

# Derivatives

## Interactive tests

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Look at three or four or twenty my quizzes and  
then fill in my \_\_\_\_\_ please!



ROBERT MAŘÍK  
Derivace  
file der1.tex

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Test2

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# Managing test



ROBERT MAŘÍK  
Derivate  
file der1.tex

3.  $(-\ln(\cos(x)))' = -\frac{1}{\cos(x)} (-\sin x)$  Správně Correct

4.  $x^3 \cdot (-3x^2)$  Špatně Wrong

5.  $(2 \arctan(x))' = \frac{2}{x^2+1}$

6.  $(3 \frac{e^x}{x+1})' = 3 e^x (\frac{1}{(x+1)^2}) - e^x (\frac{1}{x+1})$  Čtyřikrát špatná odpověď Four-times incorrect answer

7.  $(\frac{\ln x}{x^2})' = \frac{1/x \cdot x^2 - \ln x \cdot 2x}{x^4}$  Dvě kliknutí ukáží správné řešení Two clicks show correct answer

8.  $(x \sin^2 x)' = \sin^2 x + 2x \sin x \cos x$

9.  $(\ln \frac{x+1}{x})' = \frac{x}{x+1} \cdot \frac{1}{x}$

10.  $(x^2 \cos x)' = 2x \cos x + x^2 (-\sin x)$

11.  $((x+2) \sin^3 x)' = 1 \cdot \sin^3(x) + (x+2) \cdot 3 \sin^2(x) \cos(x)$

$(\sin(2x))' = 2 \cos(2x)$

Správné odpovědi, ale původně s jednou chybou.  
Correct answers, originally with one mistake.



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Test 2

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# 1. Test1



## Quiz

- Complete the pattern for the derivative.
- Example: the correct answer to the first question is  $x^2$ , since  $(e^{x^2})' = e^{x^2} 2x$  and the part  $x^2$  is missing in the answer. You can write  $x*x$  or  $x^2$  into the field.
- As usual, you can see the answer by pressing  button. But don't use this button too much, please. All (or at least almost all) computations are easy. We have to learn the technique in these quizzes. The problems on exam are harder<sup>1</sup>!
- As usual: If you have any comments or suggestions concerning this test, let me know, please!

1.  $(e^{x^2})' = e^{x^2} \cdot \underline{\hspace{2cm}} \cdot 2x$

2.  $(\arcsin \frac{1}{x})' = \frac{1}{\sqrt{1-\frac{1}{x^2}}} \cdot (-1)x^{-2}$

3.  $(-\ln(\cos(x)))' = -\frac{1}{\cos(x)} \cdot (-\sin x)$

4.  $(4e^{1-x^3})' = 4e^{1-x^3} \cdot (\underline{\hspace{2cm}})$

5.  $(2 \arctan \sqrt{x})' = \frac{2}{x+1}$

<sup>1</sup>this means slightly longer computation of derivatives and integrals and so on



$$6. \left(3 \frac{e^x}{x+1}\right)' = 3 \frac{e^x(\quad) - e^x}{\quad}$$

$$7. \left(\frac{\ln x}{x^2}\right)' = \frac{(\quad)x^2 - 2x \ln x}{\quad}$$

$$8. (x \sin^2 x)' = \sin^2 x +$$

$$9. \left(\ln \frac{x+1}{x}\right)' = \frac{x}{x+1}$$

$$10. (x^2 \cos x)' = \quad \cos x + \quad (-\sin x)$$

$$11. ((x+2) \sin^3 x)' = 1 \quad + (x+2)$$

$$12. \left(\frac{\sin(2x)}{x}\right)' = \frac{x - \quad}{x^2}$$

$$13. \left(\frac{e^{-x} + 1}{\sqrt{x}}\right)' = \frac{\sqrt{x} + (e^{-x} + 1)}{x}$$

$$14. \left(\operatorname{atan} \frac{x+1}{\sqrt{3}}\right)' = \frac{1}{\quad} \cdot \frac{1}{\sqrt{3}}$$

$$15. \left(\operatorname{atan} \sqrt{\sin x}\right)' = \frac{1}{1 + \sin x}$$



16.  $(\sin(x^2 \ln x))' = \cos(x^2 \ln x)$

17.  $(\sqrt{\frac{x}{\sin x}})' = \frac{1}{2} \left(\frac{x}{\sin x}\right)^{-\frac{1}{2}} \frac{\sin^2 x - x \cos x}{\sin^4 x}$

18.  $(e^x(x^2 + x + 1))' = e^x(2x + 1) + e^x(x^2 + x + 1)$   
 $= e^x(x^2 + 3x + 2)$

19.  $((x + 5) \sin(x) - (x - 3) \cos x)' = 1 + (x - 3) \sin(x) - [1 + (x - 3) \cos(x)]$   
 $= (x - 3) \sin x + (x - 3) \cos x - 1 - (x - 3) \cos x$

20.  $((x^2 + 2x + 5)e^{-2x})' = (2x + 2)e^{-2x} - 2(x^2 + 2x + 5)e^{-2x}$   
 $= e^{-2x}(2x + 2 - 2x^2 - 4x - 10) = e^{-2x}(-2x^2 - 2x - 8)$

21.  $(\ln \frac{x+1}{x-1})' = \frac{1}{x-1} \cdot \frac{1}{(x-1)^2} = \frac{1}{(x-1)^3}$



## 2. Test2

**Quiz** Find the derivative simplify (it is not a good idea to write long expression in computer notation) and write your answer.

1.  $(x^2 + 3)' =$

2.  $(-\frac{1}{9}x^4 + \frac{2}{3}x^2)' =$

3.  $(4x^3 - 3x^4)' =$

4.  $(-2 + 12x - x^3)' =$

5.  $(x^2 + x)' =$

6.  $((x^2 + 2\sqrt{x})x)' =$

7.  $(\frac{1+2x}{\sqrt{x}})' =$

8.  $(x^2e^x)' =$

9.  $(xe^{x^2})' =$

10.  $(\sqrt{x^2 + 1})' =$



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$$11. (\sin(x^3 + x))' =$$

$$12. (e^{\sqrt{x}})' =$$

$$13. (\cos(2x - 1))' =$$

$$14. \left(x + \frac{4}{x}\right)' =$$

$$15. \left(\frac{x}{(x+1)^2}\right)' =$$

$$16. (x^2 - 2 \ln x)' =$$

$$17. (2\sqrt{x} - x)' =$$

$$18. \left(\frac{x}{1+x^2}\right)' =$$

$$19. \left(\frac{1+x^2}{1-x^2}\right)' =$$

$$20. (e^x(x^2 - 2x + 2))' =$$

$$21. ((x+1)e^x)' =$$

$$22. (x \ln(x+1))' =$$



$$23. (1 - \sqrt{3x+1})' =$$

$$24. (x^2 + x + 2)^2)' =$$

$$25. (\sin(2x))' =$$

$$26. (e^{x^2})' =$$

$$27. ((x^2 + 1)^3)' =$$

$$28. ((x + 1) \ln(x^2 + 1))' =$$

$$29. \left( \left( \frac{x-1}{x+1} \right)^2 \right)' =$$

$$30. \left( \frac{e^x}{x+1} \right)' =$$

$$31. (x \ln(x^2 - 1))' =$$

$$32. \left( \frac{1}{4} \ln \frac{x^2 - 1}{x^2 + 1} \right)' =$$

$$33. (\sqrt{x+1} - \ln(1 + \sqrt{x+1}))' =$$

$$34. \left( \ln \frac{x+1}{x-2} \right)' =$$





$$35. (\ln(1 + \sin^2 x))' =$$

$$36. (x^2 e^{-x})' =$$

$$37. (e^{\tan x^2})' =$$

$$38. (\ln \sin x)' =$$

$$39. (x\sqrt{1-x^2})' =$$

$$40. (\tan(x+x^2))' =$$

$$41. \left(\tan \frac{x+1}{x}\right)' =$$

$$42. (x \ln^2 x)' =$$

$$43. ((3-x)\sqrt{x})' =$$

$$44. \left(\frac{x^2}{1-x}\right)' =$$

$$45. \left(\left(\frac{1+x}{1-x}\right)^4\right)' =$$

$$46. \left(\frac{x-2}{\sqrt{x^2+1}}\right)' =$$



$$47. \left( \frac{x^2}{x^2 + 1} \right)' =$$

$$48. \left( \frac{\ln^2 x}{x} \right)' =$$

$$49. \left( \frac{\ln x}{\sqrt{x}} \right)' =$$

$$50. \left( xe^{\frac{1}{x}} \right)' =$$

$$51. \left( (x^2 + 1) \operatorname{atan}(x) \right)' =$$

$$52. \left( \ln(\operatorname{atan}(x^2)) \right)' =$$

$$53. \left( \ln(\sin(2x)) \right)' =$$

$$54. \left( \operatorname{atan} \sqrt{x^2 + 1} \right)' =$$

$$55. \left( \arcsin(x) + \frac{\sqrt{1 - x^2}}{x + 1} \right)' =$$

$$56. \left( \sqrt{\frac{1 - x}{3 + x^2}} \right)' =$$

$$57. \left( \arcsin \sqrt{\frac{x - 1}{x}} \right)' =$$