

 Derivatives

 Derivace

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Test 1

Test 2

Home Page

Print

Title Page



Page 1 of 11

Go Back

Full Screen

Close

Quit

# 1. Test 1



- Complete fields inside the following patterns for derivative and press **Enter**.
- You can see the correct answer clicking **Ans**.
- For comments concerning writing mathematical expressions see the file [instrukce.pdf](#).



- Doplňte derivaci a stiskněte **Enter**.
- Pokud jste neuspěli, zkuste znova, nebo klikněte na **Ans**.
- Matematické výrazy zapisujte tak, jak je uvedeno v souboru [instrukce.pdf](#).



Test 1

Test 2

Home Page

Print

Title Page



Page 2 of 11

Go Back

Full Screen

Close

Quit

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

4. **Špatně Wrong**  $x^3 \cdot (-3x^2)$

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

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

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

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

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

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

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

**Dvě kliknutí ukáží správné řešení Two clicks show correct answer**

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



Test 1

Test 2

Home Page

Print

Title Page



Page 4 of 11

Go Back

Full Screen

Close

Quit

## Quiz

1.  $(e^{x^2})' = e^{\quad\quad\quad} \cdot 2x$

2.  $\left(\sin \frac{1}{x}\right)' = \frac{1}{\sqrt{\quad\quad\quad}} \cdot (-1)x^{-2}$

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

4.  $(4e^{1-x^3})' = 4e^{1-x^3} \cdot (\quad\quad\quad)$

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

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

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

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

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



Test 1

Test 2

Home Page

Print

Title Page



Page 5 of 11

Go Back

Full Screen

Close

Quit

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

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

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

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

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

$$15. \left(\tan^{-1} \sqrt{\sin x}\right)' = \frac{1}{1 + \sin x}$$

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

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

$$18. \left(e^x (x^2 + x + 1)\right)' = e^x \left(\quad \quad \quad\right) + e^x \left(\quad \quad \quad\right) \\ = e^x \left(\quad \quad \quad\right)$$



Test 1

Test 2

Home Page

Print

Title Page



Page 6 of 11

Go Back

Full Screen


Close


Quit

19.  $((x + 5) \sin(x) - (x - 3) \cos x)' = 1 \quad + ( \quad ) \cos(x)$   
 $- \left[ 1 \quad + (x - 3)( \quad ) \right]$   
 $= ( \quad ) \sin x + ( \quad ) \cos x$
20.  $((x^2 + 2x + 5)e^{-2x})' = (2x + 2)e^{-2x} + \quad e^{-2x}$   
 $= e^{-2x} ( \quad )$
21.  $\left( \ln \frac{x+1}{x-1} \right)' = \frac{1}{\quad} \cdot \frac{\quad}{(x-1)^2} =$

## 2. Test 2

### Quiz

 Find the derivative, simplify and write into the field.

 Zderivujte a upravte.

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

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



Test 1

Test 2

Home Page

Print

Title Page



Page 7 of 11

Go Back

Full Screen

Close

Quit

3.  $\left(4x^3 - 3x^4\right)' =$

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

5.  $\left(x^2 + x\right)' =$

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

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

8.  $\left(x^2 e^x\right)' =$

9.  $\left(x e^{x^2}\right)' =$

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

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

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

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

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



Test 1

Test 2

Home Page

Print

Title Page



Page 8 of 11

Go Back

Full Screen

Close

Quit

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

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

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

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

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

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

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

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

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

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

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

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





Test 1

Test 2

Home Page

Print

Title Page



Page 9 of 11

Go Back

Full Screen

Close

Quit

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

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

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

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

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

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

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

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

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

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

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

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



Test 1

Test 2

Home Page

Print

Title Page



Page 10 of 11

Go Back

Full Screen

Close

Quit

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

$$40. \left( \operatorname{atan}(x+x^2) \right)' =$$

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

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

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

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

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

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

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

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

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



Test 1

Test 2

Home Page

Print

Title Page



Page 11 of 11

Go Back

Full Screen

Close

Quit

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