

$$1. a) y[n] + 0.5y[n-1] = 2x[n-1], x[n] = \delta[n], y[-1] = 0$$

$$y[n] = -0.5y[n-1] + 2x[n-1]$$

$$y[0] = -0.5y[-1] + 2\delta[-1] = 0$$

$$y[1] = -0.5y[0] + 2\delta[0] = 2$$

$$y[2] = -0.5y[1] + 2\delta[1] = -1$$

$$y[3] = -0.5y[2] + 2\delta[2] = 0.5$$

$$y[4] = -0.5y[3] + 2\delta[3] = -0.25$$

$$b) y[n] + 2y[n-1] = 2x[n-1], x[n] = \delta[n], y[-1] = 0$$

$$y[0] = -2y[-1] + 2\delta[-1] = 0$$

$$y[1] = -2y[0] + 2\delta[0] = 2$$

$$y[2] = -2y[1] + 2\delta[1] = -4$$

$$y[3] = -2y[2] + 2\delta[2] = 8$$

$$y[4] = -2y[3] + 2\delta[3] = -16$$

$$c) y[n] + 1.2y[n-1] + 0.32y[n-2] = x[n] - x[n-1], x[n] = u[n]$$

$$y[-2] = 1, y[-1] = 2$$

$$y[0] = -1.2y[-1] - 0.32y[-2] + u[0] - u[-1]$$

$$= -2.4 - 0.32 + 1 = -1.72$$

$$y[1] = -1.2y[0] - 0.32y[-1] + u[1] - u[0]$$

$$= 2.064 - 0.64 = 1.424$$

$$y[2] = -1.2y[1] - 0.32y[0] + u[2] - u[1]$$

$$= -1.7088 + 0.5504 = -1.1584$$

$$y[3] = 1.39008 - 0.45568 = 0.9344$$

$$y[4] = -1.12128 + 0.370688 = -0.7506$$

```

% a)
a=.5; b=[0 2];
n = 0:30;
y0 = 0;
x0 = 0;
x = zeros(size(n));
x(1) = 1;
y=recur(a,b,n,x,x0,y0);
subplot(221),stem(n,y)
title('1a')
xlabel('n')
ylabel('y[n]')
y(1:5) % displays y for n=0 to 5, used to double-check hand answers

```

```

% b)
a=2; b=[0 2];
n = 0:30;
y0 = 0;
x0 = 0;
x = zeros(size(n));
x(1) = 1;
y=recur(a,b,n,x,x0,y0);
subplot(222),stem(n,y)
title('1b')
xlabel('n')
ylabel('y[n]')
y(1:5)

```

```

% c)
a=[1.2 .32]; b = [1 -1];
y0 = [1 2];
x0 = 0;
x = ones(size(n));
y=recur(a,b,n,x,x0,y0);
subplot(223),stem(n,y)
title('1c')
xlabel('n')
ylabel('y[n]')
y(1:5)

```

