

LN Integrals + Inverse Derivatives
Harter – Calculus AB

Find the derivative of the inverse at $x = a$, $(f^{-1})'(a)$ for each.

1. $f(x) = x^3 + 2x - 1$; $a = 2$

2. $f(x) = \sqrt{x-4}$; $a = 2$

3. $f(x) = x^3 - \frac{4}{x}$; $a = 6$

Multiple Choice!

4. At what point does $(f^{-1})(x)$ have a instantaneous slope of $\frac{1}{4}$, if $f(x) = x^4 - 28x + 3$?

a. $(2, -37)$

c. $(-2, 75)$

e. $(-37, 2)$

b. $(75, -2)$

d. $(4, 147)$

5-6 Use the graph of f' at the right with the areas indicated.

5. If $f(0) = 3$, write an integral expression and find each.

a. $f(4) =$

b. $f(7) =$

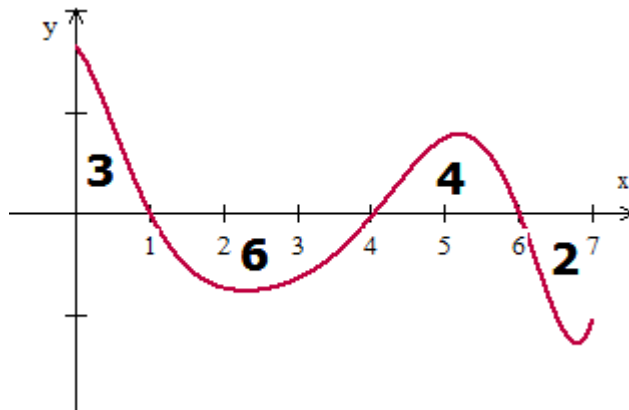
c. $f(6) =$

6. If $f(6) = 1$, write an integral expression and find each.

a. $f(4) =$

b. $f(0) =$

c. $f(7) =$



Integrate each.

7. $\int \frac{2}{3-5x} dx$

10. $\int_0^2 \frac{x}{x^2+3} dx$

13. $\int \frac{x^4+x-1}{x^2+1} dx$

8. $\int_1^e \frac{(\ln x)^3}{x} dx$

11. $\int_2^3 \frac{x+1}{x-1} dx$

14. $\int \tan(2x) dx$

9. $\int_{e^2}^{e^3} \frac{1}{x \ln x^2} dx$

12. $\int_{-1}^1 \frac{x^2-2}{x+2} dx$

15. $\int \frac{x^2+x+4}{x^2+4} dx$

Find the derivative.

16. $f(x) = \sin(\ln x)$

18. $f(x) = \frac{\ln x^2}{x^4}$

19. Find the equation of the tangent line when $x = e$ if $f(x) = 1 + \ln x$.

17. $f(x) = \ln\left(\frac{2x-1}{3x+2}\right)$

ANSWERS

1. $\frac{1}{5}$

2. 4

3. $\frac{1}{13}$

4. E

5. -

a. $f(4) = f(0) + \int_0^4 f'(x) dx = 0$

b. $f(7) = f(0) + \int_0^7 f'(x) dx = 2$

c. $f(6) = f(0) + \int_0^6 f'(x) dx = 4$

6. -

a. $f(4) = f(6) + \int_6^4 f'(x) dx = -3$

b. $f(0) = f(6) + \int_6^0 f'(x) dx = 0$

c. $f(7) = f(6) + \int_6^7 f'(x) dx = -1$

7. $-\frac{2}{5} \ln|3-5x| + C$

8. $\frac{1}{4}$

9. $\ln \frac{\sqrt{6}}{2}$

10. $\frac{1}{2} \ln \frac{7}{3}$

11. $1 + \ln 4$

12. $-4 + \ln 9$

13. $\frac{1}{3} x^3 - x + \ln \sqrt{x^2 + 1} + C$

14. $\frac{1}{2} \ln |\sec 2x| + C$

15. $x + \frac{1}{2} \ln(x^2 + 4) + C$

16. $f'(x) = \frac{\cos(\ln x)}{x}$

17. $f'(x) = \frac{2}{2x-1} - \frac{3}{3x+2}$

18. $f'(x) = \frac{2-8 \ln x}{x^5}$

19. $y-2 = \frac{1}{e}(x-e)$