Homework 2

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ddx [$(4x3+x)(2x4-x2+2)$]

Product rule:

$4x3+x$ = 12x2 + 1 | 2x4 – x2 + 2 = 8x3 – 2x

(12x2 + 1)(2x4 – x2 + 2) + (8x3 – 2x)($4x3+x$)

(24x6 – 10x4 + 23x2 + 2) + (32x6 – 2x)

56x6 – 10x4 + 21x2 + 2

$ddx(4k/7x8), k\ is\ a\ constant$

Constant multiplication rule:

$4k7/x8$ = (4k/7)(-8x-9)

-32k7^x-9 = -32k/7x9

$ddx(3x2+1/x+4)$

Quotient rule:

$3x2+1/x+4$ = 6x/1

x+4(6x)-(3x^2+1)(1)/(x+4)^2 = 6x^2 +24x – (3x^2 +1)/(x+4)^2

3x^2+24x-1/(x+4)^2

$ddx(x2+3\ \surd\ 2x+(x2+1))10$

$(x2+3\ \surd\ 2x+(x2+1))10$ = 3(2x+(x2+1))1/2

Chain rule:

3·1/2(2x+(x2+1))−1/2 · 2+2x = 3/2 √ 2x+(x2+1) · (2+2x)

10·(x2+32x+(x2+1))9·(2x+22x+(x2+1)3·(2+2x))

ddxsin (cos(tan(x)))

Chain rule:

(cos(tan(x))) = −cos(cos(tan(x)))·sin(tan(x))·sec2(x)

$4x2y - 2y = x3 + 2$, $dydx = ?$

Product rule:

$4x2y - 2y = x3 + 2$ → 8xy + 4x^2(dy/dx) – 2(dy/dx) = 3x^2

4x^2(dy/dx) – 2(dy/dx) = 3x^2 – 8xy → (dy/dx)$(4x2 - 2) = 3x2 - 8xy$

dxdy = $3x2 - 8xy$ / 4x^2 – 2

$x2y + y3 = \sin(x)$, $dydx = ?$

Product rule:

2xy +x^2(dy/dx) + 3y2(dx/dy) + 3y2(dx/dy) = cos(x)

x2(dx/dy)+3y2(dx/dy) = cos(x)−2xy

(dx/dy)(x2+3y2) = cos(x)−2xy

dx/dy = cos(x)−2xy/x2+3y2

sin(cos (x+y))=x2+y2, $dydx = ?$

cos(cos(x+y))(−sin(x+y)·(1+dx/dy)) = 2x+2y(dx/dy)

−cos(cos(x+y))·sin(x+y)−cos(cos(x+y))·sin(x+y)·dx/dy = 2x+2y(dx/dy)

−cos(cos(x+y))·sin(x+y)·dx/dy−2y(dx/dy)= 2x+cos(cos(x+y))·sin(x+y)

dx/dy·(−cos(cos(x+y))·sin(x+y)−2y) = 2x+cos(cos(x+y))·sin(x+y)

dx/dy = −cos(cos(x+y))·sin(x+y)−2y2x+cos(cos(x+y))·sin(x+y)

$tan2(xy) + csc2(x+y) = 1$, $dydx = ?$

Product rule:

d/dx(tan2(xy)) = 2tan(xy)·sec2(xy)·(x(dx/dy)+y)

dxd(csc2(x+y)) = −2csc2(x+y)·cot(x+y)·(1+dx/dy)

2tan(xy)·sec2(xy)·(x(dx/dy)+y) − 2csc2(x+y)·cot(x+y)·(1+dx/dy) = 0

2tan(xy)·sec2(xy)·x(dy/dx)−2csc2(x+y)·cot(x+y)·dy/dx = −2tan(xy)·sec2(xy)·y+2csc2(x+y)·cot(x+y)

dy/dx(2tan(xy)·sec2(xy)·x−2csc2(x+y)·cot(x+y)) = −2tan(xy)·sec2(xy)·y+2csc2(x+y)·cot(x+y)

dy/dx = −2tan(xy)·sec2(xy)·y+2csc2(x+y)·cot(x+y) / 2tan(xy)·sec2(xy)·x−2csc2(x+y)·cot(x+y)