**Задача 6**. Найти производную.

6.1. 

ex + 2e2x+ex

y' = 1- √(e2x+ex+1) = 2+ex+√(e2x+ex+1)-ex√(e2x+ex+1)-2e2x-ex =

2+ex+2√(e2x+ex+1) 2+ex+2√(e2x+ex+1)

= (2-ex)√(e2x+ex+1)+2+ex-2ex

2+ex+2√(e2x+ex+1)

6.2. 

y' = 1/4\*e2x(2-sin2x-cos2x)+1/8\*e2x(-2cos2x+2sin2x)=1/8\*e2x(4-2sin2x-2cos2x-2cos2x+2sin2x)=1/8\*e2x(4-4cos2x)=e2x\*sin2x

6.3. 

y' = 1 \* 1 \* 2ex = ex .

2 1 + (ex-3)2 4 e2x-6ex+10

4

6.4. 

y' = 1 \* 1-2x \* -2xln2(1+2x)-(1-2x)2xln2 = (2x-1)2xln4 = 2x(2x-1)

ln4 1+2x (1+2x)2 ln4(1+2x)3 (1+2x)3

6.5. 

ex(√(ex+1)+1) \_ ex(√(ex+1)-1)

y' = ex + √(ex+1)+1 \* 2√(ex+1) 2√(ex+1) =

√(ex+1) √(ex+1)-1 (√(ex+1)+1)2

= ex + ex√(ex+1)+ex-ex√(ex+1)+ex = √(ex+1)

√(ex+1) 2ex√(ex+1)

6.6. 

y' = 2/3\*3/2\*√(arctgex) \* ex = ex√(arctgex)

1+ex 1+ex

6.7. 

y' = 2ex - 2ex  = ex

2(e2x+1) 1+e2x 1+e2x

6.8. 

6.9. 

y' = 2/ln2\*((2xln2)/(2√(2x-1))-(2xln2)/(1+2x-1))=2x/√(2x-1)-2

6.10. 

ex(√(1+ex)+1) \_ ex(√(1+ex)-1)

y'= 2√(1+ex)+2ex(x-2) \_ √(1+ex)+1 \* 2√(1+ex) 2√(1+ex) =

2√(1+ex) √(1+ex)-1 (√(1+ex)+1)

= xex+2 \_ 2ex√(1+ex)+2ex = xex .

√(1+ex) ex√(1+ex)( √(1+ex)+1) √(1+ex)

6.11. 

y'= αeαx(αsinβx-βcosβx)+eαx(αβcosβx+β2sinβx) =

α2+β2

= eαx(α2sinβx+β2sinβx) = eαxsinβx

α2+β2

6.12. 

y'= αeαx(βsinβx-αcosβx)+eαx(β2cosβx+αβsinβx) =

α2+β2

= eαx(β2cosβx+2αβsinβx-α2cosβx)

α2+β2

6.13. 

y'= aeax\* ┌ 1 + acos2bx+2bsin2bx ┐+ eax ┌ -2absin2bx+4b2cos2bx ┐=

└ 2a 2(a2+4b2) ┘ └ 2(a2+4b2) ┘

= eax/2\*(1+cos2bx)= eaxcos2bx

6.14. 

y' = 1 – ex - ex = 1 - ex-ex-e2x = 1 + e2x .

(1+ex)2 1+ex (1+ex)2 (1+ex)2

6.15. 

3/6\*ex/6\*√(1+ex/3) + 1/3\*ex/3(1+ex/6)

y'= 1 - 2√(1+ex/3) \_ 3/6\*ex/6 =

(1+ex/6)√(1+ex/3) 1+ex/3

= 1- ex/6+ex/2+ex/3+ex/2 \_ ex/6 = 1- ex/3-ex/6 .

2(1+ex/6)(1+ex/3) 2(1+ex/3) 2(1+ex/6)(1+ex/3)

6.16. 

y' = 1 - 8ex/4 = 1 - 2ex/4 .

4(1+ex/4)2 (1+ex/4)2

6.17. 

ex+ e2x

y'= √(e2x-1) ­\_ e-x = ex(ex+√(e2x-1)) \_ e-x\*ex  = ex-1 .

ex+√(e2x-1) √(1-e-2x) (ex+√(e2x-1))√(e2x-1) √(e2x-1) √(e2x-1)

6.18. 

e2x

y'= 1+e-xarcsinex – e-x\*ex + √(1-e2x) =

√(1-e2x) 1+√(1-e2x)

= 1+e-xarcsinex - 1 + e2x  =

√(1-e2x) (1+√(1-e2x)) √(1-e2x)

= e-xarcsinex

6.19. 

y'= 1- ex +e-x/2arctgex/2 – e-x/2\*ex/2 \_ ex/2arctgex/2 =

1+ex 1+ex 1+ex

= 1- ex + 1 + arctgex/2\* 1-ex = arctgex/2\* 1-ex .

1+ex 1+ex ex/2(1+ex) ex/2(1+ex)

6.20. 

y'= 3x2ex3(1+x3)-3ex3x2 = 3x5ex3

(1+x3)2 (1+x3)2

6.21. 

y'= b \*memx√a = emx  .

m√(ab)(b+ae2mx) √b b+ae2mx

6.22. 

y'= e3^√x/3√x(3√x2-23√x+2)+3e3^√x(2/(33√x)-2/(33√x2))= e3^√x

3^√x= кубический корень из х

6.23. 

( ex+2e2x \_ ex)(√(1+ex+e2x)-ex+1) \_ ( ex+2e2x \_ ex)(√(1+ex+e2x)-ex-1)

y'= √(1+ex+e2x)-ex+1 \* 2√(1+ex+e2x) 2√(1+ex+e2x) =

√(1+ex+e2x)-ex-1 (√(1+ex+e2x)-ex+1)2

= ex(1+2e2x-2√(1+ex+e2x)) = 1 .

(ex(1+2e2x-2√(1+ex+e2x)))√(1+ex+e2x) √(1+ex+e2x)

6.24. 

y'= cosxesinx(x-1/cosx)+esinx(1-sinx/cos2x)= esinx(xcosx-sinx/cos2x)

6.25. 

y'= ex/2((x2-1)cosx+(x-1)2sinx)+ex/2(2xcosx-(x2-1)sinx+2(x-1)sinx+(x-1)2cosx)=

= ex/2(x-1)(5x+3)cosx

6.26. 

y'= ex+e-x  = e3x+ex .

1+(ex-e-x)2 e4x-e2x+1

6.27. 

y'= e3^√x/3√x2(3√x5-53√x4+20x-603√x2+1203√x-120)+e3^√x(53√x2-203√x+20-120/3√x+120/3√x2)= e3^√x(x-40)

6.28. 

y'= -3e3xsh3x+3e3xsh2xchx = e3x(chx-shx)

3sh6x sh4x

6.29. 

y'= -e-x  + e2x  = √(e4x-e2x)-√(e-2x-1) = √(e2x-1)-√(1-e2x)

√(1-e-2x) √(1-e2x) √(1-e-2x)\*√(1-e2x) √(1-e-2x) √(1-e2x)

6.30. 

y'= xe-x2(x4+2x2+2)-1/2\*e-x2(4x3+4x)= x5e-x2

6.31. 

y'= 2xex2(1+x2)-2ex2x = 2x3ex2

(1+x2)2 (1+x2)2