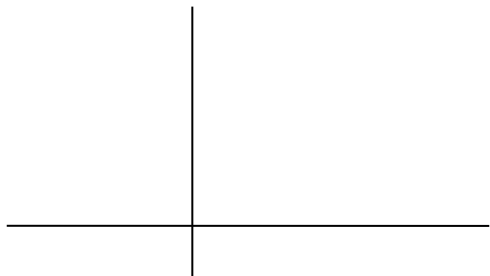


$y = e^x$ + Review

Graph on the axis $f(x) = e^x$. Use tick marks to indicate values. Use the table on your calculator to fill out the chart below. Label 3 y-values and the slope.

x	y	m
-3		
-2		
-1		
0		
1		
2		
3		



1. Fill in the intriguing derivative and integral formulas (This is America's Favorite derivative/integral).

$\frac{d}{dx}[e^x] =$	$\int e^x dx =$
-----------------------	-----------------

Look at the changes in the chart on your calculator for $f(x) = e^{2x}$ and $f(x) = e^{3x}$.

2. Find the derivative of each. You may need some "rules".

a. $f(x) = e^{2x}$

d. $f(x) = 4e^{x/2}$

b. $g(x) = 3xe^{3x}$

e. $g(x) = (\ln 3x)(e^{4x})$

c. $h(x) = \frac{e^{2x}}{x}$

f. $h(x) = 2(e^{2x})^3$

3. Find the integral. You may need some "rules" and some "you-substitution."

a. $\int xe^{3x^2} dx$

d. $\int e^{2x-1} dx$

b. $\int_0^2 e^{2x} dx$

e. $\int e dx$

c. $\int_0^2 e^{x/2} dx$

f. $\int \ln e^x dx$

Desperately needed Review Problems!

4. Solve: $\log(x) + \log(x-3) = 1$

5. Solve: $\log_2(x) - \log_2(x+1) = -2$

6. Simplify: $\log_{10} 100 + 2\log_3 1/9 - 2\log_4 32$

Find the derivative. Use the PRODUCT RULE ON PRODUCTS, the QUOTIENT RULE ON QUOTIENTS, LOG RULES WHEN POSSIBLE!

7. $f(x) = \ln\left(\frac{3x^2}{\tan x}\right)$

8. $g(x) = \ln(\ln 2x)$

9. $f(x) = \ln(\cos x)$

10. $y = \frac{\ln x^3}{x^2}$

Use implicit differentiation to find dy/dx .

11. $-2xy + \ln(xy) + x = 4$

12. $xy - \ln y = 2$

13. Find the equation of the tangent line for $y = 3x - \ln(x-1)$ at $x = 2$

14. Name the x value of any relative extrema for $y = 4x - 2x \ln x$. Is it a relative minimum or maximum? Make a chart to justify your answer.

15. Use logarithmic differentiation to find y' for $y = \frac{(2x-3)^2}{\sqrt{2x-1}}$.

Integrate each!

16. $\int \frac{dx}{(\ln x)^2 x}$

18. $\int_1^e \frac{2x+1}{x} dx$

17. $\int_{-2}^1 \frac{x+1}{x+3} dx$

19. $\int \frac{2x^3 - 3x^2 + 3}{x-2} dx$

20. $\int \frac{x^4 + 2x^2 + x - 3}{x^2 - 1} dx$

Use the chart to answer each.

21. If $f^{-1}(x) = Q$, find $Q'(3)$.

22. If $g^{-1}(x) = R$, find $R'(3)$.

23. At what point is the instantaneous slope of $g^{-1}(x) = -1/3$?

x	f	f'	g	g'
0	4	2	1	-1/3
1	3	2/3	4	-2
2	2	3	3	-3
3	1	3/2	2	-4
4	0	4	0	-5

ANSWERS

1. -

$\frac{d}{dx}[e^x] = e^x$

$\int e^x dx = e^x + C$

2. -

a. $f' = 2e^{2x}$

b. $g' = 3e^{3x}(1+3x)$

c. $h' = \frac{e^{2x}(2x-1)}{x^2}$

d. $f' = 2e^{\frac{1}{2}x}$

e. $g' = e^{4x} \left(\frac{1}{x} + 4 \ln 3x \right)$

f. $h' = 12e^{6x}$

3. -

a. $\frac{1}{6}e^{3x^2} + C$

b. $\frac{1}{2}(e^4 - 1)$

c. $2(e-1)$

d. $\frac{1}{2}e^{2x-1} + C$

e. $ex + C$

f. $\frac{1}{2}x^2 + C$

4. 5 only

5. 1/3

6. -7

7. $\frac{2}{x} - \csc x \sec x$

8. $\frac{1}{x \ln 2x}$

9. $-\tan x$

10. $\frac{3-6 \ln x}{x^3}$

11. $\frac{2xy^2 - y - xy}{x - 2x^2y}$

12. $\frac{-y^2}{xy-1}$

13. $y-6=2(x-2)$

14. Rel max at $x = e$

15. $\frac{(6x-1)(2x-3)}{(2x-1)^{3/2}}$

16. $\frac{-1}{\ln x} + C$

17. $2e-1$

18. $3 - \ln 16$

19. $\frac{2}{3}x^3 + \frac{1}{2}x^2 + 2x + 7 \ln|x-2| + C$

20. $\frac{1}{3}x^3 + 3x + \frac{1}{2} \ln|x^2-1| + C$

21. 3/2

22. -1/3

23. (3,2)

