p. 162 #2

$u = x \quad v = y$

$u' = 1 \quad v = y'$

$(uv)' = uv' + u'v$

$x^3 + y^3 = 18(xy)$

$3x^2 + 3y^2y' = 18(uv)'$

$3x^2 + 3y^2y' = 18(xy' + y)$

$x^2 + y^2y' = 6(xy' + y)$

$x^2 + y^2y' = 6xy' + 6y$

$y^2y' - 6xy' = 6y - x^2$

$y'(y^2 - 6x) = 6y - x^2$

$y' = \dfrac{6y - x^2}{y^2 - 6x}$

p. 162 #16

find where slope of curve is defined.

$x^2 + 4xy + 4y^2 - 3x = 6$

$2x + 4\left(y + x\dfrac{dy}{dx}\right) + 4 \cdot 2y\dfrac{dy}{dx} - 3 = 0$

$2x + 4y + 4x\dfrac{dy}{dx} + 8y\dfrac{dy}{dx} - 3 = 0$

$4x\dfrac{dy}{dx} + 8y\dfrac{dy}{dx} = 3 - 2x - 4y$

$\dfrac{dy}{dx}(4x + 8y) = 3 - 2x - 4y$

$\dfrac{dy}{dx} = \dfrac{3 - 2x - 4y}{4x + 8y}$

$4x + 8y \neq 0$

$4(x + 2y) \neq 0$

$x \neq -2y$

any pt on the line $x = 2y$

#10 $s(t) = t \cdot \cos(\pi - 4t)$

$v(t) = \frac{ds}{dt} =$ $u = t$ $v = \cos(\pi - 4t)$

$u' = 1$ $v' = -\sin(\pi - 4t) \cdot (-4)$

$= 4\sin(\pi - 4t)$

$= u'v + uv'$

$= \cos(\pi - 4t) + t \cdot 4\sin(\pi - 4t)$

$= \cos(\pi - 4t) + 4t \cdot \sin(\pi - 4t)$

p. 153 #16 find dy/dx

$y = x^3 \cdot (2x-5)^4$ $u = x^3$ $v = (2x-5)^4$

$u' = 3x^2$ $v' = 4(2x-5)^3 \cdot 2$

$= 8(2x-5)^3$

$\frac{dy}{dx} = 3x^2(2x-5)^4 + 8x^3(2x-5)^3$

- simplify -

$= x^2(2x-5)^3 \cdot [3(2x-5) + 8x]$

$6x - 15 + 8x$

$14x - 15$

$= x^2(2x-5)^3(14x-15)$

P. 182 # 33

$y = \sqrt{\frac{1-x}{1+x^2}}$ $\sqrt{u} = u^{1/2}$

$\frac{1}{2}u^{-1/2}du$ $-1-x^2-2x+2x^2$

x^2-2x-1

$u' = -1$

$u \quad 1-x$

$v \quad 1+x^2$

$-1(1+x^2)-(1-x)(2x)$ / $(1+x^2)^2$

$v' = 2x$

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

$\frac{1}{2}\frac{(1+x^2)^{1/2}(x^2-2x-1)}{(1-x)^{1/2}(1+x^2)^2(1+x^2)^{+3/2}}$