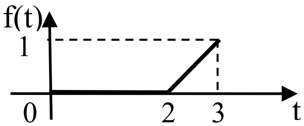
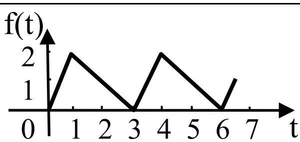
Условия задач

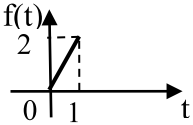
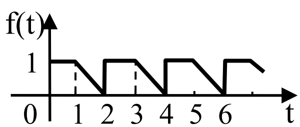
Задача 1. Определить, является ли данная функция оригиналом.
Задача 2. Найти изображение.
Задача 3. Найти изображение.
Задача 4. Найти изображение.
Задача 5. Найти изображение.
Задача 6. Найти изображение.
Задача 7. Найти изображение функции, заданной графически.
Задача 8. Найти изображение.
Задача 9. Найти изображение.
Задача 10. Найти изображение.
Задача 11. Найти изображение периодической функции *f(t)*, которая задана графически.
Задача 12. Найти изображение.
Задача 13. Найти оригинал.
Задача 14. Найти оригинал.
Задача 15. Найти оригинал.
Задача 16. Решить дифференциальное уравнение, удовлетворяющее начальным условиям.
Задача 17. Решить дифференциальное уравнение, удовлетворяющее начальным условиям.
Задача 18. Решить дифференциальное уравнение, удовлетворяющее начальным условиям.
Задача 19. Решить систему дифференциальных уравнений при заданных начальных условиях.
Задача 20. Применяя формулу Дюамеля, решить дифференциальное уравнение при заданных начальных условиях.

Вариант 1

Условие	Ответ
1. $f(t)=\cos^2 t$	1. Да
2. $f(t)=\sin^2 2t$	2. $F(p)=\dfrac{8}{p(p^2+16)}$
3. $f(t)=e^{2t}ch\,t+sh\,t$	3. $F(p)=\dfrac{(p^2-5)(p-1)}{(p^2-4p+3)(p^2-1)}$
4. $f(t)=\int\limits_0^t t^2e^{-2t}dt$	4. $F(p)=\dfrac{2!}{p(p+2)^3}$
5. $f(t)=sh\,3(t-5)\eta(t-5)$	5. $F(p)=\dfrac{3e^{-5p}}{p^2-9}$
6. $f(t)=\int\limits_0^t \tau^2 ch(t-\tau)d\tau$	6. $F(p)=\dfrac{2}{p^2(p^2-25)}$
7. 	7. $F(p)=\dfrac{e^{-2p}}{p^2}(1-e^{-p}(1+p))$
8. $f(t)=(t^2-4t+5)\eta(t-2)$	8. $F(p)=\dfrac{e^{-2p}}{p^3}(2+p^2)$
9. $f(t)=(t\cdot\cos 2t\cdot e^{3t})'$	9. $F(p)=\dfrac{p^3-6p^2+5p}{(p^2-6p+13)^2}$
10. $f(t)=\int\limits_0^t \dfrac{1-e^{-2t}}{t}dt$	10. $F(p)=\dfrac{1}{p}\ln\dfrac{p+2}{p}$
11. 	11. $F(p)=\dfrac{2-3e^{-p}+e^{-3p}}{p^2(1-e^{-3p})}$

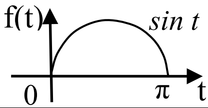
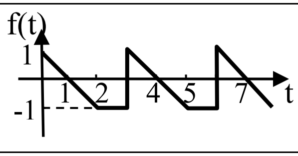
12. $f(t)=\int\limits_0^t \left(t^3 e^{-3t}\right)' ch\,2t\,dt$	12. $F(p)=\dfrac{3(p-2)}{p(p+1)^4}+\dfrac{3(p+2)}{p(p+5)^4}$
13. $F(p)=\dfrac{2e^{-3p}}{(p-4)^2}$	13. $f(t)=2(t-3)\,e^{4(t-3)}\eta(t-3)$
14. $F(p)=\dfrac{1}{p(p^2+2p+2)}$	14. $f(t)=\dfrac{1}{2}-\dfrac{e^{-t}}{2}(\cos t+\sin t)$
15. $F(p)=\dfrac{4}{p^2(p^2-p-12)}$	15. $f(t)=\dfrac{1}{36}-\dfrac{t}{3}+\dfrac{e^{4t}}{28}-\dfrac{4e^{-3t}}{63}$
16. $y''+2y'+y=f(t)$, где $f(t)=\begin{cases}1, & t\in[0,2],\\ 0, & t>2,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=1-e^{-t}-te^{-t}-$ $-\eta(t-2)+e^{-(t-2)}\eta(t-2)$ $-(t-2)e^{-(t-2)}\eta(t-2)$
17. $x''-2x'-8x=7sh2t$ $x(0)=0,\quad x'(0)=4$	17. $x(t)=\dfrac{7}{12}te^{-2t}-\dfrac{7}{16}e^{2t}+$ $+\dfrac{31}{36}e^{4t}-\dfrac{61}{144}e^{-2t}$
18. $x''+4x=2\cos 2t$ $x(0)=x'(0)=-4$	18. $x(t)=\dfrac{1}{2}t\sin 2t-2\sin 2t-$ $-4\cos 2t$
19. $\begin{cases}x'-x-y=-e^{2t}\\ y'+2y+2x=e^{t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\dfrac{1}{2}e^{t}-\dfrac{2}{3}e^{2t}+\dfrac{1}{6}e^{-t}$ $y(t)=-\dfrac{1}{3}e^{-t}+\dfrac{1}{3}e^{2t}$
20. $x''+3x'+2x=\dfrac{1}{1+e^{t}}$ $x(0)=x'(0)=0$	20. $x(t)=(e^{-t}+e^{-2t})\ln\dfrac{1+e^{t}}{2}-e^{-t}+e^{-2t}$

Вариант 2

Условие	Ответ
1. $f(t)=\sin^2 t+1$	1. Да
2. $f(t)=\cos^2 t$	2. $F(p)=\dfrac{p^2+2}{p(p^2+4)}$
3. $f(t)=e^{2t}\cos 2t-e^{2t}\sin 2t$	3. $F(p)=\dfrac{p-4}{p^2-4p+8}$
4. $f(t)=\int\limits_0^t t\,ch^2 2t\,dt$	4. $F(p)=\dfrac{1}{2p^3}+\dfrac{p^2+16}{2p(p^2-16)^2}$
5. $f(t)=sh4(t-7)\eta(t-7)$	5. $F(p)=\dfrac{4e^{-7p}}{p^2-16}$
6. $f(t)=\int\limits_0^t (t-\tau)^4 ch7\tau\,d\tau$	6. $F(p)=\dfrac{24}{p^4(p^2-49)}$
7. 	7. $F(p)=\dfrac{2}{p^2}(1-e^{-p}-pe^{-p})$
8. $f(t)=(t^2-9)\eta(t-3)$	8. $F(p)=\dfrac{2e^{-3p}}{p^3}(1+3p+18p^2)$
9. $f(t)=e^{2(t-2)}\sin(3t-6)\eta(t-2)$	9. $F(p)=\dfrac{3e^{-2p}}{(p-2)^2+9}$
10. $f(t)=\int\limits_0^t \dfrac{sh\tau-sh2\tau}{\tau}d\tau$	10. $F(p)=\dfrac{1}{4p}\ln\dfrac{(p-1)^2(p+2)}{(p+1)^2(p-2)}$
11. 	11. $F(p)=\dfrac{p+e^{-2p}-e^{-p}}{p^2(1+e^{-2p})}$

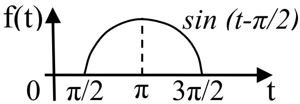
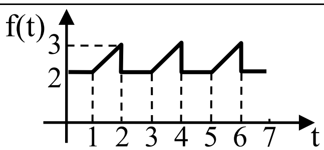
12. $f(t)=\int_0^t \sin^2 3t \frac{d^2}{dt^2}(t^2-e^{-t})dt$	12. $F(p)=\frac{36}{p^2(p^2+36)}-$ $-\frac{1}{2p(p+1)}+\frac{p+1}{2p(p^2+2p+37)}$
13. $F(p)=\frac{3e^{-5p}}{(p-6)^2}$	13. $f(t)=3(t-5)e^{6(t-5)}\eta(t-5)$
14. $F(p)=\frac{p+1}{(p+2)(p^2+3)}$	14. $f(t)=-\frac{1}{7}e^{-2t}+\frac{1}{7}\cos\sqrt{3}\,t$ $+\frac{5}{7\sqrt{3}}\sin\sqrt{3}\,t$
15. $F(p)=\frac{-1}{p(p^2-2p-15)}$	15. $f(t)=\frac{1}{15}-\frac{1}{24}e^{-3t}-\frac{1}{40}e^{5t}$
16. $y''+y'=f(t)$, где $f(t)=\begin{cases}0, & t\in[0,1) \\ 2, & t\in[1,2], \\ 0, & t>2,\end{cases}$ $y(0)=0$, $y'(0)=1$	16. $y(t)=2(t-1)\eta(t-1)-$ $-2\eta(t-1)+2e^{-(t-1)}\eta(t-1)+$ $+2\eta(t-2)-2(t-2)\eta(t-2)-$ $-2e^{-(t-2)}\eta(t-2)+1-e^{-t}$
17. $x''+2x'-3x=4sh3t$ $x(0)=0,\quad x'(0)=-1$	17. $x(t)=\frac{11}{24}e^{-3t}+\frac{1}{2}te^{-3t}+$ $+\frac{1}{6}e^{3t}-\frac{5}{8}e^{t}$
18. $x''+9x=3\cos 3t$ $x(0)=0,\ x'(0)=-6$	18. $x(t)=\sin 3t\cdot(\frac{t}{2}-2)$
19. $\begin{cases}x'+x+y=-e^{2t} \\ y'-2x-2y=e^{3t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\frac{2}{3}-\frac{e^{3t}}{6}-\frac{e^{t}}{2}$ $y(t)=-\frac{2}{3}+\frac{2}{3}e^{3t}-e^{2t}+e^{t}$
20. $x''=\ln(1+4t^2)$ $x(0)=x'(0)=0$	20. $x(t)=\frac{1}{8}-\frac{3}{2}t^2+t\cdot arctg2t+$ $\frac{1}{2}t^2\ln(1+4t^2)-\frac{1}{8}\ln(1+4t^2)$

Вариант 3

Условие	Ответ
1. $f(t)=\dfrac{1}{\sqrt{t}}$	1. Нет
2. $f(t)=t+\sin t$	2. $F(p)=\dfrac{2p^2+1}{p^2(p^2+1)}$
3. $f(t)=e^{2t}\cos t+\sin t$	3. $F(p)=\dfrac{p^3-p^2-3p+3}{(p^2+1)(p^2-4p+5)}$
4. $f(t)=\int\limits_0^t tsh^2t\,dt$	4. $F(p)=\dfrac{4+p^2}{2p(p^2-4)^2}-\dfrac{1}{2p^3}$
5. $f(t)=\cos 3(t-5)\eta(t-5)$	5. $F(p)=\dfrac{p\,e^{-5p}}{p^2+9}$
6. $f(t)=\int\limits_0^t (t-\tau)^2 ch3\tau\, d\tau$	6. $F(p)=\dfrac{2}{p^2(p^2-9)}$
7. 	7. $F(p)=\dfrac{1+e^{-\pi p}}{1+p^2}$
8. $f(t)=(3t^2-4t+1)\eta(t-1)$	8. $F(p)=(\dfrac{6}{p^3}+\dfrac{2}{p^2})\cdot e^{-p}$
9. $f(t)=(t-1)^2e^{(2t-2)}\eta(t-1)$	9. $F(p)=\dfrac{2e^{-p}}{(p-2)^3}$
10. $f(t)=\{(e^t\cdot t)'t\}'$	10. $F(p)=\dfrac{p^2+p}{(p-1)^3}$
11. 	11. $F(p)=\dfrac{p-1+e^{-2p}+pe^{-3p}}{p^2(1-e^{-3p})}$

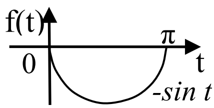
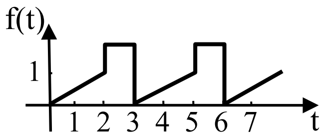
12. $f(t)=\int\limits_0^t \frac{\cos 3t-\cos 2t}{t}\,dt$	12. $F(p)=\frac{1}{2p}\ln\frac{p^2+4}{p^2+9}$
13. $F(p)=\frac{4p+3}{(p^2+9)(p+1)}$	13. $f(t)=\frac{1}{10}\cos 3t+\frac{13}{10}\sin 3t-\frac{1}{10}e^{-t}$
14. $F(p)=\frac{d}{dp}\left(\frac{2p-2}{(p-1)^2+2}\right)$	14. $f(t)=-2t\,e^{t}\cos t\sqrt{2}$
15. $F(p)=\frac{-6}{p^2(p^2-7p+12)}$	15. $f(t)=\frac{-7}{24}-\frac{t}{2}+\frac{2e^{3t}}{3}-\frac{3e^{4t}}{8}$
16. $y''+y=f(t)$, где $f(t)=\begin{cases}1-t, & 0\le t\le 1,\\ 0, & t>1,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=1-t-\cos t+\sin t+$ $+(t-1)\eta(t-1)-$ $-\sin(t-1)\eta(t-1)$
17. $x''+14x'+49x=3e^{3t}$ $x(0)=0,\quad x'(0)=-1$	17. $x(t)=\frac{3e^{3t}}{100}-\frac{3e^{-7t}}{100}-\frac{13}{10}t\,e^{-7t}$
18. $x''+x=\cos t$ $x(0)=0\ \ x'(0)=-2$	18. $x(t)=(\frac{1}{2}t-2)\sin t$
19. $\begin{cases}x'+x+y=e^{t}\\ y'+2y+2x=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-\frac{1}{2}-\frac{e^{2t}}{10}+\frac{3}{4}e^{t}-\frac{3}{20}e^{-3t}$ $y(t)=\frac{1}{2}+\frac{3}{10}e^{2t}-\frac{e^{t}}{2}-\frac{3}{10}e^{-3t}$
20. $x''+5x'+6x=\frac{1}{1+e^{t}}$ $x(0)=x'(0)=0$	20. $x(t)=\frac{1}{2}(e^{-t}-e^{-3t})-$ $-(e^{-2t}+e^{-3t})\ln\frac{1+e^{t}}{2}$

Вариант 4

Условие	Ответ
1. $f(t)=\dfrac{1}{t-1}$	1. Нет
2. $f(t)=ch2t+e^{-t}sh2t$	2. $F(p)=\dfrac{p^3+4p^2-3p-8}{(p^2-4)(p^2+2p-3)}$
3. $f(t)=\cos 2(t-5)e^{-(t-5)}\eta(t-5)$	3. $F(p)=\dfrac{(p+1)e^{-5p}}{(p+1)^2+4}$
4. $f(t)=\int\limits_0^t t^2e^{3t}dt$	4. $F(p)=\dfrac{2}{p(p-3)^3}$
5. $f(t)=ch^2(t-4)\eta(t-4)$	5. $F(p)=\dfrac{p^2-2}{p(p^2-4)}e^{-4p}$
6. $f(t)=\int\limits_0^t (t-\tau)^3\cos 3\tau\, d\tau$	6. $F(p)=\dfrac{6}{p^3(p^2+9)}$
7. 	7. $F(p)=\dfrac{1}{p^2+1}(e^{-\frac{\pi}{2}p}+e^{-\frac{3\pi}{2}p})$
8. $f(t)=(\dfrac{t^2}{4}-t-24)\eta(t-8)$	8. $F(p)=(\dfrac{1}{2p^3}+\dfrac{3}{p^2}-\dfrac{16}{p})e^{-8p}$
9. $f(t)=(t\cdot ch2t\cdot sh2t)'$	9. $F(p)=\dfrac{4p^2}{(p^2-16)^2}$
10. $f(t)=\dfrac{1}{t}\left(\int\limits_0^t\left(\int\limits_0^\tau \sin\gamma\, d\gamma\right)d\tau\right)$	10. $F(p)=\dfrac{1}{p}-\dfrac{\pi}{2}+arctg\ p$
11. 	11. $F(p)=\dfrac{2p+e^{-p}-e^{-2p}(1+3p)}{p^2(1-e^{-2p})}$

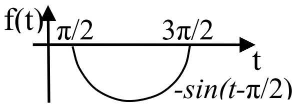
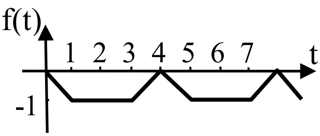
12. $f(t)=\int\limits_0^t \frac{ch\,2\tau - ch\,\tau}{\tau}\,d\tau$	12. $F(p)=\frac{1}{2p}\ln\left\vert\frac{p^2-1}{p^2-4}\right\vert$
13. $F(p)=\frac{p^2+2}{(p-1)(p^2+1)}$	13. $f(t)=\frac{3}{2}e^t-\frac{1}{2}(\cos t+\sin t)$
14. $F(p)=\frac{3e^{-2p}}{(p-1)^3}$	14. $f(t)=\frac{3}{2}(t-2)^2e^{t-2}\eta(t-2)$
15. $F(p)=\frac{1}{p^3+2p^2+5p}$	15. $f(t)=\frac{1}{5}-\frac{1}{5}e^{-t}\cos 2t-\frac{1}{10}e^{-t}\sin 2t$
16. $y''+y=f(t)$, где $f(t)=\begin{cases} t, & t\in[0;1],\\ 0, & t>1,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=t-\sin t-\eta(t-1)-$ $-(t-1)\eta(t-1)+\sin(t-1)\eta(t-1)$ $+\cos(t-1)\eta(t-1)$
17. $x''-12x'+36x=-7e^{-t}$ $x(0)=0,\quad x'(0)=2$	17. $x(t)=\frac{1}{7}e^{6t}-\frac{1}{7}e^{-t}-t\,e^{6t}$
18. $x''+36x=6\cos 6t$ $x(0)=0\;\; x'(0)=-3$	18. $x(t)=\frac{1}{2}t\sin 6t-\frac{1}{2}\sin 6t$
19. $\begin{cases} x'+2x+2y=2e^t\\ y'-x-y=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=3-\frac{e^{2t}}{3}-\frac{8}{3}e^{-t}$ $y(t)=-3+\frac{2}{3}e^{2t}+e^t+\frac{4}{3}e^{-t}$
20. $x''=\ln(1+t^2)$ $x(0)=x'(0)=0$	20. $x(t)=\frac{1}{2}-\frac{3}{2}t^2+2t\cdot arctg\,t+$ $+\frac{1}{2}t^2\ln(1+t^2)-\frac{1}{2}\ln(1+t^2)$

Вариант 5

Условие	Ответ
1. $f(t)=e^{\frac{1}{t-2}}$	1. Нет
2. $f(t)=sh^2 t$	2. $F(p)=\dfrac{2}{p(p^2-4)}$
3. $f(t)=e^{-2t}cht-e^{-2t}sh\,t$	3. $F(p)=\dfrac{p+1}{(p+2)^2-1}$
4. $f(t)=\int\limits_0^t t^3e^{-2t}dt$	4. $F(p)=\dfrac{3!}{p(p+2)^4}$
5. $f(t)=\cos^2(t-5)\eta(t-5)$	5. $F(p)=\dfrac{e^{-5p}}{2p}+\dfrac{pe^{-5p}}{2(p^2+4)}$
6. $f(t)=\int\limits_0^t \tau^3 sh5(t-\tau)\,d\tau$	6. $F(p)=\dfrac{30}{p^4(p^2-25)}$
7. 	7. $F(p)=-\dfrac{1+e^{-\pi p}}{p^2+1}$
8. $f(t)=(\frac{t^2}{2}-4t+10)\eta(t-4)$	8. $F(p)=(\dfrac{1}{p^3}+\dfrac{2}{p})\cdot e^{-4p}$
9. $f(t)=\sin^2(t-3)e^{-(t-3)}\eta(t-3)$	9. $F(p)=\dfrac{e^{-3p}}{2}\left(\dfrac{1}{p+1}-\dfrac{p+1}{(p+1)^2+4}\right)$
10. $f(t)=e^{-t}\int\limits_0^t (L^{-1}\{\frac{p}{p^2+4}\})dt$	10. $F(p)=\dfrac{1}{(p+1)^2+4}$
11. 	11. $F(p)=\dfrac{1+2pe^{-2p}-e^{-2p}-4pe^{-3p}}{2p^2(1-e^{-3p})}$

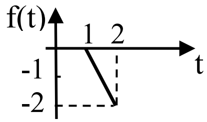
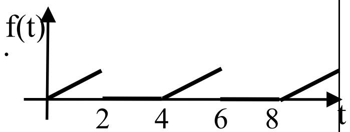
12. $f(t)=\dfrac{\int\limits_0^t (ch\,\tau - ch\,2\tau)\,d\tau}{t}$	12. $F(p)=\dfrac{1}{2}\ln\dfrac{p+1}{p-1}\sqrt{\dfrac{p-2}{p+2}}$
13. $F(p)=\dfrac{p^2}{(p+1)(p^2+4)}$	13. $f(t)=\dfrac{1}{5}e^{-t}+\dfrac{4}{5}\cos 2t-\dfrac{2}{5}\sin 2t$
14. $F(p)=\dfrac{4e^{-p}}{(p-3)^4}$	14. $f(t)=\dfrac{2}{3}(t-1)^3 e^{3(t-1)}\eta(t-1)$
15. $F(p)=\dfrac{-4}{p^2(p^2-p-2)}$	15. $f(t)=2t-1+\dfrac{4}{3}e^{-t}-\dfrac{1}{3}e^{2t}$
16. $y''+4y=f(t)$, где $f(t)=\begin{cases}0, & t\in[0;2),\\ -3, & t\in[2;3],\\ 0, & t>3,\end{cases}$ $y(0)=3$, $y'(0)=0$	16. $y(t)=3\cos 2t-\dfrac{3}{4}\eta(t-2)+$ $+\dfrac{3}{4}\cos 2(t-2)\eta(t-2)+\dfrac{3}{4}\eta(t-3)$ $-\dfrac{3}{4}\cos 2(t-3)\eta(t-3)$
17. $x''+12x'+36x=e^{-3t}$, $x(0)=0,\quad x'(0)=-1$	17. $x(t)=\dfrac{e^{-3t}}{9}-\dfrac{1}{9}(1+12t)\,e^{-6t}$
18. $x''+25x=5\cos 5t$, $x(0)=0\ \ x'(0)=-4$	18. $x(t)=(\dfrac{t}{2}-\dfrac{4}{5})\sin 5t$
19. $\begin{cases}x'+2x+2y=2e^t\\ y'+y+x=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-\dfrac{1}{3}-\dfrac{e^{2t}}{5}+e^t-\dfrac{7}{15}e^{-3t}$ $y(t)=\dfrac{1}{3}+\dfrac{2}{5}e^{2t}-\dfrac{e^t}{2}-\dfrac{7}{30}e^{-3t}$
20. $x''+2x'=\dfrac{1}{1+e^{2t}}$, $x(0)=x'(0)=0$	20. $x(t)=\dfrac{t}{2}-\dfrac{1}{4}\ln\dfrac{1+e^{2t}}{2}-\dfrac{e^{-2t}}{4}\ln\dfrac{1+e^{2t}}{2}$

Вариант 6

Условие	Ответ
1. $f(t)=t^5\cos t$	1. Да
2. $f(t)=ch^2 3t$	2. $F(p)=\dfrac{p^2-18}{p(p^2-36)}$
3. $f(t)=e^{-2t}\cos 2t+e^{-2t}\sin 2t$	3. $F(p)=\dfrac{p+4}{(p+2)^2+4}$
4. $f(t)=\int\limits_0^t t^3 e^{-3t}dt$	4. $F(p)=\dfrac{3!}{p(p+3)^4}$
5. $f(t)=\cos 4(t-7)\eta(t-7)$	5. $F(p)=\dfrac{pe^{-7p}}{p^2+16}$
6. $f(t)=\int\limits_0^t (t-\tau)^3 ch 9\tau\, d\tau$	6. $F(p)=\dfrac{6}{p^3(p^2-81)}$
7. 	7. $F(p)=-\dfrac{1}{p^2+1}(e^{-\frac{\pi}{2}p}+e^{-\frac{3\pi}{2}p})$
8. $f(t)=(t^2-6t)\eta(t-3)$	8. $F(p)=(\dfrac{2}{p^3}-\dfrac{9}{p})\cdot e^{-3p}$
9. $f(t)=(t^2e^{-t}ch^2t)'$	9. $F(p)=p\left(\dfrac{1}{(p+1)^3}+\dfrac{1}{2(p-1)^3}+\dfrac{1}{2(p+3)^3}\right)$
10. $f(t)=e^{-t}\int\limits_0^t L^{-1}\left\{\dfrac{p}{p^2+9}\right\}dt$	10. $F(p)=\dfrac{1}{(p+1)^2+9}$
11. 	11. $F(p)=\dfrac{e^{-p}-1-e^{-4p}+e^{-3p}}{p^2(1-e^{-4p})}$

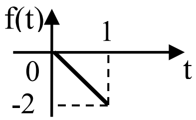
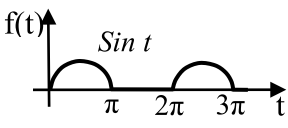
12. $f(t)=\int_0^t \frac{1-e^{2t}}{t}dt$	12. $F(p)=\frac{1}{p}\ln\frac{p-2}{p}$
13. $F(p)=\frac{p^2-1}{(p^2+1)(p-4)}$	13. $f(t)=\frac{2}{17}\cos t+\frac{8}{17}\sin t+\frac{15}{17}e^{4t}$
14. $F(p)=\frac{3e^{-2p}}{(p-1)^3}$	14. $f(t)=\frac{3}{2}(t-2)^2e^{t-2}\eta(t-2)$
15. $F(p)=\frac{15}{p^2(p^2+2p-15)}$	15. $f(t)=\frac{5}{24}e^{3t}-\frac{2}{15}-t-\frac{3}{40}e^{-5t}$
16. $y''+9y=f(t)$, где $f(t)=\begin{cases}0, & t\in[0;2),\\ -3, & t\in[2;3),\\ 0, & t\geq 3,\end{cases}$ $y(0)=0$ $y'(0)=1$	16. $y(t)=-\frac{1}{3}\eta(t-2)-\frac{1}{3}\cos 3(t-2)\eta(t-2)+$ $+\frac{1}{3}\eta(t-3)+\frac{1}{3}\cos 3(t-3)\eta(t-3)+\frac{1}{3}\sin 3t$
17. $x''-10x'+25x=-2e^{-5t}$ $x(0)=0,\quad x'(0)=1$	17. $x(t)=\frac{e^{5t}}{50}-\frac{e^{-5t}}{50}+\frac{4}{5}te^{5t}$
18. $x''+16x=4\cos 4t$ $x(0)=0\ \ x'(0)=1$	18. $x(t)=\frac{1}{2}(t+\frac{1}{2})\sin 4t$
19. $\begin{cases}x'-x-y=-e^t\\ y'-2y-2x=e^{4t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\frac{3}{4}+\frac{e^{4t}}{4}-\frac{e^t}{2}-\frac{e^{3t}}{2}$ $y(t)=-\frac{3}{4}+\frac{3}{4}e^{4t}+e^t-e^{3t}$
20. $x''+3x'=\frac{1}{1+e^{3t}}$ $x(0)=x'(0)=0$	20. $x(t)=\frac{t}{3}-\frac{1}{9}(1+e^{-3t})\ln\frac{1+e^{3t}}{2}$

Вариант 7

Условие	Ответ
1. $f(t)=e^{t^5}$	1. Нет
2. $f(t)=sh^2 5t$	2. $F(p)=\dfrac{50}{p(p^2-100)}$
3. $f(t)=e^{-2t}sh2t-e^{-2t}ch\,2t$	3. $F(p)=-\dfrac{p}{(p+2)^2-4}$
4. $f(t)=\int\limits_0^t t\sin t\,dt$	4. $F(p)=\dfrac{2}{(p^2+1)^2}$
5. $f(t)=\sin 4(t-7)\eta(t-7)$	5. $F(p)=\dfrac{4}{p^2+16}e^{-7p}$
6. $f(t)=\int\limits_0^t e^{3(t-\tau)}\tau^2 d\tau$	6. $F(p)=\dfrac{2}{p^3(p-3)}$
7. 	7. $F(p)=\dfrac{2e^{-p}}{p^2}((1+p)e^{-p}-1)$
8. $f(t)=(t^2-16)\eta(t-4)$	8. $F(p)=(\dfrac{2}{p^3}+\dfrac{8}{p^2})e^{-4p}$
9. $f(t)=\left(\cos(t-3)+1\right)\times$ $\times e^{-(t-3)}\eta(t-3)$	9. $F(p)=\dfrac{(p+1)e^{-3p}}{(p+1)^2+1}+\dfrac{e^{-3p}}{p+1}$
10. $f(t)=(t(\cos 2t-\sin t))'$	10. $F(p)=p\left(\dfrac{p^2-4}{(p^2+4)^2}-\dfrac{2p}{(p^2+1)^2}\right)$
11. 	11. $F(p)=\dfrac{1-e^{-2p}-2pe^{-2p}}{2p^2(1-e^{-4p})}$
12.	12.

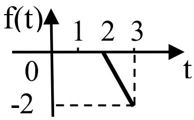
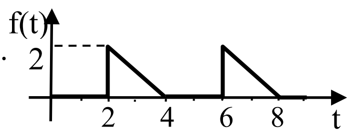
$f(t)=\int_0^t \frac{\sin mt\cdot\cos nt}{t}d\tau$	$F(p)=\frac{1}{p}(\pi-arctg\frac{p}{m+n}-arctg\frac{p}{m-n})$
13. $F(p)=\frac{p^2}{(p+3)(p^2+4)}$	13. $f(t)=\frac{9}{13}e^{-3t}+\frac{4}{13}\cos 2t-\frac{6}{13}\sin 2t$
14. $F(p)=\frac{3e^{-2p}}{(p-1)^3}$	14. $f(t)=\frac{3}{2}(t-2)^2e^{(t-2)}\eta(t-2)$
15. $F(p)=\frac{-3}{p^2(p^2+8p+15)}$	15. $f(t)=\frac{8}{75}-\frac{1}{5}t-\frac{1}{6}e^{-3t}+\frac{3}{50}e^{-5t}$
16. $y''+4y'+4y=f(t)$, где $f(t)=\begin{cases}1, & 0\le t\le 1\\ 0, & 1<t\le 2,\\ 1, & 2<t\le 3\\ 0, & t>3,\end{cases}$ $y(0)=0, y'(0)=0$	16. $y(t)=\frac{1}{4}(1-e^{-2t}-2te^{-2t})-$ $-\frac{1}{4}\eta(t-1)(1+e^{-2(t-1)}+2(t-1)e^{-2(t-1)})$ $+\frac{1}{4}\eta(t-2)(1-e^{-2(t-2)}-2(t-2)\eta(t-2))$ $-\frac{1}{4}\eta(t-3)(1+e^{-2(t-3)}+2(t-3)e^{-2(t-3)})$
17. $x''-8x'+16x=-3e^{-2t}$, $x(0)=0, x'(0)=1$	17. $x(t)=\frac{1}{12}e^{4t}+\frac{1}{2}te^{4t}-\frac{1}{12}e^{-2t}$
18. $x''+\frac{1}{16}x=3\cos\frac{t}{4},$ $x(0)=0, x'(0)=-5$	18. $x(t)=(6t-20)\sin\frac{t}{4}$
19. $\begin{cases}x'+x+y=2e^{2t}\\ y'+2y+2x=2e^{3t}\end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=-\frac{4}{9}-\frac{e^{3t}}{9}+\frac{4}{5}e^{2t}-\frac{11}{45}e^{-3t},$ $y(t)=\frac{4}{9}+\frac{4}{9}e^{3t}-\frac{2}{5}e^{2t}-\frac{22}{45}e^{-3t}$
20. $x'''=\frac{1}{1+t^2},$ $x(0)=x'(0)=x''(0)=0$	20. $x(t)=\frac{t}{2}-\frac{t}{2}\ln(1+t^2)+\frac{t^2-1}{2}\cdot arctg\, t$

Вариант 8

Условие	Ответ
1. $f(t)=\dfrac{1}{t^2-1}$	1. Нет
2. $f(t)=3(t-1)^2$	2. $F(p)=\dfrac{6}{p^3}(1-p+\dfrac{1}{2}p^2)$
3. $f(t)=e^{-2t}sh\,t+e^{-2t}ch\,t$	3. $F(p)=\dfrac{p+3}{(p+2)^2-1}$
4. $f(t)=\int\limits_0^t t\,e^{2t}\,dt$	4. $F(p)=\dfrac{1}{p\,(p-2)^2}$
5. $f(t)=\sin 3(t-5)\eta(t-5)$	5. $F(p)=\dfrac{3e^{-5p}}{p^2+9}$
6. $f(t)=\int\limits_0^t e^{5\tau}(t-\tau)^3\,d\tau$	6. $F(p)=\dfrac{3!}{p^4(p-5)}$
7. 	7. $F(p)=\dfrac{1}{p^2}(e^{-p}+pe^{-p}-1)$
8. $f(t)=(t^2+50)\eta(t-5)$	8. $F(p)=\dfrac{e^{-5p}}{p^3}(2+10p+75p^2)$
9. $f(t)=sh^2(t-4)e^{-(t-4)}\eta(t-4)$	9. $F(p)=\dfrac{(p+1)e^{-4p}}{2((p+1)^2-4)}-\dfrac{e^{-4p}}{2(p+1)}$
10. $f(t)=\int\limits_0^t \dfrac{\sin^2 t}{t}dt$	10. $F(p)=\dfrac{1}{2p}\ln\dfrac{\sqrt{p^2+4}}{p}$
11. 	11. $F(p)=\dfrac{1+e^{-\pi p}}{(p^2+1)(1-e^{-2\pi p})}$

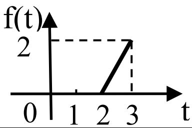
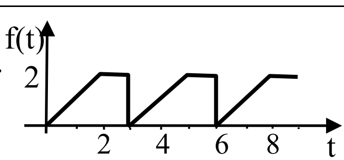
12. $f(t)=(t^2e^{-t}ch^2t)'$	12. $F(p)=p(\frac{1}{(p+1)^3}+$ $+\frac{1}{2(p-1)^3}+\frac{1}{2(p+3)^3})$
13. $F(p)=\frac{2p+1}{(p-6)(p^2+16)}$	13. $f(t)=\frac{1}{4}e^{6t}-\frac{1}{4}\cos 4t+\frac{7}{8}\sin 4t$
14. $F(p)=\frac{d}{dp}\left(\frac{3(p+1)}{(p+1)^2+9}\right)$	14. $f(t)=-3t\,e^{-t}\cos 3t$
15. $F(p)=\frac{10}{p^2(p^2+3p-4)}$	15. $f(t)=-\frac{15}{8}-\frac{5}{2}t+2e^t-\frac{1}{8}e^{-4t}$
16. $y''+3y'+2y=f(t)$, где $f(t)=\begin{cases}t, & 0\le t\le 1\\ 0, & t>1,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=-\frac{3}{4}+\frac{1}{2}t+e^{-t}-\frac{1}{4}e^{-2t}+$ $\left(\frac{1}{4}-\frac{1}{2}(t-1)-\frac{1}{4}e^{-2(t-1)}\right)\eta(t-1)$
17. $x''-4x'+4x=7e^{3t}$ $x(0)=0,\quad x'(0)=4$	17. $x(t)=-(3t+7)e^{2t}+7e^{3t}$
18. $x''+\frac{1}{4}x=2\cos\frac{t}{2}$ $x(0)=0\ \ x'(0)=5$	18. $x(t)=2(t+5)\sin\frac{t}{2}$
19. $\begin{cases}x'-2x-2y=2e^{2t}\\ y'-x-y=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-2e^{2t}+2e^{3t}$ $y(t)=-e^{2t}+e^{3t}$
20. $x''=arctg\,t$ $x(0)=x'(0)=0$	20. $x(t)=\frac{t^2}{2}arctg\,t-\frac{1}{2}t\ln(1+t^2)$ $+\frac{t}{2}-\frac{1}{2}arctg\,t$

Вариант 9

Условие	Ответ
1. $f(t)=t^2e^{-t}$	1. Да
2. $f(t)=t^2+2t$	2. $F(p)=\dfrac{2(p+1)}{p^3}$
3. $f(t)=e^t sh2t-2e^t ch2t$	3. $F(p)=\dfrac{2(1-p)}{(p-1)^2-4}$
4. $f(t)=\int\limits_0^t t\sin 3t\,dt$	4. $F(p)=\dfrac{6}{(p^2+9)^2}$
5. $f(t)=sh2(t-3)\eta(t-3)$	5. $F(p)=\dfrac{2e^{-3p}}{p^2-4}$
6. $f(t)=\int\limits_0^t e^{7(t-\tau)}\tau^4 d\tau$	6. $F(p)=\dfrac{4!}{p^5(p-7)}$
7. 	7. $F(p)=\dfrac{2e^{-2p}}{p^2}(pe^{-p}+e^{-p}-1)$
8. $f(t)=(t^2-7t)\eta(t-7)$	8. $F(p)=\dfrac{2e^{-7p}}{p^3}+\dfrac{7e^{-7p}}{p^2}$
9. $f(t)=(2(t-3)+ch(t-3))\times$ $\times e^{t-3}\eta(t-3)$	9. $F(p)=\dfrac{2e^{-3p}}{(p-1)^2}+\dfrac{(p-1)e^{-3p}}{(p-1)^2-1}$
10. $f(t)=\dfrac{\int\limits_0^t (t-\cos t)dt}{t}$	10. $F(p)=\dfrac{1}{2p^2}+arctg\,p-\dfrac{\pi}{2}$
11. 	11. $F(p)=\dfrac{e^{-4p}-e^{-2p}+2pe^{-2p}}{p^2(1-e^{-4p})}$

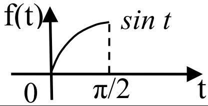
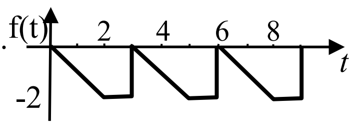
12. $f(t)=(t^2(1+\sin t))'$	12. $F(p)=\dfrac{2!}{p^2}+\dfrac{6p^3-2p}{(p^2+1)^3}$
13. $F(p)=\dfrac{p+3}{(p^2+1)(p+5)}$	13. $f(t)=-\dfrac{1}{13}e^{-5t}+\dfrac{1}{13}\cos t+\dfrac{8}{13}\sin t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{4(p-3)}{(p-3)^2+4}\right)$	14. $f(t)=-4te^{3t}\cos 2t$
15. $F(p)=\dfrac{-4}{p^2(p^2-6p+8)}$	15. $f(t)=-\dfrac{3}{8}-\dfrac{1}{2}t+\dfrac{1}{2}e^{2t}-\dfrac{1}{8}e^{4t}$
16. $y''+5y'+6y=f(t)$, где $f(t)=\begin{cases}-1, & 0\le t\le 1\\ -2, & 1<t\le 2,\\ 0, & t>2,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=-\dfrac{1}{6}+\dfrac{1}{2}e^{-2t}-\dfrac{1}{3}e^{-3t}-\dfrac{1}{6}\eta(t-1)$ $+\dfrac{1}{2}e^{-2(t-1)}\eta(t-1)-\dfrac{1}{3}e^{-3(t-1)}\eta(t-1)$ $+\dfrac{1}{3}\eta(t-2)-e^{-2(t-2)}\eta(t-2)+$ $+\dfrac{2}{3}e^{-3(t-2)}\eta(t-2)$
17. $x''-6x'+9x=6e^t$ $x(0)=0,\quad x'(0)=-4$	17. $x(t)=\dfrac{3}{2}e^t-e^{3t}(t+\dfrac{3}{2})$
18. $x''+49x=7\cos 7t$ $x(0)=0\ \ x'(0)=2$	18. $x(t)=(\dfrac{t}{2}+\dfrac{2}{7})\sin 7t$
19. $\begin{cases}x'-2x-2y=2e^{2t}\\ y'+x+y=e^{3t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\dfrac{5}{3}+\dfrac{e^{3t}}{3}+3e^{2t}-5e^t$ $y(t)=-\dfrac{5}{3}+\dfrac{e^{3t}}{6}-e^{2t}+\dfrac{5}{2}e^t$
20. $x''=t\ln^2 t$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{t^3}{6}\ln^2 t-\dfrac{5}{18}t^3\ln t+\dfrac{19}{108}t^3$

Вариант 10

Условие	Ответ
1. $f(t)=\dfrac{\sin t}{t-2}$	1. Нет
2. $f(t)=\sin^2 t$	2. $F(p)=\dfrac{2}{p(p^2+4)}$
3. $f(t)=e^{-t}sh2t+2e^{-t}ch\,2t$	3. $F(p)=\dfrac{2p+4}{(p+1)^2-4}$
4. $f(t)=\int\limits_0^t t\sin 4t\,dt$	4. $F(p)=\dfrac{8}{(p^2+16)^2}$
5. $f(t)=ch\,5(t-3)\eta(t-3)$	5. $F(p)=\dfrac{p\,e^{-3p}}{p^2-25}$
6. $f(t)=\int\limits_0^t e^{9(t-\tau)}\tau^3 d\tau$	6. $F(p)=\dfrac{3!}{p^4(p-9)}$
7. 	7. $F(p)=\dfrac{2e^{-2p}}{p^2}(1-e^{-p}-pe^{-p})$
8. $f(t)=(t^2-5t+1)\eta(t-6)$	8. $F(p)=\dfrac{e^{-6p}}{p^3}(2+7p+7p^2)$
9. $f(t)=(\sin(2t-2)+\cos(t-1))\times e^{t-1}\eta(t-1)$	9. $F(p)=\dfrac{2e^{-p}}{(p-1)^2+4}+\dfrac{(p-1)e^{-p}}{(p-1)^2+1}$
10. $f(t)=\int\limits_0^t \dfrac{\sin^2 t}{t}dt$	10. $F(p)=\dfrac{1}{2p}\ln\dfrac{\sqrt{p^2+4}}{p}$
11. 	11. $F(p)=\dfrac{1-e^{-2p}-2pe^{-3p}}{p^2(1-e^{-3p})}$

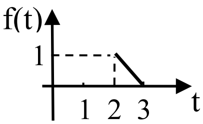
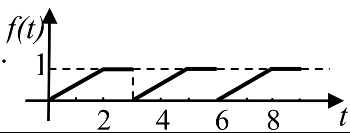
12. $f(t)=(t(ch2t+sh2t))'$	12. $F(p)=\dfrac{p(p+2)^2}{(p^2-4)^2}$
13. $F(p)=\dfrac{2p+3}{(p^2+9)(p-1)}$	13. $f(t)=\frac{1}{2}e^t-\frac{1}{2}\cos 3t+\frac{1}{2}\sin 3t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{5(p+3)}{(p+3)^2+1}\right)$	14. $f(t)=-5te^{3t}\cos t$
15. $F(p)=\dfrac{8e^{-8p}}{(p+6)(p+8)^2}$	15. $f(t)=2\Big(e^{-6(t-8)}-e^{-8(t-8)}-$ $-2(t-8)e^{-8(t-8)}\Big)\eta(t-8)$
16. $y''+16y=f(t)$, где $f(t)=\begin{cases}2, & 0\le t\le 2\\ -2, & 2<t\le 3,\\ 0, & t>3,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=\frac{1}{8}-\frac{1}{8}\cos 4t-\frac{1}{4}\eta(t-2)+$ $+\frac{1}{4}\cos 4(t-2)\eta(t-2)+$ $+\frac{1}{8}\eta(t-3)-\frac{1}{8}\cos 4(t-3)\eta(t-3)$
17. $x''+10x'+25x=e^{4t}$ $x(0)=0,\quad x'(0)=3$	17. $x(t)=3te^{-5t}-\dfrac{1+9t}{81}e^{-5t}+\dfrac{e^{4t}}{81}$
18. $x''+\frac{1}{6}x=6\cos\frac{t}{4}$ $x(0)=0\ \ x'(0)=-1$	18. $x(t)=(12t-4)\sin\frac{t}{4}$
19. $\begin{cases}x'+x+y=2e^{-2t}\\ y'-3x-3y=e^t\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=1+e^t-\frac{5}{4}e^{-2t}-\frac{3}{4}e^{2t}$ $y(t)=-1-2e^t+\frac{3}{4}e^{-2t}+\frac{9}{4}e^{2t}$
20. $x''=\ln(1+t^2)$ $x(0)=x'(0)=0$	20. $x(t)=\frac{t^2}{2}\ln(1+t^2)-\frac{3}{2}t^2-$ $-\frac{1}{2}\ln(1+t^2)+2t\,arctg\,t$

Вариант 11

Условие	Ответ
1. $f(t)=t^5\sin 4t$	1. Да
2. $f(t)=e^{3t}ch\,3t$	2. $F(p)=\dfrac{p-3}{(p-3)^2-9}$
3. $f(t)=e^{-2t}sh\,4t+e^{-2t}ch\,4t$	3. $F(p)=\dfrac{p+6}{(p+2)^2-16}$
4. $f(t)=\int_0^t t\,ch\,3t\,dt$	4. $F(p)=\dfrac{9+p^2}{p(p^2-9)^2}$
5. $f(t)=ch\,4(t-7)\eta(t-7)$	5. $F(p)=\dfrac{pe^{-7p}}{p^2-16}$
6. $f(t)=\int_0^t e^{2\tau}(t-\tau)^5\,d\tau$	6. $F(p)=\dfrac{5!}{p^6(p-2)}$
7. 	7. $F(p)=\dfrac{1}{p^2+1}(1-pe^{-\frac{\pi}{2}p})$
8. $f(t)=(\frac{t^2}{2}-4t+1)\eta(t-8)$	8. $F(p)=(\frac{1}{p^3}+\frac{4}{p^2}+\frac{1}{p})e^{-8p}$
9. $f(t)=ch^2(2t-3)e^{-(2t-3)}\eta(t-\frac{3}{2})$	9. $F(p)=\dfrac{e^{-\frac{3}{2}p}}{2(p+2)}+\dfrac{1}{2}\cdot\dfrac{(p+2)e^{-\frac{3}{2}p}}{(p+2)^2-16}$
10. $f(t)=\int_0^t \frac{e^{2t}-e^{3t}}{t}dt$	10. $F(p)=\frac{1}{p}\ln\frac{p-3}{p-2}$
11. 	11. $F(p)=\dfrac{e^{-2p}-1+2pe^{-3p}}{p^2(1-e^{-3p})}$

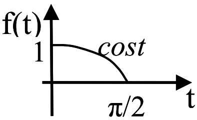
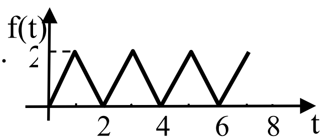
12. $f(t)=(t(2\sin 3t+e^{t}))''$	12. $F(p)=\dfrac{12p^3}{(p^2+9)^2}+\dfrac{p^2}{(p-1)^2}$
13. $F(p)=\dfrac{p+16}{(p^2+4)(p+3)}$	13. $f(t)=e^{-3t}-\cos 2t+\dfrac{1}{2}\sin 2t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{8}{(p-1)^2+16}\right)$	14. $f(t)=-2te^{t}\sin 4t$
15. $F(p)=\dfrac{-8e^{-8t}}{(p-6)(p-10)^2}$	15. $f(t)=\dfrac{1}{2}\Big(e^{10(t-8)}(33-4t)-$ $-e^{6(t-8)}\Big)\eta(t-8)$
16. $y''+4y'+3y=f(t)$, где $f(t)=\begin{cases}0, & 0\le t\le 3\\ 3, & 3<t\le 5,\\ 0, & t>5,\end{cases}$ $y(0)=y'(0)=0$	16. $y(t)=\eta(t-3)-\dfrac{3}{2}e^{-(t-3)}\eta(t-3)+$ $+\dfrac{1}{2}e^{-3(t-3)}\eta(t-3)-\eta(t-5)+$ $+\dfrac{3}{2}e^{-(t-5)}\eta(t-5)-\dfrac{1}{2}e^{-3(t-5)}\eta(t-5)$
17. $x''-2x'-3x=6\,\mathrm{sh}\,t$ $x(0)=0,\quad x'(0)=-4$	17. $x(t)=-\dfrac{13}{16}e^{3t}-\dfrac{3}{4}e^{t}+$ $+\dfrac{12t+25}{16}e^{-t}$
18. $x''+\dfrac{x}{4}=5\cos\dfrac{t}{2}$ $x(0)=0\;\; x'(0)=3$	18. $x(t)=(5t+6)\sin\dfrac{t}{2}$
19. $\begin{cases}x'-x-y=e^{2t}\\ y'+3x+3y=2e^{-t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\dfrac{1}{4}-2e^{-t}+\dfrac{5}{8}e^{2t}+\dfrac{9}{8}e^{-2t}$ $y(t)=-\dfrac{1}{4}+4e^{-t}-\dfrac{3}{8}e^{2t}-\dfrac{27}{8}e^{-2t}$
20. $x'''=\ln(1+t)$ $x(0)=x'(0)=x''(0)=0$	20. $x(t)=-\dfrac{2}{9}t^3-\dfrac{5}{12}t^2-\dfrac{t}{6}+\dfrac{(t+1)^3}{6}\ln(1+t)$

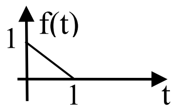
Вариант 12

Условие	Ответ
1. $f(t)=\dfrac{t}{\sin 2t}$	1. Нет
2. $f(t)=e^{-2t}sh\,2t$	2. $F(p)=\dfrac{2}{(p+2)^2-4}$
3. $f(t)=e^{5t}sh3t+e^{5t}ch\,3t$	3. $F(p)=\dfrac{p-2}{(p-5)^2-9}$
4. $f(t)=\int\limits_0^t t\cos 4t\,dt$	4. $F(p)=\dfrac{p^2-16}{(p^2+16)^2\,p}$
5. $f(t)=sh3(t-5)\eta(t-5)$	5. $F(p)=\dfrac{p\,e^{-5p}}{p^2-9}$
6. $f(t)=\int\limits_0^t (t-\tau)^2\sin 3\tau\,d\tau$	6. $F(p)=\dfrac{6}{p^3\,(p^2+9)}$
7. 	7. $F(p)=\dfrac{e^{-2p}}{p^2}(p-1+e^{-p})$
8. $f(t)=(\dfrac{t^2}{3}-3t-2)\eta(t-2)$	8. $F(p)=\dfrac{1}{3p^3}(2-5p-20p^2)e^{-2p}$
9. $f(t)=e^{\beta t-\alpha}\left(ch(\beta t-\alpha)+\right.$ $\left.+sh(\beta t-\alpha)\right)\eta(t-\dfrac{\alpha}{\beta})$	9. $F(p)=\dfrac{p\,e^{-\frac{\alpha}{\beta}p}}{(p-\beta)^2-\beta^2}$
10. $f(t)=\int\limits_0^t \dfrac{\sin 2t}{2t}dt$	10. $F(p)=\dfrac{1}{2p}\left(\dfrac{\pi}{2}-arctg\,\dfrac{p}{2}\right)$
11. 	11. $F(p)=\dfrac{1-e^{-2p}-2pe^{-3p}}{2p^2(1-e^{-3p})}$

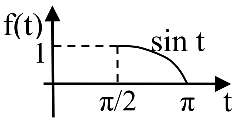
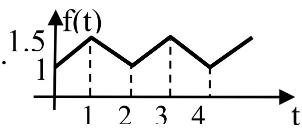
12. $f(t)=(t\cos 5t)'$	12. $F(p)=\dfrac{p^3-25p}{(p^2+25)^2}$
13. $F(p)=\dfrac{p^2}{(p^2+1/4)(p+2)}$	13. $f(t)=\dfrac{16}{17}e^{-2t}+\dfrac{1}{17}\cos\dfrac{t}{2}-\dfrac{4}{17}\sin\dfrac{t}{2}$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{9}{(p+1)^2+9}\right)$	14. $f(t)=-3te^{-t}\sin 3t$
15. $F(p)=\dfrac{20}{p^2(p^2-7p+10)}$	15. $f(t)=\dfrac{7}{5}+2t+\dfrac{4}{15}e^{5t}-\dfrac{5}{3}e^{2t}$
16. $y'''+y'=f(t)$, где $f(t)=\begin{cases} t, & t\in[0;1], \\ 0, & t>1, \end{cases}$ $y(0)=y'(0)=y''(0)=0$	16. $y(t)=\dfrac{1}{2}t^2-1+\cos t+\eta(t-1)-$ $-\dfrac{1}{2}(t-1)^2\eta(t-1)-\cos(t-1)\eta(t-1)$ $-(t-1)\eta(t-1)+\sin(t-1)\eta(t-1)$
17. $x''+2x'-8x=sh\,4t$ $x(0)=0, \quad x'(0)=3$	17. $x(t)=\dfrac{1}{32}e^{4t}+\dfrac{4}{9}e^{2t}+$ $+\left(\dfrac{1}{12}t-\dfrac{137}{288}\right)e^{-4t}$
18. $x''+\dfrac{x}{9}=4\cos\dfrac{t}{3}$ $x(0)=0 \;\; x'(0)=6$	18. $x(t)=(6t+18)\sin\dfrac{t}{3}$
19. $\begin{cases} x'+x+y=e^t \\ y'+3x+3y=2e^{-t} \end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-\dfrac{5}{4}+\dfrac{2}{3}e^{-t}+\dfrac{4}{5}e^{t}-\dfrac{13}{60}e^{-4t}$ $y(t)=\dfrac{5}{4}-\dfrac{3}{5}e^{t}-\dfrac{13}{20}e^{-4t}$
20. $x'''=\dfrac{1}{1+t^2}+t$ $x(0)=x'(0)=x''(0)=0$	20. $x(t)=\dfrac{t^4}{24}+\dfrac{t}{2}-\dfrac{t}{2}\ln(1+t^2)+$ $+\dfrac{1}{2}(t^2-1)arctg\,t$

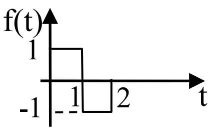
Вариант 13

Условие	Ответет
1. $f(t)=tcht$	1. Да
2. $f(t)=e^{t}ch^{2}t$	2. $F(p)=\dfrac{p^{2}-2p-1}{(p-1)(p^{2}-2p-3)}$
3. $f(t)=e^{-5t}sh\,4t+e^{-5t}ch\,4t$	3. $F(p)=\dfrac{p+9}{(p+5)^{2}-16}$
4. $f(t)=\int\limits_{0}^{t}t^{3}e^{4t}dt$	4. $F(p)=\dfrac{3!}{p(p-4)^{4}}$
5. $f(t)=\sin^{2}(t-5)\eta(t-5)$	5. $F(p)=\dfrac{2e^{-5p}}{p(p^{2}+4)}$
6. $f(t)=\int\limits_{0}^{t}\tau^{3}\sin 5(t-\tau)\,d\tau$	6. $F(p)=\dfrac{30}{p^{4}(p^{2}+25)}$
7. 	7. $F(p)=\dfrac{p+e^{-\frac{\pi}{2}p}}{p^{2}+1}$
8. $f(t)=(2t^{2}-9t+5)\eta(t-4)$	8. $F(p)=\dfrac{e^{-4p}}{p^{3}}(2+7p+p^{2})$
9. $f(t)=(sh(t-1)+ch(t-1))\times$ $\times e^{2(t-1)}\eta(t-1$	9. $F(p)=\dfrac{(3-p)e^{-p}}{p^{2}-4p+3}$
10. $f(t)=(t\sin 3te^{-5t})'$	10. $F(p)=\dfrac{6p(p+5)}{((p+5)^{2}+9)^{2}}$
11. 	11. $F(p)=\dfrac{2(1+e^{-2p}-2e^{-p})}{p^{2}(1-e^{-2p})}$

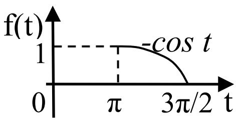
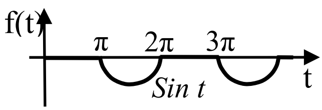
12. $f(t)=\frac{1}{t}\int\limits_0^t e^{-2t}\sin 2t\,dt$	12. $F(p)=\frac{1}{10}\ln\frac{p^2+4p+5}{p^2}-\frac{\pi}{5}+$ $+\frac{2}{5}arctg\,(p+2)$
13. $F(p)=\frac{3p+4}{(p^2-6p+9)(p^2+4)}$	13. $f(t)=\frac{1}{2}t^2e^{3t}-\frac{3}{13}te^{3t}+$ $+\frac{3}{13}\cos 2t-\frac{2}{13}\sin 2t$
14. $F(p)=\left(\frac{8}{(p-3)^2+4}\right)'$	14. $f(t)=-4te^{3t}\sin 2t$
15. $F(p)=\frac{1}{p^2(p^2-4p+13)}$	15. $f(t)=\frac{1}{13}+\frac{e^{2t}}{39}(2\sin 3t-3\cos 3t)$
16. $y''+a^2y=f(t)$, где  $y(0)=y'(0)=0$	16. $y(t)=\frac{1}{a^2}-\frac{1}{a^2}\cos at-\frac{1}{a^2}t+$ $+\frac{1}{a^3}\sin at+\frac{1}{a^2}(t-1)\eta(t-1)-$ $-\frac{1}{a^3}\sin a(t-1)\eta(t-1)$
17. $x''+2x'-3x=\frac{16}{3}sh\,3t$ $x(0)=0,\qquad x'(0)=2$	17. $x(t)=\frac{2}{3}t\,e^{-3t}+\frac{4}{9}sh\,3t$
18. $x''+3x'=6\sin 2t$ $x(0)=0\;\; x'(0)=0$	18. $x(t)=1-\frac{4}{13}e^{-3t}-\frac{9}{13}\cos 2t-\frac{6}{13}\sin 2t$
19. $\begin{cases} x'-3x-3y=2e^t \\ y'+x+y=e^{-2t} \end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\frac{1}{4}-4e^t+\frac{27}{8}e^{2t}+\frac{3}{8}e^{-2t}$ $y(t)=-\frac{1}{4}+2e^t-\frac{9}{8}e^{2t}-\frac{5}{8}e^{-2t}$
20. $x''=arctg\,t$ $x(0)=x'(0)=0$	20. $x(t)=\frac{t^2}{2}arctg\,t-\frac{t}{2}\ln(1+t^2)+$ $+\frac{t}{2}-\frac{1}{2}arctg\,t$

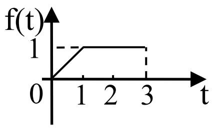
Вариант 14

Условие	Ответ
1. $f(t)=te^{t^2}$	1. Нет
2. $f(t)=e^{-t}sh^2t$	2. $F(p)=\dfrac{2}{(p+1)(p^2+2p-3)}$
3. $f(t)=e^{-3t}sh2t+e^{-3t}ch2t$	3. $F(p)=\dfrac{p+5}{(p+3)^2-4}$
4. $f(t)=\int\limits_0^t t^4e^{-2t}dt$	4. $F(p)=\dfrac{4!}{p(p+2)^5}$
5. $f(t)=sh^2(t-4)\eta(t-4)$	5. $F(p)=\dfrac{2e^{-4p}}{p(p^2-4)}$
6. $f(t)=\int\limits_0^t(t-\tau)^4\sin7\tau\,d\tau$	6. $F(p)=\dfrac{168}{p^5(p^2+49)}$
7. 	7. $F(p)=\dfrac{pe^{-\frac{\pi}{2}p}+e^{-\pi p}}{p^2+1}$
8. $f(t)=(3t^2-14t-5)\eta(t-5)$	8. $F(p)=\dfrac{e^{-5p}}{p^3}(6+16p)$
9. $f(t)=\sin(2t-5)\cdot ch(4t-10))\times$ $\times\eta(t-\frac{5}{2})$	9. $F(p)=\dfrac{(2p^2+40)e^{-\frac{5}{2}p}}{(p^2-8p+20)(p^2+8p+20)}$
10. $f(t)=\int\limits_0^t\dfrac{e^{-t}\sin^2 2t}{t}dt$	10. $F(p)=\dfrac{1}{p}\ln\sqrt[4]{\dfrac{p^2+2p+17}{(p+1)^2}}$
11. 	11. $F(p)=\dfrac{e^{-2p}-2e^{-p}+1}{2p^2}+\dfrac{1-e^{-2p}}{p}$

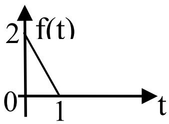
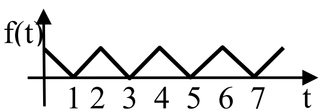
12. $f(t)=\int\limits_0^t \left(t\sin t+t\,e^{-4t}\right)dt$	12. $F(p)=\dfrac{2}{(p^2+1)^2}+\dfrac{1}{p\,(p+4)^2}$
13. $F(p)=\dfrac{1}{(p+2)^2(p^2+4)}$	13. $f(t)=\dfrac{1}{8}te^{-2t}+\dfrac{1}{16}e^{-2t}-\dfrac{1}{16}\cos 2t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{5}{(p+3)^2+1}\right)$	14. $f(t)=-5t\,e^{-3t}\sin t$
15. $F(p)=\dfrac{7e^{-7p}}{(p+1)(p+2)^2}$	15. $f(t)=7(e^{-(t-7)}-(t-7)\,e^{-2(t-7)}-e^{-2(t-7)})\,\eta(t-7)$
16. $y''+5y'+4y=f(t)$, где  $y(0)=y'(0)=0$	16. $y(t)=\dfrac{1}{4}-\dfrac{1}{3}e^{-t}+\dfrac{1}{12}e^{-4t}+$ $+\left(-\dfrac{1}{2}+\dfrac{2}{3}e^{-(t-1)}-\dfrac{1}{6}e^{-4(t-1)}\right)\eta\,(t-1)+$ $+\left(\dfrac{1}{4}-\dfrac{1}{3}e^{-(t-2)}+\dfrac{1}{12}e^{-4(t-2)}\right)\eta\,(t-2)$
17. $x''+3x'-4x=-sh\,t$ $x(0)=0,\quad x'(0)=1$	17. $x(t)=-\dfrac{14}{75}e^{-4t}-\dfrac{1}{12}e^{-t}+\dfrac{1}{100}(27-10t)\,e^{t}$
18. $x''+2x'=6\sin t$ $x(0)=0\;\; x'(0)=0$	18. $x(t)=3-\dfrac{3}{5}e^{-2t}-\dfrac{12}{5}\cos t-\dfrac{6}{5}\sin t$
19. $\begin{cases} x'+3x+3y=e^{2t} \\ y'+x+y=2e^{-2t} \end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\dfrac{1}{4}e^{2t}+\dfrac{3}{2}e^{-2t}-\dfrac{7}{8}-\dfrac{7}{8}e^{-4t}$ $y(t)=\dfrac{7}{8}-\dfrac{1}{2}e^{-2t}-\dfrac{1}{12}e^{2t}-\dfrac{7}{24}e^{-4t}$
20. $x''=\ln(4+t)$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{t^2}{2}\ln(4+t)-\dfrac{3}{4}t^2-2t+$ $+(4t+8)\ln(4+t)-(4t+8)\ln 4$

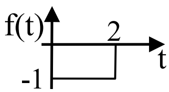
Вариант 15

Условие	Ответ
1. $f(t)=cht\cdot\sin 3t$	1. Да
2. $f(t)=\sin^2 3t+1$	2. $F(p)=\dfrac{3}{2p}-\dfrac{p}{2(p^2+36)}$
3. $f(t)=e^{3t}sh\,t+2t$	3. $F(p)=\dfrac{1}{(p-3)^2-1}+\dfrac{2}{p^2}$
4. $f(t)=\int\limits_0^t t^4e^{3t}dt$	4. $F(p)=\dfrac{4!}{p(p-3)^5}$
5. $f(t)=sh^2(t-5)\eta(t-5)$	5. $F(p)=\dfrac{2e^{-5p}}{p(p^2-4)}$
6. $f(t)=\int\limits_0^t (t-\tau)^3\sin 9\tau\,d\tau$	6. $F(p)=\dfrac{54}{p^4(p^2+81)}$
7. 	7. $F(p)=\dfrac{pe^{-\pi p}+e^{-\frac{3\pi}{2}p}}{p^2+1}$
8. $f(t)=(\dfrac{t^2}{2}-2t+6)\eta(t-6)$	8. $F(p)=\dfrac{e^{-6p}}{p^3}(1+4p+12p^2)$
9. $f(t)=\cos(3t-2)e^{2(t-\frac{2}{3})}\eta(t-\dfrac{2}{3})$	9. $F(p)=\dfrac{(p-2)e^{-\frac{2}{3}p}}{(p-2)^2+9}$
10. $f(t)=\int\limits_0^t \dfrac{e^{-t}-\cos 2t}{t}dt$	10. $F(p)=\dfrac{1}{p}\ln\sqrt{\dfrac{p^2+4}{(p+1)^2}}$
11. 	11. $F(p)=\dfrac{-(e^{-\pi p}+e^{-2\pi p})}{(1-e^{-2\pi p})(p^2+1)}$

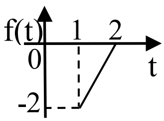
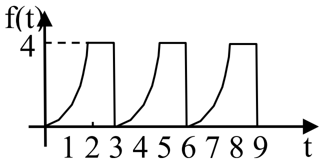
12. $f(t)=(t\cos 3t\,e^{2t})''$	12. $F(p)=\dfrac{p^2(p^2-4p-5)}{(p^2-4p+13)^2}$
13. $F(p)=\dfrac{2p+3}{(p-1)^2(p^2+9)}$	13. $f(t)=\dfrac{1}{2}te^t+\dfrac{1}{10}e^t-\dfrac{1}{10}\cos 3t-\dfrac{1}{5}\sin 3t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{2(p-1)}{(p-1)^2-16}\right)$	14. $f(t)=-2te^t ch 4t$
15. $F(p)=\dfrac{-7e^{-7p}}{(p-1)(p-8)^2}$	15. $f(t)=\left[\left(\dfrac{1}{7}-(t-7)\right)e^{8(t-7)}-\dfrac{1}{7}e^{t-7}\right]\times\eta(t-7)$
16. $y''+y'-6y=f(t)$, где  $y(0)=y'(0)=0$	16. $y(t)=-\dfrac{1}{36}-\dfrac{1}{6}t+\dfrac{1}{20}e^{2t}-\dfrac{1}{45}e^{-3t}+\left[\dfrac{1}{36}+\dfrac{1}{6}(t-1)-\dfrac{1}{20}e^{2(t-1)}+\dfrac{1}{45}e^{-3(t-1)}\right]\eta(t-1)+\left[\dfrac{1}{6}-\dfrac{1}{10}e^{2(t-3)}-\dfrac{1}{15}e^{-3(t-3)}\right]\eta(t-3)$
17. $x''+x'-6x=-4sh 2t$, $x(0)=0,\quad x'(0)=-3$	17. $x(t)=-\dfrac{2}{5}te^{2t}-\dfrac{67}{25}e^{2t}-\dfrac{1}{2}e^{-2t}+\dfrac{23}{25}e^{-3t}$
18. $x''+\dfrac{1}{9}x=7\cos\dfrac{t}{3}$, $x(0)=0\ \ x'(0)=7$	18. $x(t)=\dfrac{21}{2}t\sin\dfrac{t}{3}+21\sin\dfrac{t}{3}$
19. $\begin{cases} x'-x-y=2e^t \\ y'-3y-3x=e^{2t} \end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\dfrac{4}{3}e^t-\dfrac{1}{4}e^{2t}-\dfrac{11}{8}+\dfrac{7}{24}e^{4t}$ $y(t)=\dfrac{11}{8}-2e^t-\dfrac{1}{4}e^{2t}+\dfrac{21}{24}e^{4t}$
20. $x''=\dfrac{1}{1+4t^2}$, $x(0)=x'(0)=0$	20. $x(t)=\dfrac{t}{2}arctg 2t-\dfrac{1}{8}\ln(1+4t^2)$

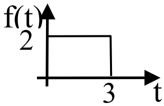
Вариант 16

Условие	Ответ
1. $f(t)=tg\,t^2$	1. Нет
2. $f(t)=t\cdot sh\,t$	2. $F(p)=\dfrac{2p}{(p^2-1)^2}$
3. $f(t)=e^{-2t}\cos 2t-e^{-2t}\sin 2t$	3. $F(p)=\dfrac{p}{(p+2)^2+4}$
4. $f(t)=\int\limits_0^t t^4e^{-3t}dt$	4. $F(p)=\dfrac{4!}{p(p+3)^5}$
5. $f(t)=\cos^2(t-4)\eta(t-4)$	5. $F(p)=\dfrac{(p^2+2)e^{-4p}}{2p(p^2+4)}$
6. $f(t)=\int\limits_0^t \tau^2 sh3(t-\tau)\,d\tau$	6. $F(p)=\dfrac{6}{p^3(p^2-9)}$
7. 	7. $F(p)=\dfrac{2(p-1+e^{-p})}{p^2}$
8. $f(t)=(t^2-8t+7)\eta(t-7)$	8. $F(p)=\dfrac{2+6p}{p^3}e^{-7p}$
9. $f(t)=(2t-1)sh(2t-1)\eta(t-\frac{1}{2})$	9. $F(p)=\dfrac{8p}{(p^2-4)^2}e^{-\frac{p}{2}}$
10. $f(t)=\dfrac{\sin 2t\cdot\left[\int\limits_0^t\left(\int\limits_0^\tau \eta(u)du\right)d\tau\right]}{t^3}$	10. $F(p)=\dfrac{1}{2}\left(\dfrac{\pi}{2}-arctg\,\dfrac{p}{2}\right)$
11. 	11. $F(p)=\dfrac{1}{(1-e^{-2p})}\left(\dfrac{1-e^{-2p}}{p}-\dfrac{(1-e^{-p})^2}{p^2}\right)$

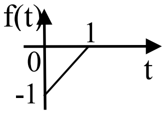
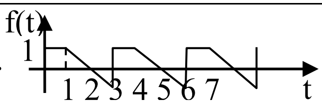
12. $f(t)=(e^{\alpha t}e^{-\beta t}t^2e^{-\gamma t})''$	12. $F(p)=\dfrac{2p^2}{(p-\alpha+\beta+\gamma)^3}$
13. $F(p)=\dfrac{p+2}{(p^2-4p+4)(p^2+4)}$	13. $f(t)=\frac{1}{2}te^{2t}-\frac{1}{8}e^{2t}+$ $+\frac{1}{8}\cos 2t-\frac{1}{8}\sin 2t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{3(p+1)}{(p+1)^2-9}\right)$	14. $f(t)=-3te^{-t}ch3t$
15. $F(p)=\dfrac{5e^{-5p}}{(p+3)(p-4)^2}$	15. $f(t)=(\frac{5}{49}e^{-3(t-5)}+\frac{5}{7}(t-5)e^{4(t-5)}$ $-\frac{5}{49}e^{4(t-5)})\eta(t-5)$
16. $y''+y'-2y=f(t)$, где  $y(0)=1$ $y'(0)=1$	16. $y(t)=\frac{1}{2}-\frac{1}{6}e^{-2t}+\frac{2}{3}e^{t}-\frac{1}{2}\eta(t-2)$ $+\frac{1}{6}e^{-2(t-2)}\eta(t-2)+\frac{1}{3}e^{t-2}\eta(t-2)$
17. $x''-x'-6x=-2sh3t$ $x(0)=0,\quad x'(0)=-2$	17. $x(t)=-\frac{t}{5}e^{3t}-\frac{49}{150}e^{3t}+\frac{1}{6}e^{-3t}+\frac{4}{25}e^{-2t}$
18. $x''+4x'+3x=2\sin 2t$ $x(0)=0\ \ x'(0)=0$	18. $x(t)=\frac{2}{5}e^{-t}-\frac{16}{65}\cos 2t-$ $-\frac{2}{65}\sin 2t-\frac{2}{13}e^{-3t}$
19. $\begin{cases}x'+3x+3y=e^t\\ y'+2y+2x=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-\frac{1}{10}-\frac{3}{14}e^{2t}+\frac{1}{2}e^{t}-\frac{13}{70}e^{-5t}$ $y(t)=\frac{1}{10}+\frac{5}{14}e^{2t}-\frac{1}{3}e^{t}-\frac{13}{105}e^{-5t}$
20. $x''+x=\dfrac{1}{1+\cos t}$ $x(0)=x'(0)=0$	20. $x(t)=t\sin t-2\sin^2\frac{t}{2}+$ $+\cos t\cdot\ln(1+\cos t)-\ln(2\cos t)$

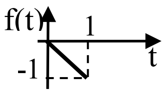
Вариант 17

Условие	Ответ
1. $f(t)=e^{\sin t}$	1. Да
2. $f(t)=t\cdot ch3t$	2. $F(p)=\dfrac{p^2+9}{(p^2-9)^2}$
3. $f(t)=e^{-t}\cos 2t+e^{-t}\sin 2t$	3. $F(p)=\dfrac{p+3}{(p+1)^2+4}$
4. $f(t)=\int\limits_0^t t^4e^{4t}dt$	4. $F(p)=\dfrac{4!}{p(p-4)^5}$
5. $f(t)=\cos^2(t-5)\eta(t-5)$	5. $F(p)=\dfrac{(p^2+2)}{p(p^2+4)}e^{-5p}$
6. $f(t)=\int\limits_0^t (t-\tau)^3 sh5\tau\, d\tau$	6. $F(p)=\dfrac{30}{p^4(p^2-25)}$
7. 	7. $F(p)=\dfrac{2(1-p-e^{-p})}{p^2}e^{-p}$
8. $f(t)=(\dfrac{t^2}{4}-3t+7)\eta(t-8)$	8. $F(p)=e^{-8p}\left(\dfrac{1}{2p^3}+\dfrac{1}{p^2}-\dfrac{1}{p}\right)$
9. $f(t)=(2t-2)^2 sh(t-1)\eta(t-1)$	9. $F(p)=4e^{-p}\left(\dfrac{1}{(p-1)^3}-\dfrac{1}{(p+1)^3}\right)$
10. $f(t)=\int\limits_0^t \dfrac{\sin 3t\cdot\sin 5t}{t}di$	10. $F(p)=\dfrac{1}{p}\ln\sqrt[4]{\dfrac{p^2+64}{p^2+4}}$
11. 	11. $F(p)=\dfrac{2-2e^{-2p}-4pe^{-2p}-4p^2e^{-3p}}{p^3(1-e^{-3p})}$

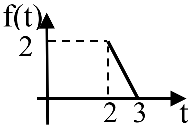
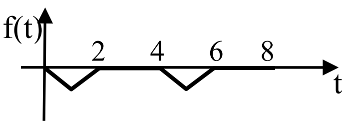
12. $f(t)=e^{2t}\int\limits_0^t 2\sin(t-\tau)\cdot\cos\tau\,d\tau$	12. $F(p)=\dfrac{2(p-2)}{((p-2)^2+1)^2}$
13. $F(p)=\dfrac{3p+2}{(p^2+4)(p^2+4p+4)}$	13. $f(t)=\dfrac{3}{8}\sin 2t-\dfrac{1}{8}\cos 2t-$ $-\dfrac{1}{2}te^{-2t}+\dfrac{1}{8}e^{-2t}$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{4(p-3)}{(p-3)^2-4}\right)$	14. $f(t)=-4te^{3t}ch2t$
15. $F(p)=\dfrac{-5e^{-5p}}{(p-3)(p-4)^2}$	15. $f(t)=-5(e^{3(t-5)}+(t-5)e^{4(t-5)}$ $-e^{4(t-5)})\eta(t-5)$
16. $y''-5y'-6y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=-\dfrac{1}{3}+\dfrac{1}{21}e^{6t}+\dfrac{2}{7}e^{-t}+\dfrac{1}{3}\eta(t-3)$ $-\dfrac{1}{21}e^{6(t-3)}\eta(t-3)-\dfrac{2}{7}e^{-(t-3)}\eta(t-3)$
17. $x''-3x'-4x=-3sh4t$ $x(0)=0,\quad x'(0)=-1$	17. $x(t)=\dfrac{1}{25}e^{-t}+\dfrac{1}{16}e^{-4t}-\dfrac{(120t+41)e^{4t}}{400}$
18. $x''+x'-2x=3\sin 3t$ $x(0)=0\ \ x'(0)=0$	18. $x(t)=-\dfrac{9}{130}\cos 3t-\dfrac{33}{130}\sin 3t-$ $-\dfrac{3}{13}e^{-2t}+\dfrac{3}{10}e^{t}$
19. $\begin{cases}x'+3x+3y=e^{-t}\\ y'-y-x=3e^{-t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=-5-6e^{-2t}+11e^{-t}$ $y(t)=5+2e^{-2t}-7e^{-t}$
20. $x''+4x=\dfrac{1}{1+\cos 2t}$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{1}{2}t\sin t-\dfrac{1}{2}\sin^2 t+$ $+\dfrac{1}{4}\cos 2t\cdot\ln(1+\cos 2t)-\dfrac{\cos 2t}{4}\ln 2$

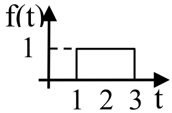
Вариант 18

Условие	Ответ
1. $f(t)=\dfrac{1}{2t^2}$	1. Нет
2. $f(t)=2t\cdot ch5t$	2. $F(p)=\dfrac{2(p^2+25)}{(p^2-25)^2}$
3. $f(t)=e^t\sin 2t-2e^t\cos 2t$	3. $F(p)=\dfrac{4-2p}{(p-1)^2+4}$
4. $f(t)=\int\limits_0^t t^4e^{-5t}dt$	4. $F(p)=\dfrac{4!}{p(p+5)^5}$
5. $f(t)=\sin^2(t-4)\eta(t-4)$	5. $F(p)=\dfrac{2e^{-4p}}{p(p^2+4)}$
6. $f(t)=\int\limits_0^t \tau^4 sh7(t-\tau)\,d\tau$	6. $F(p)=\dfrac{168}{p^5(p^2-49)}$
7. 	7. $F(p)=\dfrac{1-p-e^{-p}}{p^2}$
8. $f(t)=(t^2-11t+20)\eta(t-9)$	8. $F(p)=\dfrac{e^{-9p}}{p^3}\left(2+7p+2p^2\right)$
9. $f(t)=\sin 2(t-1)e^{-(t-1)}\eta(t-1)$	9. $F(p)=\dfrac{2e^{-p}}{(p+1)^2+4}$
10. $f(t)=\dfrac{2}{t}\int\limits_0^t\left(\cos\omega t-\cos kt\right)di$	10. $F(p)=\dfrac{\pi}{\omega}-\dfrac{\pi}{k}-\dfrac{2}{\omega}arctg\dfrac{p}{\omega}+\dfrac{2}{k}arctg\dfrac{p}{k}$
11. 	11. $F(p)=\dfrac{1}{p^2}(p+pe^{-3p}+e^{-3p}-e^{-p})$

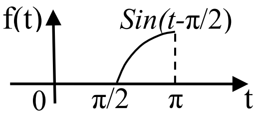
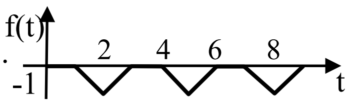
12. $f(t)=2(\sin t\cdot e^{t}-\sin te^{-t})'$	12. $F(p)=\dfrac{8p^2}{((p-2)^2+1)((p+1)^2+1)}$
13. $F(p)=\dfrac{8p+2}{p^2(p^2+4)}$	13. $f(t)=2+\frac{1}{2}t-2\cos 2t-\frac{1}{4}\sin 2t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{5(p+3)}{(p+3)^2-1}\right)$	14. $f(t)=-5te^{-3t}ch\,t$
15. $F(p)=\dfrac{6e^{-6p}}{(p+2)(p-4)^2}$	15. $f(t)=(\frac{1}{6}e^{-2(t-6)}-\frac{1}{6}e^{4(t-6)}+$ $+(t-6)e^{4(t-6)})\eta(t-6)$
16. $y''+10y'+25y=f(t)$, где  $y(0)=y'(0)=0$	16. $y(t)=\frac{2}{125}-\frac{1}{25}t-\frac{2}{125}e^{-5t}-\frac{1}{25}te^{-5t}+$ $+\frac{3}{125}\eta(t-1)+\frac{1}{25}(t-1)\eta(t-1)-$ $-\frac{3}{125}e^{-5(t-1)}\eta(t-1)-\frac{4}{25}(t-1)e^{-5(t-1)}\eta(t-1)$
17. $x''+3x'-4x=2sh\,t$ $x(0)=0,\quad x'(0)=2$	17. $x(t)=\frac{1}{5}te^{t}+\frac{1}{6}e^{-t}+\frac{13}{50}e^{t}-\frac{32}{75}e^{-4t}$
18. $x''+4x'=20\sin 3t$ $x(0)=0\quad x'(0)=0$	18. $x(t)=\frac{5}{3}-\frac{3}{5}e^{-4t}-\frac{4}{5}\sin 3t-\frac{16}{15}\cos 3t$
19. $\begin{cases}x'-3x-3y=3e^{3t}\\ y'-y-x=e^{2t}\end{cases}$ $x(0)=y(0)=0$	19. $x(t)=\frac{1}{8}-\frac{3}{4}e^{2t}-2e^{3t}+\frac{21}{8}e^{4t}$ $y(t)=-\frac{1}{8}+\frac{1}{4}e^{2t}-e^{3t}+\frac{7}{8}e^{4t}$
20. $x''-2x'=\dfrac{1}{1+e^{2t}}$ $x(0)=x'(0)=0$	20. $x(t)=-\frac{1}{4}+\frac{e^{2t}}{4}\ln(1+e^{2t})-$ $-\frac{te^{2t}}{2}-\frac{t}{2}+\frac{1}{4}\ln(1+e^{2t})$

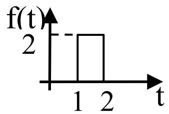
Вариант 19

Условие	Ответ
1. $f(t)=t\cdot ctgt$	1. Нет
2. $f(t)=3e^{t}sh^{2}t$	2. $F(p)=\frac{3}{2}\frac{p-1}{(p-1)^{2}-4}-\frac{3}{2(p-1)}$
3. $f(t)=e^{-2t}\sin t+e^{-2t}\cos t$	3. $F(p)=\frac{p+3}{(p+2)^{2}+1}$
4. $f(t)=\int_{0}^{t}t\cos t\,dt$	4. $F(p)=\frac{p^{2}-1}{p(p^{2}+1)^{2}}$
5. $f(t)=\cos 7(t-8)e^{t-8}\eta(t-8)$	5. $F(p)=\frac{(p-1)e^{-8p}}{(p-1)^{2}+49}$
6. $f(t)=\int_{0}^{t}(t-\tau)^{5}\sin 2\tau\,d\tau$	6. $F(p)=\frac{240}{p^{6}(p^{2}+4)}$
7. 	7. $F(p)=\frac{2e^{-2p}}{p^{2}}(p-1+e^{-p})$
8. $f(t)=(t^{2}-6t+5)\eta(t-1)$	8. $F(p)=\frac{2e^{-p}}{p^{3}}-\frac{4e^{-p}}{p^{2}}$
9. $f(t)=2sh(3t-5)\cdot ch(3t-5)\eta(t-\frac{5}{3}$	9. $F(p)=\frac{6e^{-\frac{5}{3}p}}{p^{2}-36}$
10. $f(t)=\int_{0}^{t}\frac{sht-\sin t}{t}dt$	10. $F(p)=\frac{1}{p}arctg\,p-\frac{\pi}{2p}-\frac{1}{2p}\ln\left\|\frac{p-1}{p+1}\right\|$
11. 	11. $F(p)=\frac{2e^{-p}-1-e^{-2p}}{p^{2}(1-e^{-4p})}$

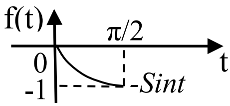
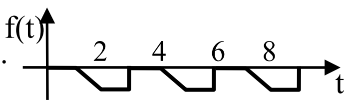
12. $f(t)=-t(te^{-9t})'$	12. $F(p)=\dfrac{9-p}{(p+9)^3}$
13. $F(p)=\dfrac{2p^2-5}{(p+3)^2(p^2+4)}$	13. $f(t)=\dfrac{6}{13}e^{-3t}+te^{-3t}+\dfrac{6}{13}\cos 2t-\dfrac{5}{26}\sin 2t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{8}{(p-1)^2-16}\right)$	14. $f(t)=-2te^t sh4t$
15. $F(p)=\dfrac{4e^{-4p}}{(p-2)(p+1)^2}$	15. $f(t)=\dfrac{4}{9}(e^{2(t-4)}-e^{-(t-4)}-$ $-3(t-4)e^{-(t-4)})\eta(t-4)$
16. $y''+y'-12y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\left[-\dfrac{1}{12}+\dfrac{1}{21}e^{3(t-1)}+\dfrac{1}{28}e^{-4(t-1)}\right]\eta(t-1)$ $+\left[\dfrac{1}{12}-\dfrac{1}{21}e^{3(t-3)}-\dfrac{1}{28}e^{-4(t-3)}\right]\eta(t-3)$
17. $x''+x'-6x=-sh2t,$ $x(0)=0, x'(0)=-1$	17. $x(t)=\dfrac{7}{25}e^{-3t}-\dfrac{1}{8}e^{-2t}-$ $-\dfrac{31}{200}e^{2t}-\dfrac{1}{10}te^{2t}$
18. $x''-x'-2x=12\sin 2t$ $x(0)=0, x'(0)=0$	18. $x(t)=e^{2t}-\dfrac{8}{5}e^{-t}-\dfrac{9}{5}\sin 2t+\dfrac{3}{5}\cos 2t$
19. $\begin{cases} x'-3x-3y=2e^{3t} \\ y'-2y-2x=2e^{t} \end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=\dfrac{14}{15}-\dfrac{3}{2}e^{t}-\dfrac{1}{3}e^{3t}+\dfrac{9}{10}e^{5t},$ $y(t)=-\dfrac{14}{15}+e^{t}-\dfrac{2}{3}e^{3t}+\dfrac{3}{5}e^{5t}$
20. $x''-3x'=\dfrac{1}{1+e^{-3t}}$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{e^{3t}}{9}\ln 2-\dfrac{1}{9}\ln(e^{-3t}+1)+$ $+\dfrac{\ln 2}{9}-\dfrac{e^{3t}}{9}\ln(1+e^{-3t})-\dfrac{t}{3}$

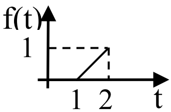
Вариант 20

Условие	Ответ
1. $f(t)=\int\limits_0^t t\,sht\,dt$	1. Да
2. $f(t)=2e^{-t}\sin 3t$	2. $F(p)=\dfrac{6}{(p+1)^2+9}$
3. $f(t)=e^{-2t}\sin 5t-e^{-2t}\cos 5t$	3. $F(p)=\dfrac{3-p}{(p+2)^2+25}$
4. $f(t)=\int\limits_0^t t\,ch2t\,dt$	4. $F(p)=\dfrac{p^2+4}{p(p^2-4)^2}$
5. $f(t)=\sin 5(t-2)\eta(t-2)$	5. $F(p)=\dfrac{5e^{-2p}}{p^2+25}$
6. $f(t)=\int\limits_0^t \tau^5 ch2(t-\tau)\,d\tau$	6. $F(p)=\dfrac{5!}{p^6(p^2-4)}$
7. 	7. $F(p)=\dfrac{e^{-\frac{\pi}{2}p}-pe^{-\pi p}}{p^2+1}$
8. $f(t)=(\dfrac{t^2}{2}-2t+3)\eta(t-2)$	8. $F(p)=\dfrac{e^{-2p}}{p^3}+\dfrac{e^{-2p}}{p}$
9. $f(t)=sh(2t-7)e^{-2t+7}\eta(t-\dfrac{7}{2})$	9. $F(p)=\dfrac{2e^{-\frac{7}{2}p}}{(p+2)^2-4}$
10. $f(t)=\int\limits_0^t \dfrac{e^{-\lambda t}\sin\omega t}{t}dt$	10. $F(p)=\dfrac{1}{p}\left[\dfrac{\pi}{2}-arctg\,\dfrac{p+\lambda}{\omega}\right]$
11. 	11. $F(p)=\dfrac{2e^{-2p}-e^{-3p}-e^{-p}}{p^2(1-e^{-3p})}$

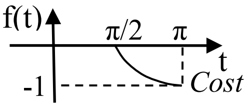
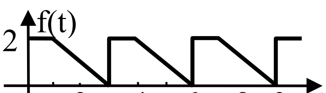
12. $f(t)=t(te^{2t})'$	12. $F(p)=\dfrac{2+p}{(p-2)^3}$
13. $F(p)=\dfrac{p^2+5}{p^2(p^2+25)}$	13. $f(t)=\dfrac{1}{5}t+\dfrac{4}{25}\sin 5t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{9}{(p+1)^2-9}\right)$	14. $f(t)=-3te^{-t}sh3t$
15. $F(p)=\dfrac{e^{-p}}{(p+5)(p-3)^2}$	15. $f(t)=\dfrac{1}{64}(e^{-5(t-1)}-e^{3(t-1)}+$ $+8(t-1)e^{3(t-1)})\eta(t-1)$
16. $y''+3y'-10y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\left[-\dfrac{1}{5}+\dfrac{1}{7}e^{2(t-1)}+\dfrac{2}{35}e^{-5(t-1)}\right]\eta(t-1)$ $+\left[\dfrac{1}{5}-\dfrac{1}{7}e^{2(t-2)}-\dfrac{2}{35}e^{-5(t-2)}\right]\eta(t-2)$
17. $x''-x'-6x=2sh3t,$ $x(0)=0, x'(0)=1$	17. $x(t)=\dfrac{1}{25}e^{-2t}-\dfrac{1}{6}e^{-3t}+$ $+\dfrac{1}{5}te^{3t}+\dfrac{19}{150}e^{3t}$
18. $x''-3x'+2x=10\sin t$ $x(0)=0, x'(0)=0$	18. $x(t)=2e^{2t}-5e^{t}+\sin t+3\cos t$
19. $\begin{cases} x'-3x-3y=2e^{-2t} \\ y'+2y+2x=e^{-t} \end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=-5+\dfrac{3}{2}e^{-t}+\dfrac{7}{2}e^{t},$ $y(t)=5-2e^{-t}-\dfrac{2}{3}e^{-2t}-\dfrac{7}{3}e^{t}$
20. $x'''=\dfrac{1}{1+t^2}+2t,$ $x(0)=x'(0)=x''(0)=0$	20. $x(t)=\dfrac{t^2}{2}arctg\,t-\dfrac{1}{2}t\ln(1+t^2)$ $+\dfrac{t}{2}-\dfrac{1}{2}arctg\,t+\dfrac{t^4}{12}$

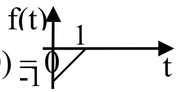
Вариант 21

Условие	Ответ
1. $f(t)=\dfrac{1}{\sin 3t}$	1. Нет
2. $f(t)=3e^{-3t}\cos 2t$	2. $F(p)=\dfrac{3(p+3)}{(p+3)^2+4}$
3. $f(t)=e^{t}\sin 2t+2e^{t}\cos 2t$	3. $F(p)=\dfrac{2p-1}{(p-1)^2+4}$
4. $f(t)=\int\limits_0^t t\,sh3t\,dt$	4. $F(p)=\dfrac{6}{(p^2-9)^2}$
5. $f(t)=\cos 6(t-2)\eta(t-2)$	5. $F(p)=\dfrac{pe^{-2p}}{p^2+36}$
6. $f(t)=\int\limits_0^t \tau^4\cos 7(t-\tau)\,d\tau$	6. $F(p)=\dfrac{4!}{p^4(p^2+49)}$
7. 	7. $F(p)=\dfrac{pe^{-\frac{\pi}{2}p}-1}{p^2+1}$
8. $f(t)=(\dfrac{t^2}{3}-2t+5)\eta(t-3)$	8. $F(p)=\dfrac{2e^{-3p}}{3p^3}+\dfrac{2e^{-3p}}{p}$
9. $f(t)=ch(2t-4)e^{-2t+4}\eta(t-2)$	9. $F(p)=\dfrac{(p+2)e^{-2p}}{(p+2)^2-4}$
10. $f(t)=\int\limits_0^t \dfrac{e^{-3t}+2t-1}{t}dt$	10. $F(p)=\dfrac{2}{p^2}+\dfrac{1}{p}\ln\left\|\dfrac{p}{p+3}\right\|$
11. 	11. $F(p)=\dfrac{e^{-2p}-e^{-p}+pe^{-3p}}{(1-e^{-3p})p^2}$
12. $f(t)=t(\sin 3t+\cos 3t)$	12. $F(p)=\dfrac{p^2+6p-9}{(p^2+9)^2}$

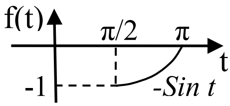
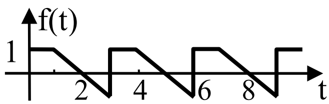
13. $F(p)=\dfrac{p-1}{(p+1)^2(p^2+1)}$	13. $f(t)=\dfrac{1}{2}(\cos t+\sin t)-e^{-t}(\dfrac{1}{2}+t)$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{8}{(p-3)^2-4}\right)$	14. $f(t)=-4te^{3t}sh2t$
15. $F(p)=\dfrac{-e^{-p}}{(p-5)(p+3)^2}$	15. $f(t)=\dfrac{1}{64}(e^{-3(t-1)}-e^{5(t-1)}+$ $+8(t-1)e^{-3(t-1)})\eta(t-1)$
16. $y''-2y'-3y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\left[\dfrac{2}{9}-\dfrac{1}{3}(t-1)-\dfrac{1}{4}e^{-(t-1)}+\right.$ $\left.+\dfrac{1}{36}e^{3(t-1)}\right]\eta(t-1)+$ $+\left[\dfrac{1}{9}+\dfrac{1}{3}(t-2)-\dfrac{1}{9}e^{3(t-2)}\right]\eta(t-2)$
17. $x''-3x'-4x=3sh4t,$ $x(0)=0, x'(0)=1$	17. $x(t)=\dfrac{3}{10}te^{4t}+\dfrac{41}{400}e^{4t}-$ $-\dfrac{1}{25}e^{-t}-\dfrac{1}{16}e^{-4t}$
18. $x''+5x'+4x=\sin t$ $x(0)=0, x'(0)=0$	18. $x(t)=\dfrac{e^{-t}}{6}-\dfrac{e^{-4t}}{51}+\dfrac{3}{34}\sin t-\dfrac{5}{34}\cos t$
19. $\begin{cases} x'+3x+3y=e^t \\ y'-2y-2x=2e^{-3t} \end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=-e^{-3t}-\dfrac{1}{2}e^{t}+\dfrac{3}{2}e^{-t},$ $y(t)=e^{t}-e^{-t}$
20. $x'''=\dfrac{1}{1+4t^2}+2t,$ $x(0)=x'(0)=x''(0)=0$	20. $x(t)=\dfrac{t^2}{4}arctg2t-\dfrac{t}{8}\ln(1+4t^2)$ $+\dfrac{t}{8}-\dfrac{1}{16}arctg\,2t+\dfrac{t^4}{12}$

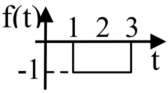
Вариант 22

Условие	Ответ
1. $f(t)=t+e^{t^2}$	1. Нет
2. $f(t)=2t+e^{-t}$	2. $F(p)=\dfrac{p^2+2p+2}{p^2(p+1)}$
3. $f(t)=e^{-2t}\sin 4t+3e^{-2t}\cos 4t$	3. $F(p)=\dfrac{3p+10}{(p+2)^2+16}$
4. $f(t)=\int\limits_0^t t\,sh2t\,dt$	4. $F(p)=\dfrac{4}{(p^2-4)^2}$
5. $f(t)=e^{4(t-3)}\eta(t-3)$	5. $F(p)=\dfrac{e^{-3p}}{p-4}$
6. $f(t)=\int\limits_0^t (t-\tau)^3\cos 9\tau\,d\tau$	6. $F(p)=\dfrac{6}{p^3(p^2+81)}$
7. 	7. $F(p)=\dfrac{pe^{-\pi p}-e^{-\frac{\pi}{2}p}}{p^2+1}$
8. $f(t)=(2t^2-5t-12)\eta(t-4)$	8. $F(p)=\dfrac{4}{p^3}e^{-4p}+\dfrac{11}{p^2}e^{-4p}$
9. $f(t)=(\cos(t-\frac{3}{2})e^{-(2t-3)}+ +e^{-(2t-3)})\eta(t-\frac{3}{2})$	9. $F(p)=\dfrac{(p+2)e^{-\frac{3}{2}p}}{(p+2)^2+1}+\dfrac{e^{-\frac{3}{2}p}}{p+2}$
10. $f(t)=\dfrac{\int\limits_0^t (ch2\tau-\cos\tau)\,dt}{t}$	10. $F(p)=arctg\,p-\dfrac{\pi}{2}-\dfrac{1}{4}\ln\left\|\dfrac{p-2}{p+2}\right\|$
11. 	11. $F(p)=\dfrac{1}{1-e^{-3p}}\left[\dfrac{2}{p}+\dfrac{e^{-3p}}{p^2}-\dfrac{e^{-p}}{p^2}\right]$

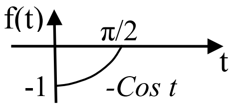
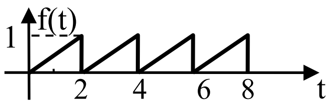
12. $f(t)=(e^{-2t}\cdot sht+t\cdot e^{-t})''$	12. $F(p)=\dfrac{p^2}{(p+2)^2-1}+\dfrac{p^2}{(p+1)^2}$
13. $F(p)=\dfrac{p}{(p+4)^2(p^2+16)}$	13. $f(t)=-\dfrac{1}{8}te^{-4t}+\dfrac{1}{32}\sin 4t$
14. $F(p)=\dfrac{d}{dp}\left(\dfrac{5}{(p+3)^2-1}\right)$	14. $f(t)=-5te^{-3t}sht$
15. $F(p)=\dfrac{3e^{-3p}}{(p+4)(p-1)^2}$	15. $f(t)=\dfrac{3}{25}(e^{-4(t-3)}-e^{t-3}+$ $+5(t-3)e^{t-3})\eta(t-3)$
16. $y''-2y'-8y=f(t)$, где  $y(0)=$ $y'(0)=0$	16. $y(t)=\dfrac{5}{32}-\dfrac{t}{8}-\dfrac{1}{8}e^{-2t}-\dfrac{1}{32}e^{4t}-$ $\left[\dfrac{1}{32}+\dfrac{t-1}{8}+\dfrac{1}{24}e^{-2(t-1)}-\dfrac{1}{96}e^{4(t-1)}\right]\eta(t-1)$
17. $x''-2x'+x=5e^{3t}$, $x(0)=0, x'(0)=2$	17. $x(t)=\dfrac{5}{4}e^{3t}-\dfrac{1}{2}te^{t}-\dfrac{5}{4}e^{t}$
18. $x''+2x'-3x=10\sin 5t$ $x(0)=0, x'(0)=0$	18. $x(t)=-\dfrac{25}{68}e^{-3t}+\dfrac{25}{52}e^{t}-$ $-\dfrac{70}{221}\sin 5t-\dfrac{25}{221}\cos 5t$
19. $\begin{cases}x'+2x+2y=e^{2t}\\ y'-3y-3x=2e^{-t}\end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=\dfrac{5}{2}-2e^{-t}-\dfrac{1}{2}e^{2t}$, $y(t)=-\dfrac{5}{2}+e^{-t}+\dfrac{3}{2}e^{2t}$
20. $x''-4x'=\dfrac{1}{1+e^{-4t}}$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{1+e^{4t}}{16}\ln 2-\dfrac{1}{4}t-$ $-\dfrac{1+e^{4t}}{16}\ln(e^{-4t}+1)$

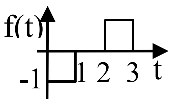
Вариант 23

Условие	Ответ
1. $f(t)=\cos 5t^2$	1. Да
2. $f(t)=2sht\cdot cht$	2. $F(p)=\dfrac{2}{p^2-4}$
3. $f(t)=e^{-3t}\sin 2t+2e^{-3t}\cos 2t$	3. $F(p)=\dfrac{2p+8}{(p+3)^2+4}$
4. $f(t)=\int\limits_0^t t\cos 8t\,dt$	4. $F(p)=\dfrac{p^2-64}{p(p^2+64)^2}$
5. $f(t)=5e^{3(t-1)}\eta(t-1)$	5. $F(p)=\dfrac{5e^{-p}}{p-3}$
6. $f(t)=\int\limits_0^t \tau^3 sh9(t-\tau)\,d\tau$	6. $F(p)=\dfrac{54}{p^4(p^2-81)}$
7. 	7. $F(p)=-\dfrac{pe^{-\frac{\pi}{2}p}+e^{-\pi p}}{p^2+1}$
8. $f(t)=(t^2-6t-7)\eta(t-7)$	8. $F(p)=\dfrac{2}{p^3}e^{-7p}+\dfrac{8}{p^2}e^{-7p}$
9. $f(t)=\cos(10t-2)e^{-5t+1}\eta(t-\frac{1}{5})$	9. $F(p)=\dfrac{(p+5)e^{-\frac{1}{5}p}}{(p+5)^2+100}$
10. $f(t)=\int\limits_0^t \dfrac{\sin t\cdot\cos t}{t}dt$	10. $F(p)=\dfrac{\pi}{4p}-\dfrac{1}{2p}arctg\dfrac{p}{2}$
11. 	11. $F(p)=\dfrac{p+(1+p)e^{-3p}-e^{-p}}{p^2(1-e^{-3p})}$
12. $f(t)=(t^2\sin 2t)'$	12. $F(p)=\dfrac{4p(3p^2-4)}{(p^2+4)^3}$

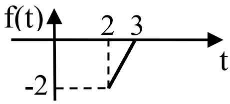
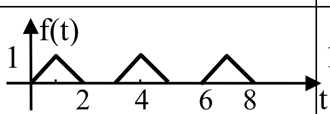
13. $F(p)=\dfrac{2p^2+1}{(p-2)(p^2+16)}$	13. $f(t)=\dfrac{9}{20}e^{2t}+\dfrac{31}{20}\cos 4t+\dfrac{31}{40}\sin 4t$
14. $F(p)=\dfrac{7}{(p-4)^4}+\dfrac{2}{p^2}$	14. $f(t)=\dfrac{7}{6}t^3e^{4t}+2t$
15. $F(p)=\dfrac{2e^{-2p}}{(p-2)(p-5)^2}$	15. $f(t)=\dfrac{2}{9}(e^{2(t-2)}-e^{5(t-2)}+$ $+3(t-2)e^{5(t-2)})\eta(t-2)$
16. $y''-8y'+16y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\dfrac{1}{16}\left[-1+e^{4(t-1)}-4(t-1)e^{4(t-1)}\right]\eta\,(t-1)$ $+\dfrac{1}{16}\left[1-e^{4(t-3)}+4(t-3)e^{4(t-3)}\right]\eta\,(t-3)$
17. $x''+2x'+x=3e^{-4t}$, $x(0)=0, x'(0)=-1$	17. $x(t)=-\dfrac{1}{3}e^{-t}+\dfrac{1}{3}e^{-4t}$
18. $x''-4x'+3x=12\sin 3t$ $x(0)=0, x'(0)=0$	18. $x(t)=e^{3t}-\dfrac{9}{5}e^{t}-\dfrac{2}{5}\sin 3t+$ $+\dfrac{4}{5}\cos 3t$
19. $\begin{cases} x'+x+y=e^{-2t} \\ y'+2y+2x=2e^{-4t} \end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=\dfrac{1}{6}-\dfrac{1}{2}e^{-4t}+\dfrac{1}{3}e^{-3t}$, $y(t)=-\dfrac{1}{6}-\dfrac{3}{2}e^{-4t}+e^{-2t}+\dfrac{2}{3}e^{-3t}$
20. $x''+4x'=\dfrac{1}{1+e^{4t}}$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{1}{4}t-\dfrac{1}{16}\ln\dfrac{1+e^{4t}}{2}-$ $-\dfrac{e^{-4t}}{16}\ln\dfrac{1+e^{4t}}{2}$

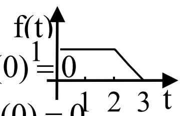
Вариант 24

Условие	Ответ
1. $f(t)=e^{\frac{1}{t}}$	1. Нет
2. $f(t)=\cos^2 t-\sin^2 t$	2. $F(p)=\dfrac{p}{p^2+4}$
3. $f(t)=te^t\sin t$	3. $F(p)=\dfrac{2p-2}{(p^2-2p+2)^2}$
4. $f(t)=\int\limits_0^t t\cos 4t\,dt$	4. $F(p)=\dfrac{p^2-16}{p(p^2+16)^2}$
5. $f(t)=e^{3(t-5)}\eta(t-5)$	5. $F(p)=\dfrac{e^{-5p}}{p-3}$
6. $f(t)=\int\limits_0^t (t-\tau)^4\,sh3\tau\,d\tau$	6. $F(p)=\dfrac{72}{p^5(p^2-9)}$
7. 	7. $F(p)=-\dfrac{p+e^{-\frac{\pi}{2}p}}{p^2+1}$
8. $f(t)=(\dfrac{t^2}{3}-3t+6)\eta(t-6)$	8. $F(p)=\dfrac{2}{3p^3}e^{-6p}+\dfrac{1}{p^2}e^{-6p}$
9. $f(t)=\sin(2t-3)e^{(3t-\frac{9}{2})}\eta(t-\dfrac{3}{2})$	9. $F(p)=\dfrac{2e^{-\frac{3}{2}p}}{(p-3)^2+4}$
10. $f(t)=\int\limits_0^t \dfrac{e^t-ch2t}{t}dt$	10. $F(p)=\dfrac{1}{p}\ln\sqrt{\dfrac{p^2-4}{(p-1)^2}}$
11. 	11. $F(p)=\dfrac{1-e^{-2p}-2pe^{-2p}}{2p^2(1-e^{-2p})}$
12. $f(t)=(t(sh2t+cht))'$	12. $F(p)=\dfrac{4p^2}{(p^2-4)^2}-\dfrac{p(1+p^2)}{(p^2-1)^2}$

13. $F(p)=\dfrac{p+6}{(p+1)^2(p^2+4)}$	13. $f(t)=\dfrac{3}{5}e^{-t}+te^{-t}-\dfrac{3}{5}\cos 2t-\dfrac{1}{5}\sin 2t$
14. $F(p)=\dfrac{5}{(p-3)^2}+\dfrac{3}{p^3}$	14. $f(t)=5te^{3t}+\dfrac{3}{2}t^2$
15. $F(p)=\dfrac{9e^{-4p}}{(p-3)(p-6)^2}$	15. $f(t)=\left[e^{3(t-4)}-e^{6(t-4)}+\right.$ $\left.+3(t-4)e^{6(t-4)}\right]\eta(t-4)$
16. $y''+6y'+9y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\dfrac{1}{9}\left[-1+e^{-3t}+3te^{-3t}\right]+$ $+\dfrac{1}{9}\left[1-e^{-3(t-1)}-3(t-1)e^{-3(t-1)}\right]\eta(t-1)+$ $\dfrac{1}{9}\left[1-e^{-3(t-2)}-3(t-2)e^{-3(t-2)}\right]\eta(t-2)+$ $\dfrac{1}{9}\left[-1+e^{-3(t-3)}+3(t-3)e^{-3(t-3)}\right]\eta(t-3)$
17. $x''+6x'+9x=4e^{-2t}$, $x(0)=0, x'(0)=-3$	17. $x(t)=-(7t+4)e^{-3t}+4e^{-2t}$
18. $x''+5x'+6x=10\sin 3t$ $x(0)=0, x'(0)=0$	18. $x(t)=\dfrac{30}{13}e^{-2t}-\dfrac{5}{3}e^{-3t}-\dfrac{5}{39}\sin 3t-$ $-\dfrac{25}{39}\cos 3t$
19. $\begin{cases} x'+2x+2y=2e^{2t} \\ y'+3y+3x=2e^{t} \end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=\dfrac{1}{5}-\dfrac{2}{3}e^{t}+\dfrac{5}{7}e^{2t}-\dfrac{2}{105}e^{-5t}$, $y(t)=-\dfrac{1}{5}+e^{t}-\dfrac{3}{7}e^{2t}-\dfrac{3}{105}e^{-5t}$
20. $x''+3x'+2x=\dfrac{1}{1+e^{t}}$ $x(0)=x'(0)=0$	20. $x(t)=(e^{-t}+e^{-2t})\ln\dfrac{1+e^{t}}{2}-e^{-t}$

Вариант 25

Условие	Ответ
1. $f(t) = t \cdot \arccos t$	1. Да
2. $f(t) = 4ch3t \cdot e^{-2t}$	2. $F(p) = \dfrac{4(p+2)}{(p+2)^2 - 9}$
3. $f(t) = e^{5t}\sin 3t + 5e^{5t}\cos 3t$	3. $F(p) = \dfrac{5p - 22}{(p-5)^2 + 9}$
4. $f(t) = \int\limits_0^t t\, ch7t\, dt$	4. $F(p) = \dfrac{p^2 + 49}{p(p^2 - 49)^2}$
5. $f(t) = e^{5(t-1)}\eta(t-1)$	5. $F(p) = \dfrac{e^{-p}}{p-5}$
6. $f(t) = \int\limits_0^t (t-\tau)^5 \cos 2\tau\, d\tau$	6. $F(p) = \dfrac{5!}{p^5(p^2+4)}$
7. 	7. $F(p) = \dfrac{2\cdot(1 - p - e^{-p})}{p^2} e^{-2p}$
8. $f(t) = (2t^2 - 9t - 5)\eta(t-5)$	8. $F(p) = \dfrac{4}{p^3}e^{-5p} + \dfrac{11}{p^2}e^{-5p}$
9. $f(t) = e^{-3t+1.5}ch(2t-1)\eta(t - \frac{1}{2})$	9. $F(p) = \dfrac{(p+3)e^{-\frac{p}{2}}}{(p+3)^2 - 4}$
10. $f(t) = \int\limits_0^t \dfrac{1 - e^{3t}\cos 3t}{t} dt$	10. $F(p) = \dfrac{1}{p}\ln\sqrt{\dfrac{(p-3)^2+9}{p^2}}$
11. 	11. $F(p) = \dfrac{(1-e^{-p})^2}{p^2(1-e^{-3p})}$
12. $f(t) = \left[\left[(t\eta(t))' t\right]' t^2\right]'' t^3$	12. $F(p) = \dfrac{12}{p^4}$

13. $F(p)=\dfrac{8p+1}{(p+1)^2(p^2+1)}$	13. $f(t)=4\sin t-\dfrac{1}{2}\cos t+\dfrac{e^{-t}}{2}(1-7t)$
14. $F(p)=\dfrac{3}{(p-2)^3}+\dfrac{4}{p^2}$	14. $f(t)=\dfrac{3}{2}t^2e^{2t}+4t$
15. $F(p)=\dfrac{-3e^{-3p}}{(p+4)(p-2)^2}$	15. $f(t)=\dfrac{1}{12}\Big[e^{2(t-3)}-e^{-4(t-3)}-$ $-6(t-3)e^{2(t-3)}\Big]\eta(t-3)$
16. $y''-10y'+25y=f(t)$, где  $y(0)=0$ $y'(0)=0$	16. $y(t)=\dfrac{1}{25}\left[1-e^{5t}+5te^{5t}\right]-\Big[\dfrac{2}{125}+\dfrac{1}{25}(t-2)$ $-\dfrac{2}{125}e^{5(t-2)}-\dfrac{1}{25}(t-2)e^{5(t-2)}\Big]\eta\,(t-2)+$ $+\Big[\dfrac{2}{125}+\dfrac{1}{25}(t-3)-\dfrac{2}{125}e^{5(t-3)}+$ $-\dfrac{1}{25}(t-3)e^{5(t-3)}\Big]\eta\,(t-3)$
17. $x''+8x'+16x=e^{-t}$, $x(0)=0, x'(0)=1$	17. $x(t)=\dfrac{2}{3}te^{-4t}-\dfrac{1}{9}e^{-4t}+\dfrac{1}{9}e^{-t}$
18. $x''+2x'-3x=12\sin t$ $x(0)=0, x'(0)=0$	18. $x(t)=-\dfrac{3}{10}e^{-3t}+\dfrac{3}{2}e^{t}-\dfrac{12}{5}\sin t-\dfrac{6}{5}\cos t$
19. $\begin{cases}x'-2x-2y=e^{t}\\ y'+3y+3x=2e^{-2t}\end{cases}$ $x(0)=0, y(0)=0$	19. $x(t)=-1+2e^{-2t}+2e^{t}-3e^{-t}$, $y(t)=1-4e^{-2t}-\dfrac{3}{2}e^{t}+\dfrac{9}{2}e^{-t}$
20. $x''=2t\ln^2 t$ $x(0)=x'(0)=0$	20. $x(t)=\dfrac{t^3}{3}\ln^2 t-\dfrac{5}{9}t^3\ln t+\dfrac{19}{54}t^3$