Laurent Series and z-Transform - Case Examples 0.B

20170205

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		1 2 (2-0.5) (2-2)	2 3 (2-2)(2-0.5)
z < 1	f(2)	Case To	Case (I)
161 > 2	Χ(₹)	Case m	Case (IV
151 5 2	f(2)	(વ <u>જ</u> 🔟	Case (I)
	X(2)	Case m	Case (I)

(ase I)
$$f(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$$
 $\chi(z) = \frac{3}{2} \frac{-z^2}{(2-2)(2-0.5)}$

(ase (1))
$$f(z) = \frac{3}{2} \frac{-z^2}{(2-2)(2-0.5)} \qquad \chi(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$$

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		1 (2-0.5) (2-2)	2 = -2² (2-0.5)
라 < 1	f(2)	Case (n>0)	case (n70)
	Χ(₹)	(n≤0)	(ase I) (n<0)
	f(2)	case (n <0)	Case (II) (NSO)
2 > 2	X(2)	Case (n)0)	Case (n>0)

Case I
$$f(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$$
 $\chi(z) = \frac{3}{2} \frac{-z^2}{(2-2)(2-0.5)}$

Case (II)
$$f(z) = \frac{3}{2} \frac{-z^2}{(2-2)(2-0.5)}$$
 $\chi(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$

Case (11)
$$f(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$$
 $\chi(z) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$

(ase (1))
$$f(z) = \frac{3}{2} \frac{-z^2}{(z-2)(z-0.5)}$$
 $\chi(z) = \frac{3}{2} \frac{-z^2}{(z-2)(z-0.5)}$

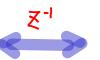
		1 (2-0.5) (2-2)	$2^{\frac{3}{2}} \frac{-\xi^2}{(2-2)(2-0.5)}$
라 < 寸	f(₹)	Case (n>0)	
161 > 2	X(3)		(ase I) (n<0)
	f(2)	case (n <0)	⁻℩ Ď
2 > 2	X(2)		Case (n>0)

		1 (2-0.5) (2-2)	$2^{\frac{3}{2}}\frac{-\xi^2}{(2-2)(2-0.5)}$
2 < 글	f(2)	- D	(450 (5)
161 / 3	Χ(₹)	Case ((n ≤ 0)	
	f(2)		Case (II) (n≤o)
2 > 2	X(2)	Case (n)0)	

		1 (2-0.2) (3-2)	2 3 - 2² (2-2)(2-0.5)
논 < 1	f(2)	Case To	
	Χ(₹)	Case To	
z > 2	f({ })	Case TI	
	X(₹)	(45c m	

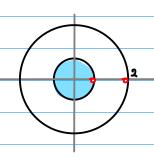
		1 (2-0.5)(5-2)	2 3 22 (2 - 0.5)
논 < 寸	f(₹)	(-h)	case (ty
	X(2)		Case (I)
z > 2	f(2)	- D	Case (IV
	X(2)		Case (IV

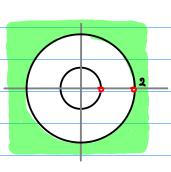
$$\frac{1}{2}(5) = \frac{5}{3} \frac{(5-0.2)(5-5)}{-1}$$



$$\frac{1}{2}(5) = \frac{3}{5} \frac{(5-0.5)(5-5)}{(5-0.5)(5-0.5)} \times (5) = \frac{3}{5} \frac{(5-5)(5-0.5)}{(5-5)(5-0.5)}$$

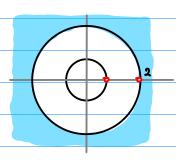
$$-\frac{2}{1-22}+\frac{0.5}{1-0.52}$$

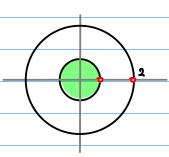




$$\sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] Z^n$$

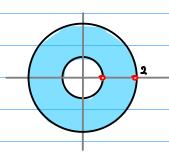
$$\sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] \stackrel{?}{\neq}^{-n}$$

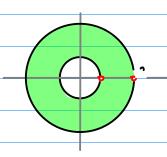




$$\sum_{n=-1}^{\infty} \left[2^{n+1} - \left(\frac{1}{2} \right)^{n+1} \right] \, \Xi^n$$

$$\sum_{n=-1}^{\infty} \left[2^{n+1} - \left(\frac{1}{2} \right)^{n+1} \right] \, \, \xi^{-n}$$





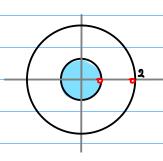
$$\sum_{n=-1}^{N-1} 2^{n+1} z^n + \sum_{n=0}^{N-1} (\frac{1}{2})^{n+1} z^n = \frac{1}{N-1}$$

$$\sum_{n=-1}^{n} 2^{n+1} \xi^{-n} + \sum_{n=0}^{\infty} (\frac{1}{2})^{n+1} \xi^{-n}$$

2. B
$$\int (z) = \frac{3}{2} \frac{-z^2}{(2-2)(2-0.5)}$$
 $\times (2) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$

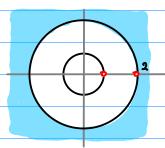


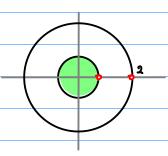
$$X(2) = \frac{3}{2} \frac{-1}{(2-0.5)(2-2)}$$



$$\sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] Z^{-n}$$

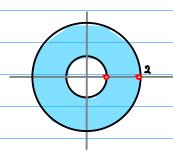
$$\sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] \, \mathbb{Z}^n$$





$$\sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2} \right)^{n-1} \right] z^{-n}$$

$$\sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2}\right)^{n-1} \right] \quad \Xi^n$$

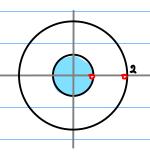


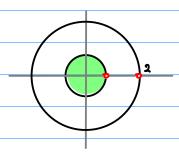
$$\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{n-1} \xi^{-n} + \sum_{n=0}^{\infty} 2^{n-1} \xi^{-n}$$

$$\sum_{-\infty}^{u=0} 5_{u-1} \xi_u + \sum_{\infty}^{u=1} \left(\frac{7}{7}\right)_{u-1} \xi_u$$

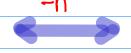
3.5
$$\int (z) = \frac{3}{2} \frac{-1}{(2-1)(2-2)}$$
 $=$ $X(2) = \frac{3}{2} \frac{-1}{(2-1)(2-2)}$

$$X(2) = \frac{3}{2} \frac{-1}{(2-1)(2-2)}$$

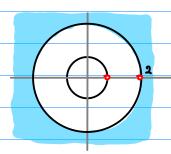


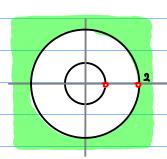


$$\sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] \frac{2}{5}^{n}$$

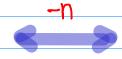


$$\sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2}\right)^{n-1} \right] \vec{z}^{-n}$$

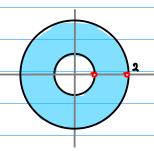


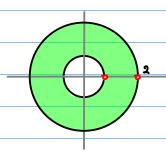


$$\sum_{n=-1}^{\infty} \left[2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \right] \, \xi^n$$



$$\sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] \, \Xi^{-n}$$



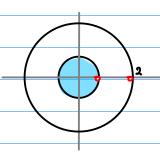


$$\sum_{n=1}^{n=1} 5_{n+1} S_n + \sum_{n=0}^{n=0} (\frac{\pi}{1})_{n+1} S_n$$



$$\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{n-1} z^{-n} + \sum_{n=0}^{-\infty} 2^{n-1} z^{-n}$$

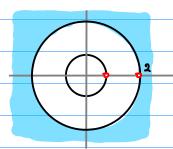
$$\int (z) = \frac{3}{2} \frac{-0.5 z^2}{(z-1)(z-0.5)} = X(z) = \frac{3}{2} \frac{-0.5 z^2}{(z-1)(z-0.5)}$$



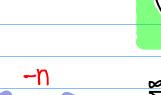
$$\sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] \, \mathbb{Z}^n$$



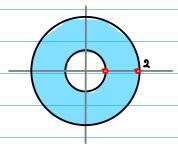
$$\sum_{n=-1}^{-\infty} \left[2^{n+1} - \left(\frac{1}{2} \right)^{n+1} \right] \Xi^{-n}$$



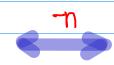
$$\sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2} \right)^{n-1} \right] \quad \Xi^n$$



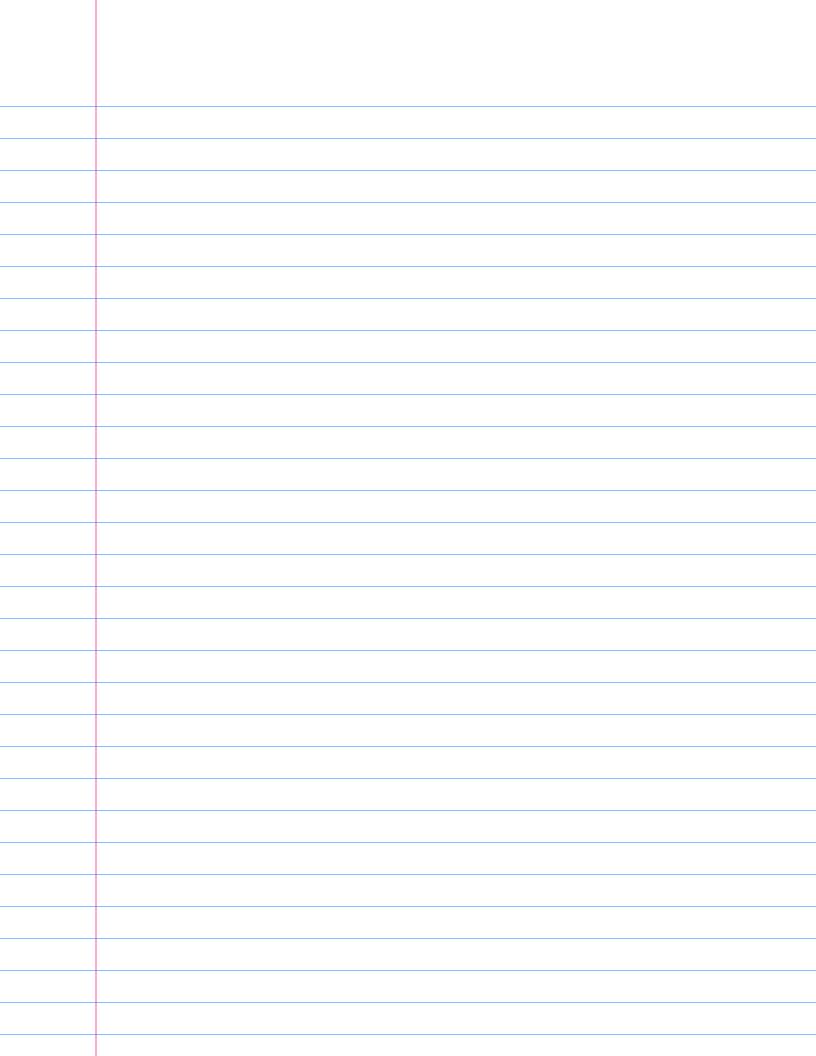
$$\sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] \not\in {\mathbb{Z}}^{-n}$$



$$\sum_{n=0}^{\infty} z_{n-1} \, \xi_n + \sum_{\infty}^{N=1} \left(\frac{1}{2}\right)_{n-1} \xi_n$$

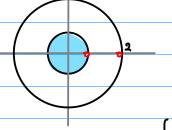


$$\sum_{n=0}^{\infty} \left(\frac{1}{2}\right)^{n+1} \xi^{-n} + \sum_{n=-1}^{-\infty} \lambda^{n+1} \xi^{-n}$$



$$\frac{1}{2}(5) = \frac{3}{3} \frac{(5-0.5)(5-5)}{(5-0.5)(5-0.5)} \times (5) = \frac{3}{3} \frac{(5-5)(5-0.5)}{(5-5)(5-0.5)}$$

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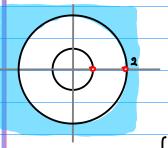


$$Q_{\eta} = \begin{cases} \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(\frac{1}{2}\right)^{n+1} \\ Q & \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(\frac{1}{2}\right)^{n+1} \end{cases}$$

$$f(z) = \sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] Z^n$$

$$\mathcal{I}_{n} = \begin{bmatrix} \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(n \geqslant 0\right) \\ 0 & \left(n < 0\right) \end{bmatrix}$$

$$\chi(z) = \sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] z^{-n}$$

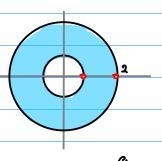


$$\mathcal{O}_{\eta} = \begin{cases} \mathcal{O} & (\eta > 0) \\ 2^{\eta + 1} - \left(\frac{1}{2}\right)^{\eta + 1} & (\eta < 0) \end{cases}$$

$$f(\xi) = \sum_{n=-1}^{-\infty} \left[2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \right] \xi^n$$

$$\chi_{n} = \begin{cases}
\nabla & (\gamma > 0) \\
2^{n+1} - \left(\frac{1}{2}\right)^{n+1} & (\gamma < 0)
\end{cases}$$

$$\chi(\xi) = \sum_{n=1}^{\infty} \left[2^{n+1} - \left(\frac{1}{2} \right)^{n+1} \right] \xi^{-n}$$



$$f(z) = \sum_{n=-1}^{\infty} 2^{n+1} z^n + \sum_{n=0}^{\infty} (\frac{1}{2})^{n+1} z^n$$

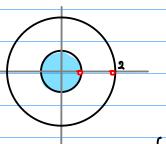
$$X_{\eta} = \begin{cases} 2^{n+1} & (\gamma > 0) \\ (\frac{1}{2})^{n+1} & (\gamma < 0) \end{cases}$$

$$\chi(\xi) = \sum_{n=-1}^{-100} z^{n+1} \xi^{-n} + \sum_{n=0}^{n=0} (\frac{1}{2})^{n+1} \xi^{-n}$$

$$\int (5) = \frac{7}{3} \frac{(5-5)(5-0.5)}{-\zeta_5}$$

$$X(2) = \frac{3}{2} \frac{(2-0.5)(2-2)}{(2-0.5)(2-2)}$$

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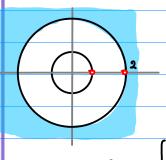


$$O_{n} = \begin{cases} \left[\left(\frac{1}{2} \right)^{n+} - 2^{n+} \right] & (n > 0) \\ O & (n \leq 0) \end{cases}$$

$$f(3) = \sum_{n=1}^{\infty} \left[\left(\frac{1}{7} \right)_{n-1} - 5_{n-1} \right] \xi_{-n}$$

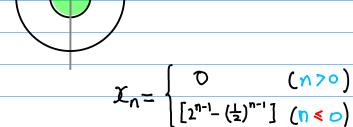
$$\mathcal{I}_{n} = \begin{bmatrix} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] & (n > 0) \\ 0 & (n < 0) \end{bmatrix}$$

$$\chi(\xi) = \sum_{n=1}^{\infty} \left[\left(\frac{1}{2}\right)^{n-1} - 2^{n-1} \right] \xi^n$$

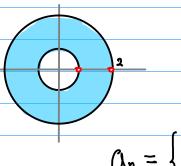


$$\mathcal{O}_{\eta} = \left\{ \begin{array}{c} \mathcal{O} & (\eta > 0) \\ \left[2^{n-1} - \left(\frac{1}{2} \right)^{n-1} \right] & (\eta \leq 0) \end{array} \right.$$

$$f(z) = \sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2}\right)^{n-1} \right] z^{-n}$$

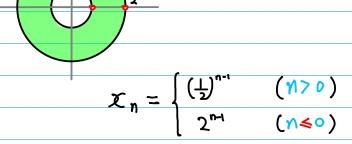


$$\chi(\xi) = \sum_{n=0}^{-\infty} \left[2^{n-1} - \left(\frac{1}{2} \right)^{n-1} \right] \xi^n$$



$$Q_{n} = \begin{cases} \left(\frac{1}{2}\right)^{n-1} & (n < 0) \\ 2^{n-1} & (n < 0) \end{cases}$$

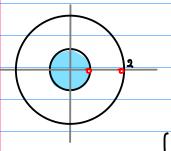
$$f(s) = \sum_{n=0}^{\infty} J_{n-1} s_{-n} + \sum_{n=1}^{\infty} \left(\frac{1}{7}\right)_{n-1} S_{-n}$$



$$\chi(\xi) = \sum_{n=0}^{N=0} s_{n-1} \, \xi_n + \sum_{\infty}^{N=1} \left(\frac{1}{2}\right)_{n-1} \xi_n$$

3.
$$D = \frac{3}{2} \frac{(3-1)(3-2)}{(3-1)(3-2)} = X(3) = \frac{3}{2} \frac{(3-1)(3-2)}{(3-1)(3-2)}$$

$$X(2) = \frac{3}{3} \frac{(3-1)(3-2)}{(3-1)(3-2)}$$



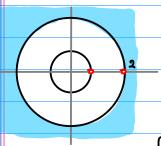
$$O_{\eta} = \begin{cases} \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(\frac{1}{2}\right) \\ O & \left(\frac{1}{2}\right) \end{cases}$$

$$f(z) = \sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)^{n+1} - 2^{n+1} \right] Z^n$$

$$\chi_{n} = \begin{cases}
0 & (n > 0) \\
2^{n-1} - (\frac{1}{2})^{n-1} & (n < 0)
\end{cases}$$

$$\chi(\xi) = \sum_{n=0}^{\infty} \left[2^{n-1} - \left(\frac{1}{2}\right)^{n-1} \right] \xi^{-n}$$





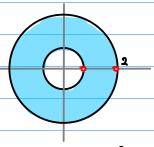
$$\mathcal{O}_{n} = \begin{cases} \mathcal{O} & (n \ge 0) \\ 2^{n+1} - \left(\frac{1}{2}\right)^{n+1} & (n < 0) \end{cases}$$

$$f(z) = \sum_{n=-1}^{\infty} \left[2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \right] Z^n$$

$$\chi_{n} = \begin{cases} \left(\frac{1}{2}\right)^{n-1} - 2^{n-1} & (n > 0) \\ 0 & (n \leq 0) \end{cases}$$

$$\chi(\xi) = \sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] \xi^{-n}$$





$$f(s) = \sum_{n=-1}^{n=-1} s_{n+1} s_n + \sum_{n=0}^{n=0} (\frac{1}{2})_{n+1} s_n$$

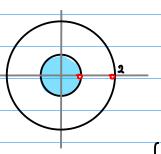
$$\mathcal{X}_{\eta} = \begin{cases} \left(\frac{1}{2}\right)^{n-1} & \left(\frac{1}{2}\right) \\ 2^{n-1} & \left(\frac{1}{2}\right) \end{cases}$$

$$X(\xi) = \sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{n-1} \xi^{-n} + \sum_{n=0}^{\infty} 2^{n-1} \xi^{-n}$$

$$\int (\xi) = \frac{3}{2} \frac{-0.5 \, \xi^2}{(\xi - 1)(z - 0.5)} = \chi(\xi) = \frac{3}{2} \frac{-0.5 \, \xi^2}{(\xi - 1)(z - 0.5)}$$

$$X(z) = \frac{3}{2} \frac{-0.5 z^2}{(2-1)(z-0.5)}$$



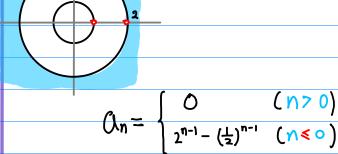


$$O_{n} = \begin{cases} \left(\frac{1}{2}\right)^{n-1} - 2^{n-1} & (1 > 0) \\ O & (1 < 0) \end{cases}$$

$$\int (\xi) = \sum_{n=1}^{\infty} \left[\left(\frac{1}{2} \right)^{n-1} - 2^{n-1} \right] \, \xi^n$$

$$I_{n} = \begin{cases} O & (n \ge 0) \\ 2^{n+1} - (\frac{1}{2})^{n+1} & (n < 0) \end{cases}$$

$$\chi(\xi) = \sum_{n=-1}^{-\infty} \left[2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \right] \xi^{-n}$$

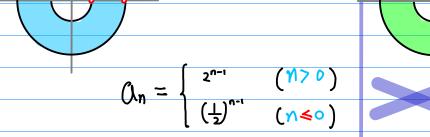


$$f(z) = \sum_{n=0}^{-\infty} \left[2^{n-1} - \left(\frac{1}{2}\right)^{n-1} \right] \stackrel{?}{Z}^n$$

$$\mathcal{I}_{n} = \begin{cases} \left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & (n \ge 0) \\ 0 & (n < 0) \end{cases}$$

$$\chi(\xi) = \sum_{n=0}^{\infty} \left[\left(\frac{1}{2} \right)_{n+1} - 3_{n+1} \right] \xi^{-n}$$

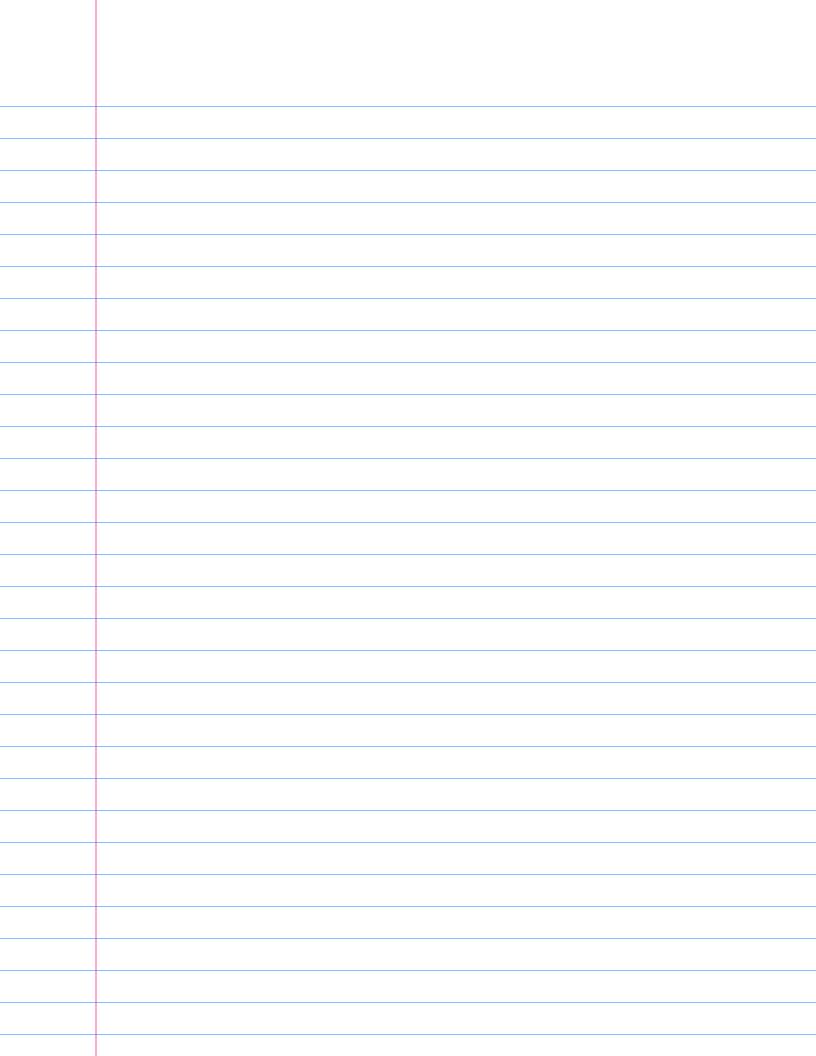




$$f(z) = \sum_{n=0}^{\infty} z_{n-1} \xi_n + \sum_{n=1}^{\infty} \left(\frac{1}{2}\right)_{n-1} \xi_n$$

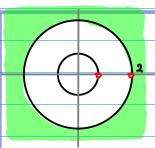
$$X_{\eta} = \begin{cases} \left(\frac{1}{2}\right)^{n+1} & (\gamma \geq 0) \\ \lambda^{n+1} & (\gamma < 0) \end{cases}$$

$$X(z) = \sum_{n=0}^{\infty} (\frac{1}{2})^{n+1} z^{-n} + \sum_{n=-1}^{\infty} x^{n+1} z^{-n}$$

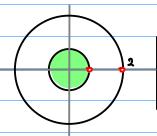


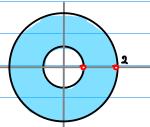
$$a_n = x_n$$

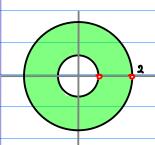




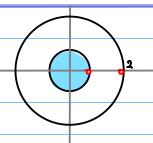
$$2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \left(\frac{n < 0}{2}\right)$$

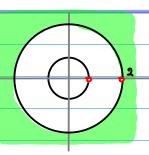




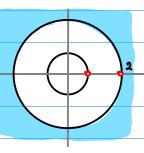


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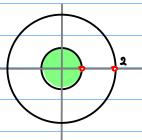


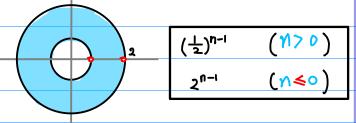
(II)

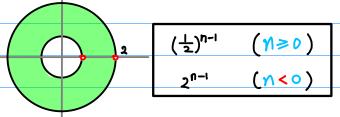


$$O \qquad (n > 0)$$

$$2^{n-1} - \left(\frac{1}{2}\right)^{n-1} (n \le 0)$$

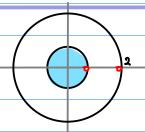


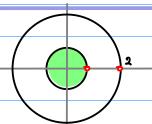




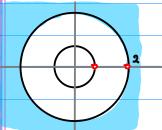
$$(s)X = X(s)$$

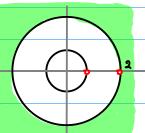
$$Q_n \stackrel{-n}{\longleftrightarrow} \chi_n$$



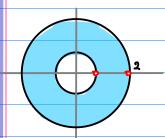


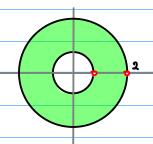
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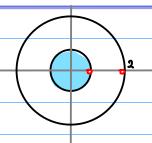


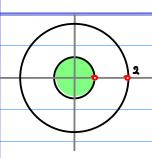
$$\begin{array}{c|c}
2^{n-1} - \left(\frac{1}{2}\right)^{n-1} & (n > 0) \\
\hline
0 & (n \leq 0)
\end{array}$$



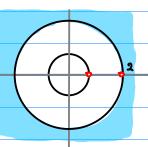


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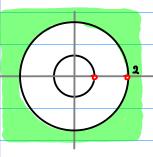




$$\begin{array}{c|c}
\hline
O & \left(n \geqslant 0\right) \\
\hline
\left(\frac{1}{2}\right)^{n+1} - 2^{n+1} & \left(n < 0\right)
\end{array}$$



$$\begin{array}{c}
O \\
2^{n-1} - \left(\frac{1}{2}\right)^{n-1} (n \leq 0)
\end{array}$$



$$2^{n+1} - \left(\frac{1}{2}\right)^{n+1} \left(n \ge 0\right)$$

$$(n < 0)$$

