BLG 354E HW1

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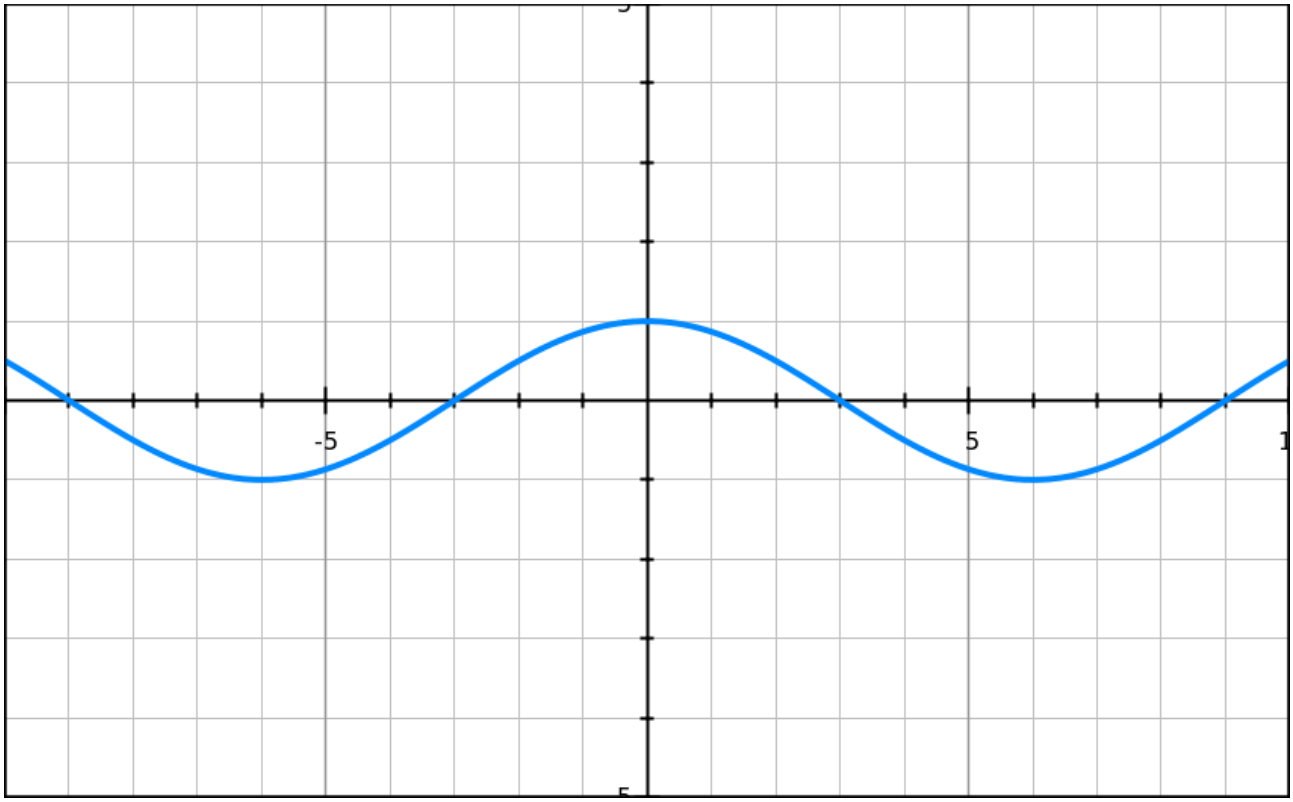
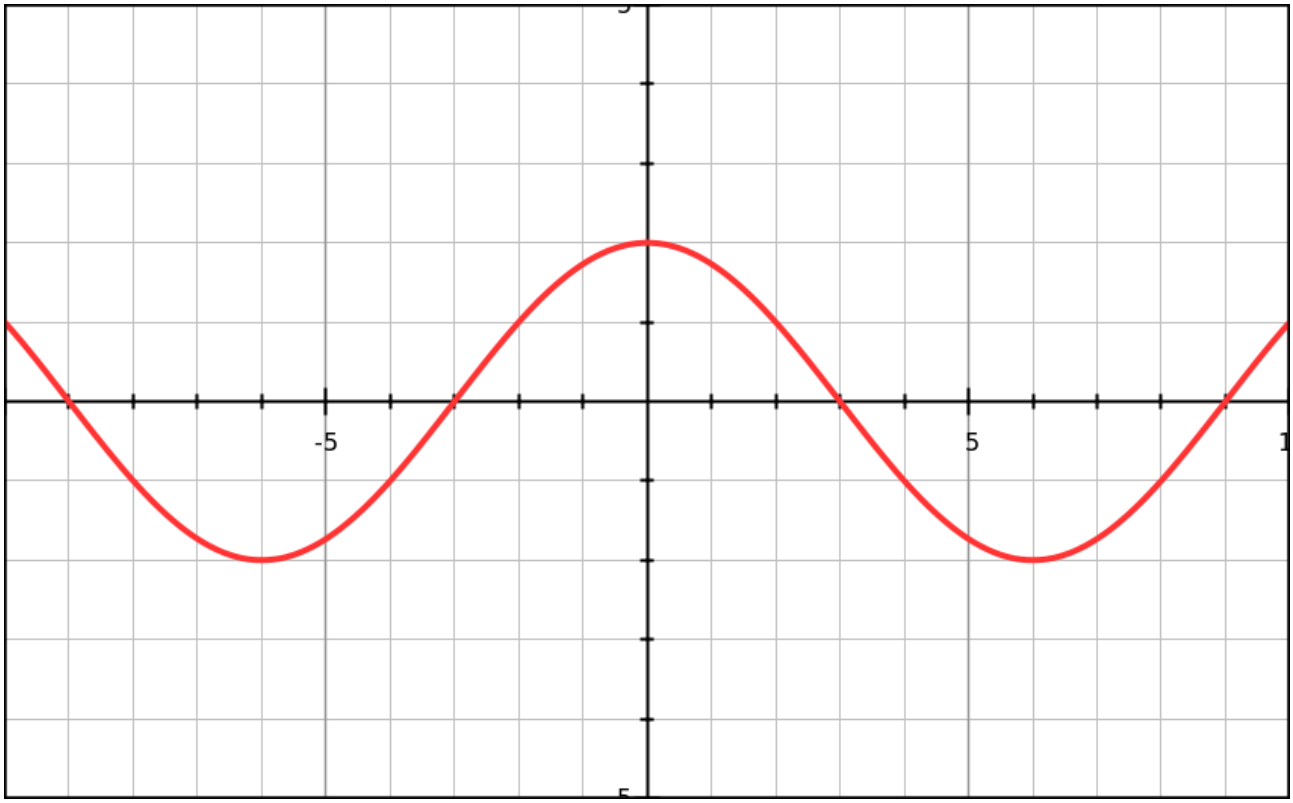
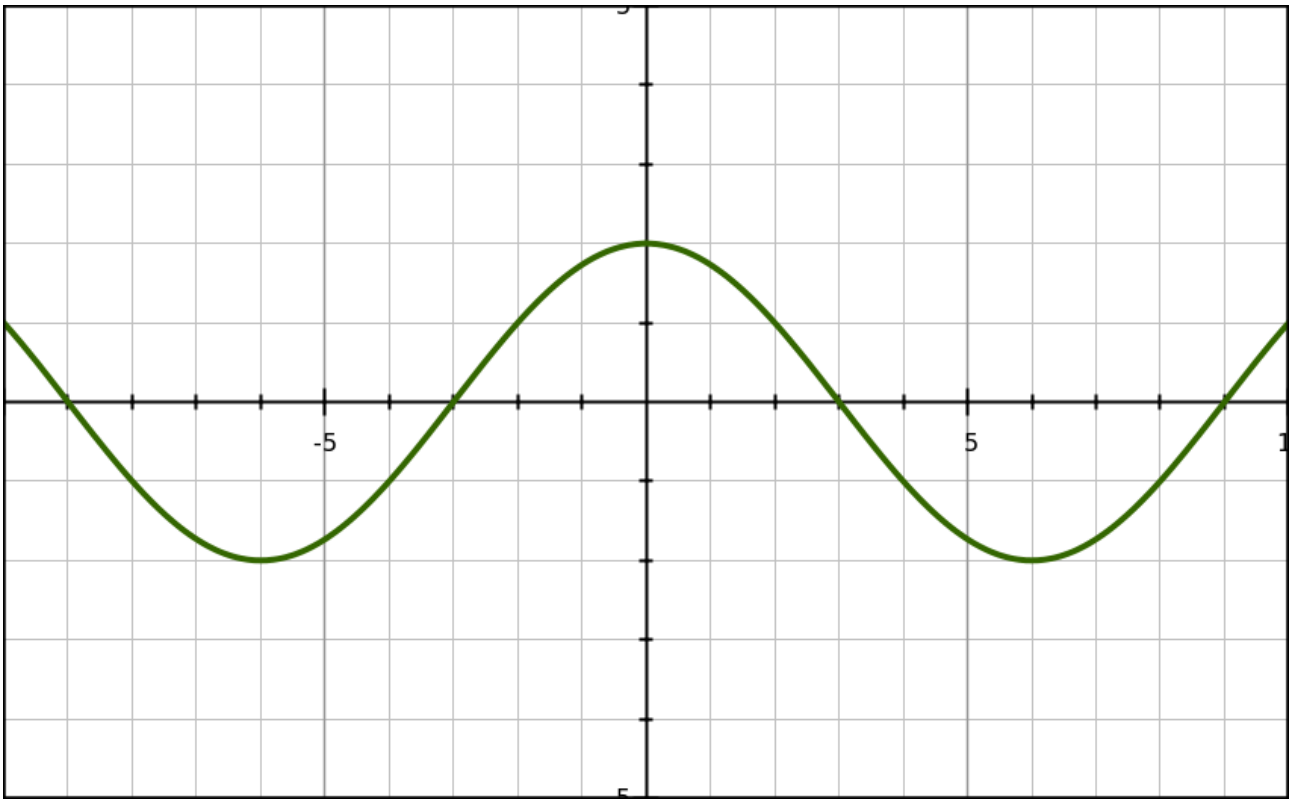
1) ID: 1 cos((pi/6)*x)



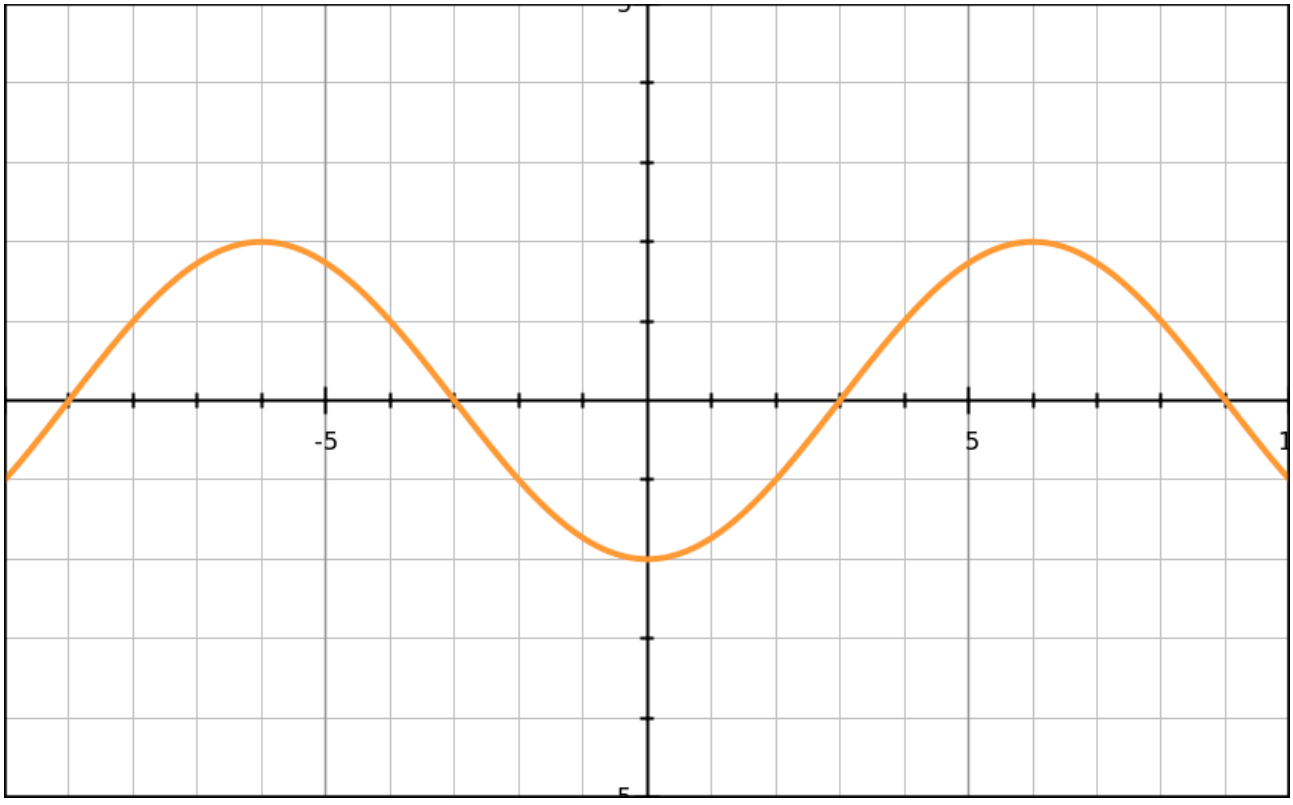
ID: 2 2*cos((pi/6)*x)



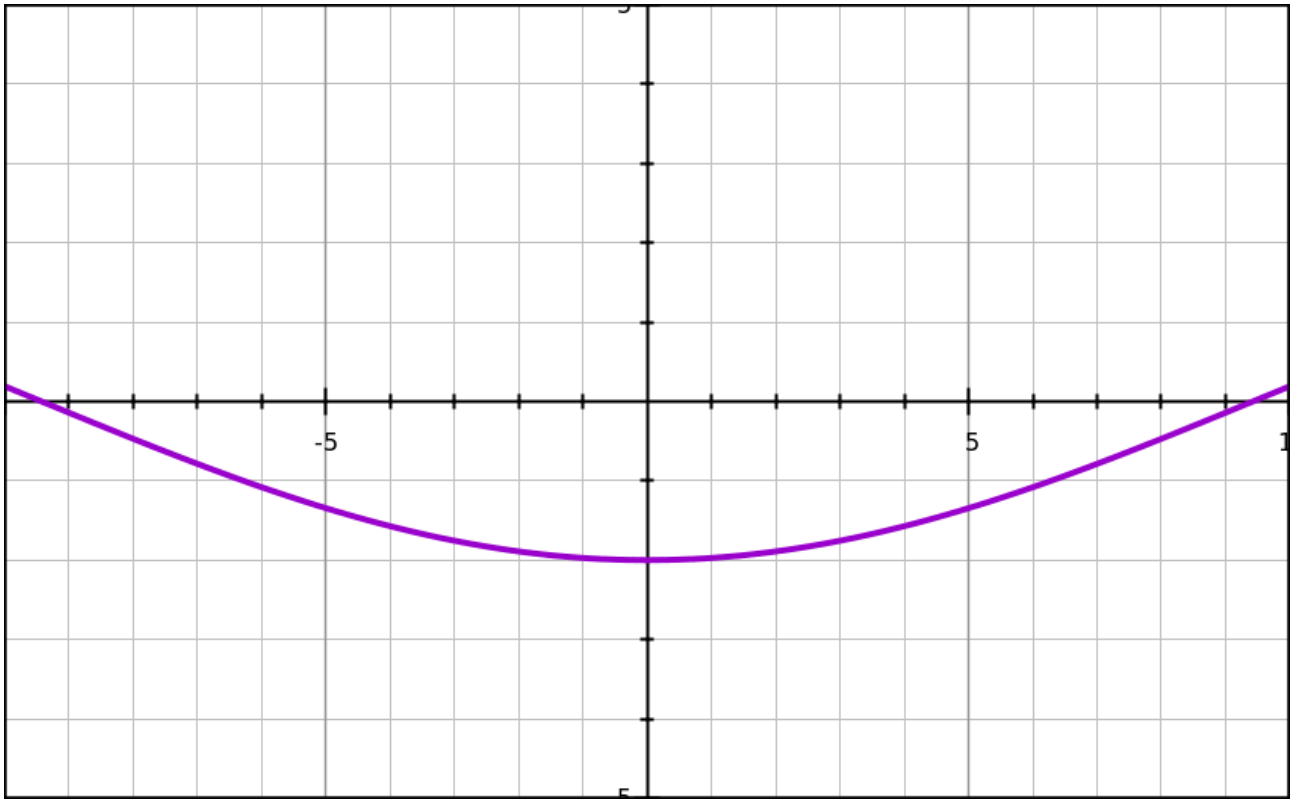
ID: 3 **2*cos((pi/6)*x+(4*pi))**



ID: 4 **2*cos((pi/6)*x+pi)**



ID: 5 **2*cos((1/6)*x+pi)**



- 1st and the 2nd signals' difference is amplitude.
- 2nd and 3rd signals are the same. 3Rd one is time-shifted. Period is 2*pi and that is why they are looking the same.
- 3rd and 4th signals' difference is their □ value. Period is 2*pi and 4th signal's shift is just pi.
- 4th and 5th signals' difference is □0 value. 1/6 is bigger than pi/6. That is why 5th signal's x coordinates are bigger that 4th one.

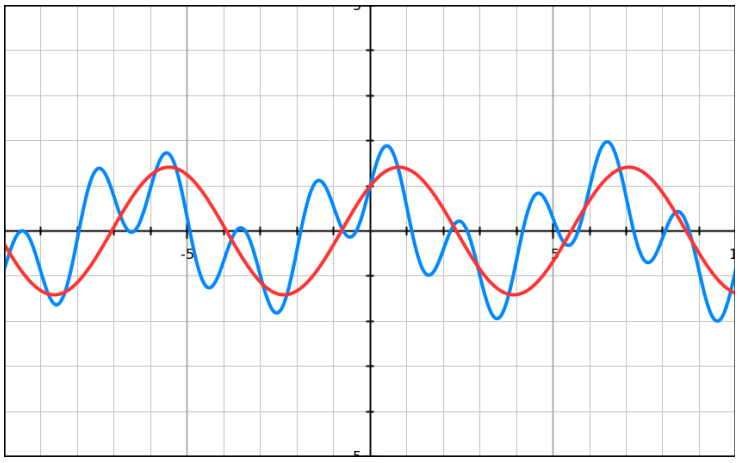
Update: These graphs plotted like cts-time ones but they have to be discrete-time graphs.

2) x1 = cos(t), x2 = sin(pi*t)

a) x1 period = 2*pi / W0 = 2*pi / 1 = 2*pi
x2 period = 2*pi / W0 = 2*pi / pi = 2

b) x3(t) = x1(t) + x2(t) = cos(t) + sin(pi*t)
- Period of x3 = 2*pi / 2 = pi --> It is irrational it cannot be periodic.

Blue: x3(t) **Red:** cos(t) + sin(t)



3) In rar file

4) y(t) = t*u(t) * x(t)

a) x1-> y1, x2->y2 then a*x1+b*x2->a*y1+b*y2

y1(t) = t*u(t) * x1(t)

y2(t) = t*u(t) * x2(t)

x3 = x1 + x2 = t*u(t) * x1(t) + t*u(t) * x2(t)

y3 = t*u(t) * x3(t) = t*u(t) * (x1(t) + x2(t)) = t*u(t) * x1(t) + t*u(t) * x2(t)

- They are equal (y3 and x3) so this system is linear.

b) This system is memoryless because system does not require previous time x(t) data (et. x(t-1)).

c) This system is casual because system does not require future time x(t) data. It only uses present time's data (et. x(t+2)).

d) x(t) = t*u(t) * x(t) x(t-t0) = t*u(t) * x(t-t0)

y(t) = t*u(t) * x(t) y(t-t0) = (t-t0) * u(t-t0) * x(t-t0)

- They are not equal (x(t-t0) and y(t-t0)) so this system is time-varient.

5) In rar file