

JEE Advanced 2024 Mock Test 4 solution

1. <https://youtu.be/H98dx1RlaTI>
2. <https://youtu.be/3gw9ArqfiuY>
3. <https://youtu.be/lqUxjbNQcfs>
4. <https://youtu.be/5Xsz-NfHn1M>
5. <https://youtu.be/33NEwC0BrC8> Time stamp 16:30
6. <https://youtu.be/05S2vZWEKOA>
<https://youtu.be/5Sg9m5Z3XsE>
https://youtu.be/nuykbE_Fsmg
<https://youtu.be/cgX3VPCI3RI>
7. https://youtu.be/j5kfwdl_kbs
8. <https://youtu.be/wuex1TL8siw> Timestamp 22:45
9. https://youtu.be/NIRGA18_suQ 3:05:00
10. <https://youtu.be/7vT6dsT4AXU>
11. <https://youtu.be/zKu3B20ke2k>
12. <https://youtu.be/V9mNQuHnHZk>
- 13.

(13) $\lim_{t \rightarrow x+1} \frac{2 + f(x+1) - (x+1)^2 f'(t)}{f'(t)} = 1$

$$(x+1)^2 f'(x+1) + f'(x+1) = 2(x+1)f(x+1)$$

or $f'(x)(x+1) = 2xf(x)$

$$\frac{f'(x)}{f(x)} = \frac{2x}{x+1}$$

$$\ln f(x) = \ln(x+1) + \ln c \quad (2)$$

$$f(x) = x+1$$

$$\lim_{x \rightarrow 1} \frac{\ln(x+1) - \ln 2}{x-1} = 1$$

14. https://youtu.be/onaA3_9nuZE
15. <https://youtu.be/FFYTWIXd5bo> Timestamp 19:20

16. <https://youtu.be/xGeQbk9u9DU> Timestamp 17:40

17. <https://youtu.be/7HeMcyjYF670> Timestamp 8:27

18.

$$a_{n+1} = a_n + \sqrt{1+a_n^2} \quad a_0 = 0$$

$$a_1 = a_0 + \sqrt{1+0} = 1 = \cot \frac{\pi}{4} = \cot \theta \quad \theta = \frac{\pi}{4}$$

$$a_2 = \cot \theta + \csc \theta = \frac{1+\cos \theta}{\sin \theta} = \cot \frac{\theta}{2}$$

$$a_3 = \cot \frac{\theta}{2^2}$$

$$\vdots$$

$$a_n = \cot \frac{\theta}{2^{n+1}}$$

$$\lim_{n \rightarrow \infty} \frac{a_n}{2^{n+1}} = \lim_{n \rightarrow \infty} \frac{\cot \frac{\theta}{2^{n+1}}}{2^{n+1} \cdot \theta}$$

$$= \lim_{n \rightarrow \infty} \frac{\theta/2^{n+1}}{\tan \frac{\theta}{2^{n+1}}} \cdot \frac{1}{\theta} = \frac{1}{\theta} = \frac{4}{\pi}$$