**Задача 12**. Найти производную.

12.1. 

y'= 2x√(x2-4) + x(x2+8) + x/8\*arcsin(2/x) – 2x2  =

24 24√(x2-4) 16x2√(1-4/x2)

= x3-x + x/8\*arcsin(2/x)

8√(x2-4)

12.2. 

y'= 4(16x2+8x+3)-(4x+1)(32x+8) + 4 =

(16x2+8x+3)2 2(1+(4x+1)2/2)

= 16 \_

(16x2+8x+3)2

12.3. 

y'= 2 + 2e4x  + 2e-2xarcsine2x – 2e2xe-2x =

√(1-e4x)(1+√(1-e4x)) √(1-e4x)

= 2e-2xarcsine2x

12.4. 

y'= (9x-6)arctg(3x-2) + 3√(9x2-12x+5) \_ 3+(9x-6)/√(9x2-12x+5) =

√(9x2-12x+5) 1+(3x-2)2 3x-2+√(9x2-12x+5)

= (9x-6)arctg(3x-2)

√(9x2-12x+5)

12.5. 

y'= -2√(2x-x2) + 2-2x + (x-1)((1-x)/√(2x-x2)-1-√(2x-x2)) =

(x-1)2 (x-1)√(2x-x2) (x-1)2(1+√(2x-x2))

= -1 \_ 2 \_ 1\_

(1+√(2x-x2))√(2x-x2) √(2x-x2)(x-1)2 (x-1)

12.6. 

y'= 2xarcsin(3/x) \_ 3x2  + 2x√(x2-9) \_ x(x2+18) =

81 81x2√(x2-9) 81x2√(x2-9) 81x2√(x2-9)

= 2xarcsin(3/x) + x3-39x \_

81 81x2√(x2-9)

12.7. 

y'= 6 + 3(3x2-2x+1)-(6x-2)(3x-1) = 4 \_

2(2+(3x-1)2) 3(3x2-2x+1)2 3(3x2-2x+1)2

12.8. 

y'= 3 + 3e6x  + 3e-3xarcsin(e3x) – 3e-3xe3x =

√(1-e6x)(1+√(1-e6x)) √(1-e6x)

= 3e-3xarcsin(e3x)

12.9. 

y'= 16x-4+4√(16x2-8x+2) \_ (16x-4)arctg(4x-1) \_ 4√(16x2-8x+2) =

(4x-1+√(16x2-8x+2)√(16x2-8x+2) √(16x2-8x+2) 2+16x2-8x

= (4-16x)arctg(4x-1)

√(16x2-8x+2)

12.10. 

y'= (2x+1)((-1-2x)/√(-x-x2)-2-4√(-x-x2)) + (-2-4x)(2x+1)/√(-x-x2)-8√(-x-x2) =

(2x+1)2(1+2√(-x-x2)) (2x+1)2

= 4x+4x2  \_ 3 \_

(2x+1)√(-x-x2)(1+2√(-x-x2)) (2x+1)√(-x-x2)

12.11. 

y'= 4(2x+3)3arcsin(1/(2x+3)) – 2(2x+3)4  + 2/3\*(8x+12)√(x2+3x+2) +

√(4x2+12x+8)

+ 2(4x2+12x+11)(2x+3) = 4(2x+3)3arcsin(1/(2x+3)) – 8/3\*(2x+3)√(x2+3x+2)

3√(x2+3x+2)

12.12. 

y'= x2+4x+6-(2x+4)(x+2) + 2 = 4 \_

(x2+4x+6)2 2(2+(x+2)2) (x2+4x+6)2

12.13. 

y'= 5 + 5e10x  + 5e-5xarcsin(e5x) – 5e-5xe5x =

√(1-e10x)(1+√(1-e10x)) √(1-e10x)

= 5e-5xarcsin(e5x)

12.14. 

y'= (x-4)arctg(x-4) + √(x2-8x+17) \_ √(x2-8x+17)+x-4 =

√(x2-8x+17) x2-8x+17 (√(x2-8x+17)+x-4)√(x2-8x+17)

= (x-4)arctg(x-4)

√(x2-8x+17)

12.15. 

y'= (2-x)((2-x)2/√(-3+4x-x2)+1+√(-3+4x-x2)) + 2(4-2x)(2-x)/√(-3+4x-x2)+2√(-3+4x-x2) =

(2-x)2(1+√(-3+4x-x2)) (2-x)2

= x2-5x+7 \_

(2-x)√(-3+4x-x2)

12.16. 

y'= (6x-4)√(9x2-12x+3) + (3x2-4x+2)(9x+6) + 12(3x-2)3arcsin(1/(3x-2)) –

√(9x2-12x+3)

- 9(3x-2)4  = 12(3x-2)3arcsin(1/(3x-2)) - 6(3x-2)3 \_

√(1-1/(3x-2)2)(3x-2)2 √(9x2-12x+3)

12.17. 

y'= 2 + x2-2x+3-(x-1)(2x-2) = 4 \_

2(3+x2-2x) (x2-2x+3)2 (x2-2x+3)2

12.18. 

y'= 5e5x(1+√(e10x-1)) \_ 5e-5x  =

√(e10x-1)(1+√(e10x-1)) √(1-e-10x)

= 5√(e5x-1)

√(e5x+1)

12.19. 

y'= 2+(4x-6)/√(4x2-12x+10) \_ (4x-6)arctg(2x-3) \_ 2√(4x2-12x+10) =

2x-3+√(4x2-12x+10) √(4x2-12x+10) √(4x2-12x+10)

= (6-4x)arctg(2x-3)

√(4x2-12x+10)

12.20. 

y'= (-2-x)((-2-x)2/√(-3-4x-x2)+1+√(-3-4x-x2)) + 2√(-3-4x-x2) + 4+2x =

(-2-x)2(1+√(-3-4x-x2)) (2+x)2  (2+x)√(-3-4x-x2)

= -x \_

(2+x)2√(-3-4x-x2)

12.21. 

y'= 2/3\*(8x-4)√(x2-x) + (4x2-4x+3)(2x-1) + 8(2x-1)3arcsin(1/(2x-1)) – 2(2x-1)5  =

3√(x2-x) (2x-1)2√(4x2-4x)

= 8(2x-1)3arcsin(1/(2x-1))

12.22. 

y'= 2(4x2-4x+3)-4(2x-1)2 + 4 = 8 \_

(4x2-4x+3)2 2(4x2-4x+3) (4x2-4x+3)2

12.23. 

y'= -4e-4x  + 4e4x+4e8x/√(e8x-1) = 4√(e4x-1)

√(1-e-8x) e4x+√(e8x-1) √(e4x+1)

12.24. 

y'= 5+25x/√(25x2+1) \_ 25xarctg5x \_ 5√(25x2+1) = \_ 25xarctg5x

5x+√(25x2+1) √(25x2+1) 25x2+1 √(25x2+1)

12.25. 

y'= -6√(-3+12x-9x2) + 12-18x + (3x-2)((6-9x)(3x-2)/√(-3+12x-9x2)-3-3√(-3+12x-9x2)) =

(3x-2)2 (3x-2)√(-3+12x-9x2) (1+√(-3+12x-9x2))(3x-2)2

= -9x-2 \_

(3x-2)2√(-3+12x-9x2)

12.26. 

y'= 12(3x+1)3arcsin(1/(3x+1)) – 3(3x+1)5  + (6x+2)√(9x2+6x) +

√(9x2+6x)(3x+1)2

+ (3x2+2x+1)(9x+3) = 12(3x+1)3arcsin(1/(3x+1)) + 18x2(3x+1)/√(x2+3x+2)

√(9x2+6x)

12.27. 

y'= 2 + 8x2+8x+6-16x2-16x-4 = 5-4x2-4x \_

2(3+4x2+4x) (4x2+4x+3)2 (4x2+4x+3)2

12.28. 

y'= 3e3x(e3x+√(e6x-1)) \_ 3e-3x  =

√(e6x-1)(e3x+√(e6x-1)) √(1-e-6x)

= 3√(e3x-1)

√(e3x+1)

12.29. 

y'= 49xarctg7x + 7√(49x2+1) \_ 7+49x/√(49x2+1) = 49xarctg7x

√(49x2+1) 49x2+1 7x+√(49x2+1) √(49x2+1)

12.30. 

y'= -√(1-4x2) \_ 4x + 2x(4x2/√(1+4x2)-1-√(1+4x2)) = -1 \_ 1 \_

x2 x√(1-4x2) 2x2(1+√(1+4x2)) x2√(1-4x2) x√(1+4x2)

12.31. 

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

√(1-e-4x) e2x+√(e4x-1) √(e2x+1)