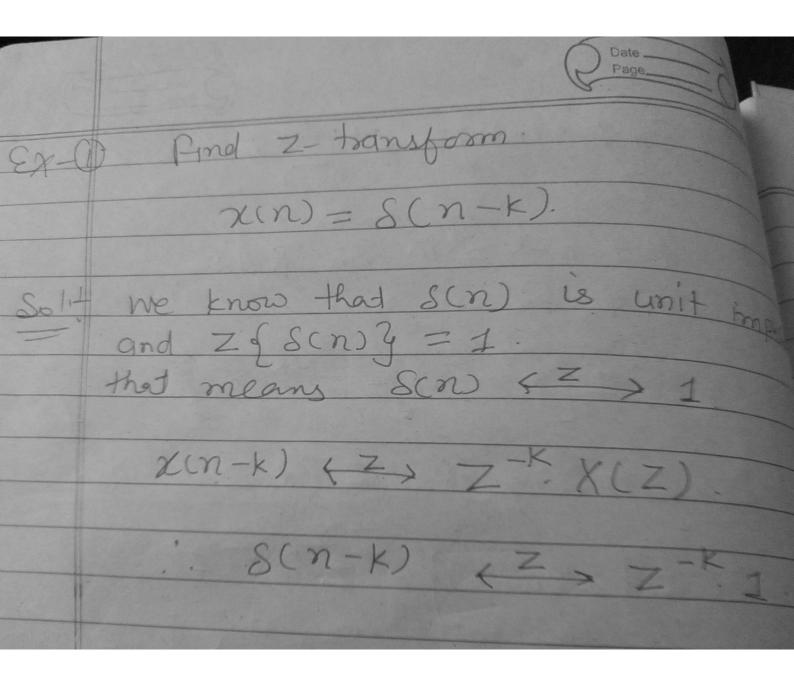
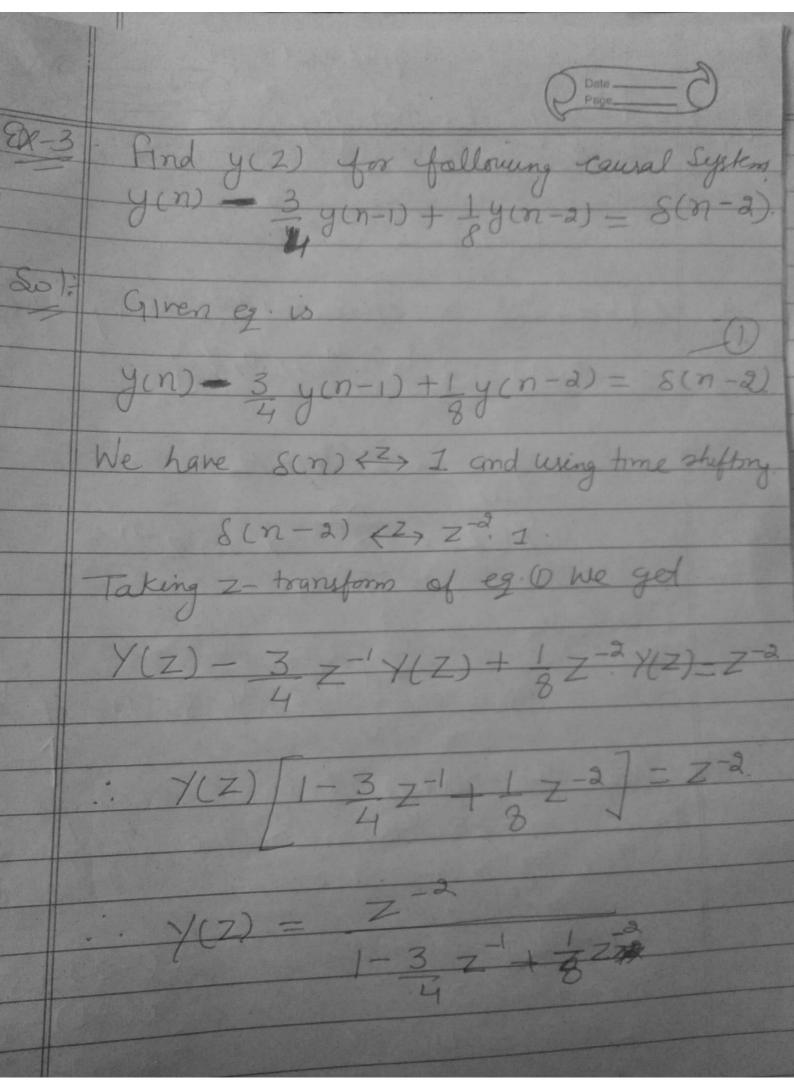


2. Time Shifting! Statement sent: $4 \times (n) \stackrel{/}{\leftarrow} X(Z)$ then xin-k) (Z) Z-KX(Z) swoff Acc. to defention of Z-bansbonnt Z { x(n) } = X(z) = = = x(n) z -n then z{x(n-k)} can be written as; Z S z (n-k) = = = x (n-k) z = = Now z-n can be written as z-n=z-n-k) Z{x(n-k)}= = x(n-k)z-(n-k)z-k

Z (x(n-K))= z-K 2 x(n-K) z-6 Put n-K= m on R'45 Replace n = m. : Z { x (n - k) } = Z - k = x (m) Z - m compare the eg. (2) with (1) · Z = x(n-k) = Z-K. X(Z). $\chi(n-k) \stackrel{Z}{\longleftrightarrow} Z^{-k} \chi(Z)$ Similarly it can be written xin+k) {z,> -+k,>



EX-2:	The 2 goods
	$\chi(n) = 8(n+2)$
Solt	we have
	$S(n) \stackrel{Z}{\longleftrightarrow} 1$
	Using time shifting property.
	$\chi(n+k) \stackrel{Z}{\longleftrightarrow} Z^{+k} \chi(z)$
F	$S(n+2) < \frac{2}{2} > \frac{2}{2}$ C := Entire 2-plane except 2= 0
Service of the servic	



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EX-4 Find z transform of fas 3 mill + 9 y y n 20. Page C Solf We have standard z-transform pair; Caswon um = Z-2 Z Caswo

Z2 2 Z Caswo+1 consider the term cos(nII). chere wo = IT : - Cas (n !) = Z = Z cos(!) z= 2 Z Cas (I4) +1 - z'- 0.707z Z2 1.414Z+1 According to time shifting property x(n+k) = Z.X(Z) 2 0.707.

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Ex. 3.3.11: Express the Z transform of

$$y(n) = \sum_{k=-\infty}^{n} x(k) \text{ in terms of } X(Z).$$

soln.: The given expression is,

$$y(n) = \sum_{k=-\infty}^{n} x(k)$$

- Let us expand the summation

$$y(n) = x(-\infty) + ... + x(0) + x(1) + ... + x(n-1) + x(n)$$

Replace 'n' by 'n - 1' in Equation (1)

$$y(n-1) = \sum_{k=-\infty}^{n-1} x(k)$$

Expanding Equation (3) we get,

$$y(n-1) = x(-\infty) + ... + x(0) + x(1) + ... + x(n)$$

Subtracting Equation (4) from Equation (2) we get,

$$y(n)-y(n-1) = x(n)$$

Taking Z transform of both sides,

$$Y(Z)-Z^{-1}Y(Z) = X(Z)$$

$$: Y(Z)[1-Z^{-1}] = X(Z)$$

$$: X(Z) = Y(Z)[1-Z^{-1}]$$

$$x_1(n) = \{1, 2, 3, 4, 0, 1\}$$

Using time shifting property find Z-transform of x₂ (n) where

$$x_2(n) = \{1, 2, 3, 4, 0, 1\}$$

Soln.:

Comparing the given sequences, we can conclude that $x_2(n)$ is advanced verse. the advance is by two units.

$$x_2(n) = x_1(n+2)$$

According to time shifting property

$$x(n+k) \stackrel{Z}{\longleftrightarrow} Z^k X(Z)$$

$$\therefore x(n+2) \stackrel{Z}{\longleftrightarrow} Z^2 X(Z)$$

Now we will obtain $X_1(Z)$

Here
$$x_1(n) = \{1, 2, 3, 4, 0, 1\}$$

According to definition of Z-transform.

$$X_1(Z) = \sum_{n=-\infty}^{\infty} x(n)Z^{-n}$$

Here range of sequence x (n) is from n = 0 to 5

$$X_1(Z) = \sum_{n=0}^{5} x(n)Z^{-n}$$

Expanding the summation and putting the values of x (n) we get,

$$X_1(Z) = 1Z^0 + 2Z^{-1} + 3Z^{-2} + 4Z^{-3} + 0 + 1Z^{-5}$$

Using Equations (1) and (2) we can write,

$$Z\{x_2(n)\} = Z^2[1+2Z^{-1}+3Z^{-2}+4Z^{-3}+Z^{-5}]$$

$$X_2(Z) = Z^2 + 2Z + 3 + 4Z^{-1} + Z^{-3}$$

oc:

This is two sided finite duration sequence. Thus ROC is entire Z-plan ∞.