1 a) 2 b) ∞

p 215 #23 #26

2a) $y' = \frac{1 - y^4 - 2xy}{4xy^3 + x^2 - 3}$ b) $y' = \frac{y - 2x\cos y}{2\cos 2y - x^2 \sin y - x}$ } chp 3 review

#29 c) $y' = \frac{2x - y\cos(xy)}{x\cos(xy) + 1}$ #36 d) $y' = \frac{\tan y}{1 - x\sec^2 y}$

p 506 chp 7 review

#33 e) $y' = (-2\ln 2) \times 2^{-x^2}$ #35 f) $\frac{x}{1+x^2} + \tan^{-1} x$ #36 g) $y' = \frac{2x}{(\ln 10)(1+x^2)}$

#38 h) $y' = y(\ln\cos x - x\tan x)$

$= (\cos x)^x (\ln\cos x - x\tan x)$

#40 i) $y' = \frac{1}{1 + (\sin^{-1}\sqrt{x})^2} \cdot \frac{1}{\sqrt{1-x}} \cdot \frac{1}{2\sqrt{x}}$

3 #57 a) $y' = (2+x)(-e^{-x}) + e^{-x} \cdot 1$

$y'(0) = -2 + 1 = -1$

$y - 2 = -1(x - 0)$

#58 b) $y' = \ln x + 1$

$y'(e) = 1 + 1 = 2$

$y - e = 2(x - e)$

c) p 215 #48 $x^2 - 4xy + y^2 = 13$

$2x - (4y + 4xy') + 2yy' = 0$

$2 \cdot 2 - 4 \cdot 1 - 4(2)y' + 2(1)y' = 0$

$-6y' = 0$

$y' = 0$

$y - 1 = 0(x - 2)$

$y = 1$

4) $2x + 2yy' = 0$

$2yy' = -2x$

$y' = \frac{-x}{y}$ at $(0,5)$ $y' = \frac{-0}{5} = 0$

$y'' = \frac{y(-1) - (-x)y'}{y^2}$

$y''(0,5) = \frac{5(-1) + (0)(0)}{5^2} = \frac{-5}{25} = \frac{-1}{5}$

WHAT KIND OF FUNCTIONS DO GURUS AND THEIR DISCIPLES STUDY?

Find the derivative of each function and match with the result.

1) $y = e^{3x}$ $e^{3x} \cdot 3$ D	2) $y = \ln(2x)$ $\frac{1}{2x} \cdot 2$ N	3) $y = 2\sin(3x)$ $2[\cos(3x)]\,3$ F	4) $y = \tan(x^2)$ S $[\sec^2(x^2)]\,2x$
5) $y = \frac{1}{2}\ln(x^2)$ $\frac{1}{2} \cdot \frac{1}{x^2} \cdot 2x$ N	6) $y = \ln(e^x)$ $\frac{1}{e^x} e^x = 1$ A	7) $y = x\cos(x)$ $1\cos x + -x\sin x$ O	8) $y = xe^x$ $1e^x + xe^x$ E
9) $y = e^{\ln(x)}$ A $e^{\ln x} \cdot \frac{1}{x} = 1$	10) $y = \sin(e^x)$ $[\cos(e^x)]e^x$ I	11) $y = \ln^2(x)$ $2\ln x \cdot \frac{1}{x}$ L	12) $y = e^{-\cos(x)}$ U $e^{-\cos x} \cdot \sin x$
13) $y = \tan^2(x)$ $2[\tan x]\sec^2 x$ R	14) $y = -\frac{1}{x}\ln(x) = -x^{-1}\ln x$ $x^{-2}\ln x - x^{-1}\frac{1}{x}$ $\frac{\ln x}{x^2} - \frac{1}{x^2}$ T	15) $y = \ln(\cos(x))$ $\frac{1}{\cos x} \cdot -\sin x$ C	
16) $y = \frac{1}{x}\ln(\frac{1}{x}) = x^{-1}\ln(x^{-1})$ T $-1x^{-2}\ln(\frac{1}{x}) + x^{-1}\frac{1}{x} \cdot -1x^{-2}$ $-\frac{1}{x^2}\ln\frac{1}{x} - \frac{1}{x^2} = \frac{1}{x^2}(-\ln x^{-1} -$	17) $y = xe^x + \ln(e^x) - x - 1$ $1e^x + xe^x + \frac{1}{e^x} \cdot e^x - 1 + 0$ 1) E		

Derivatives.

A. $y' = 1$ 6	**B.** $y' = x$	**C.** $y' = -\tan(x)$	**D.** $y' = 3e^{3x}$ 1
E. $y' = xe^x + e^x$	**F.** $y' = 6\cos(3x)$	**G.** $y' = 6\sin(3x)$	**H.** $y' = \cos(3x)$
I. $y' = e^x\cos(e^x)$	**L.** $y' = \frac{2}{x}\ln(x)$	**M.** $y' = \frac{1}{x^2}$	**N.** $y' = \frac{1}{x}$
O. $y' = \cos(x) - x\sin(x)$	**P.** $y' = x\sin(x) - \cos(x)$	**R.** $y' = 2\tan(x)\sec^2(x)$	
S. $y' = 2x\sec^2(x^2)$	**T.** $y' = \frac{1}{x^2}(\ln(x) - 1)$	**U.** $y' = \sin(x)e^{-\cos(x)}$	

T	R	A	N	S	C	E	N	D	E	N	T	A	L
14	13	6	2	4	15	17	5	1	8	5	16	9	11

F	U	N	C	T	I	O	N	S
3	12	5	15	14	10	7	2	4

WHICH LAW OF DIFFERENTIATION IS USED TO IMPRISON FUNCTIONS?

Derivatives of Composite Functions

If $y = f(g(x))$ then $y' = f'(g(x))g'(x)$

$y = 3\cos(2x^5)$

$y' = -3\sin(2x^5)\cdot(10x^4)$

$y' = -30x^4\sin(2x^5)$

Find the derivative y' of each function.

1) $y = (3x^2 + 1)^4$ $4(3x^2+1)6x$ E	2) $y = 3e^{2x^2}$ $3e^{2x^2}\cdot 4x$ E	3) $y = \sin(2x^3)$ $[\cos(2x^3)]6x^2$ I	4) $y = 2\tan(x^5)$ $2[\sec^2(x^5)]5x^4$ T
5) $y = \sqrt{3x^2 + 1}$ $\frac{1}{2}(3x^2+1)^{-1/2}6x$ C	6) $y = \frac{-1}{3x^2+1}$ $-1(3x^2+1)^{-1}$ $(3x^2+1)^{-2}\cdot 6x$ A	7) $y = \ln(3x^2 + 1)$ $\frac{1}{3x^2+1}\cdot 6x$ L	8) $y = \cos\sqrt{x}$ $[-\sin x^{1/2}]\frac{1}{2}x^{-1/2}$ R
9) $y = e^{1/x}$ $e^{-x}\cdot -1x^{-2}$ N	10) $y = 3\sin^2(x)$ $6\sin x\cos x$ H	11) $y = \tan^5(2x)$ $5\tan^4(2x)\cdot$ $\sec^2(2x)\cdot 2$ U	12) $y = 5 - 3\cos^2(x)$ $Y = -6\cos x$ $\cdot -\sin x$ H

Derivatives.

A. $y' = \frac{6x}{(3x^2+1)^2}$	B. $y' = 6x\sqrt{3x^2 + 1}$	C. $y' = \frac{3x}{\sqrt{3x^2+1}}$	E. $y' = 24x(3x^2 + 1)^3$
E. $y' = 12xe^{2x^2}$	H. $y' = 6\sin(x)\cos(x)$	I. $y' = 6x^2\cos(2x^3)$	L. $y' = \frac{6x}{3x^2+1}$
M. $y' = \frac{1}{2\sqrt{x}}\cos\sqrt{x}$	N. $y' = -\frac{1}{x^2}e^{1/x}$	P. $y' = 2\sec^2(x^5)$	R. $y' = -\frac{1}{2\sqrt{x}}\sin\sqrt{x}$
S. $y' = 10\tan(2x)\sec(2x)$	T. $y' = 10x^4\sec^2(x^5)$	U. $y' = 10\sec^2(2x)\tan^4(2x)$	

T	H	E
4	10	1

C	H	A	I	N
5	12	6	3	9

R	U	L	E
8	11	7	2