2 + (h\*yppp(tp))/6;

disp(double((xi)));

disp(double((yi)));

xii(end+1) = double(xi);

yii(end+1) = double(yi);

x = xi;

y = yi;

tpA(end+1) = tp;

tp = tp + h;

end

