

$$1- y = \sin(x^2)$$

$$u = x^2$$

$$f(u) = \sin(u)$$

$$f'(u) = \cos(u)$$

$$g(u) = x^2$$

$$g'(u) = 2x$$

$$f'(x) = 2x \cos(x^2) //$$

$$2- y = \ln(\sqrt{x^3})$$

$$u = \sqrt{x^3}$$

$$f(u) = \ln(u)$$

$$f'(u) = \frac{1}{u}$$

$$v = x^3$$

$$h(v) = \sqrt{v} = v^{\frac{1}{2}}$$

$$h'(v) = \frac{1}{2\sqrt{v}}$$

$$g(v) = x^3$$

$$g'(v) = 3x^2$$

$$\frac{1}{\sqrt{x^3}} \cdot \frac{1}{2\sqrt{x^3}} \cdot 3x^2$$

$$f'(x) = \frac{3x^2}{2(\sqrt{x^3})^2} = \frac{3x^2}{2x^3} = \frac{3}{2x} //$$

$$3- f(x) = (3x^2 - 5)^4$$

$$u = 3x^2 - 5$$

$$f(u) = u^4$$

$$f'(u) = 4u^3$$

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

$$g'(x) = 3 \cdot 2x - 0$$

$$g'(x) = 6x$$

$$f'(x) = 4(3x^2 - 5)^3 \cdot 6x$$

$$f'(x) = 24x(3x^2 - 5)^3$$

$$4 - f(x) = e^{3x-1}$$

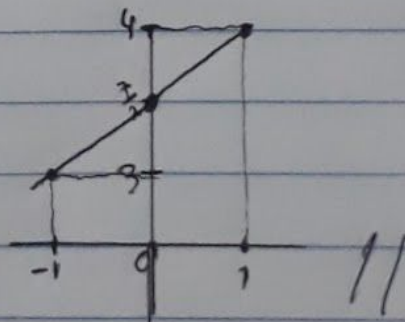
$u = 3x-1$ $f(u) = e^u$ $f'(u) = e^u$	$g(x) = 3x-1$ $g'(x) = 3$	$f'(x) = 3e^{3x-1} //$
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$$5 - \alpha(T) = \left(\underset{x}{(2T-5)}, \underset{y}{(T+1)} \right)$$

$x = 2T-5 \rightarrow T = \frac{x+5}{2}$ $y = T+1 \rightarrow T = y-1$	$\frac{x+5}{2} = y-1 //$
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$$y = \frac{x+5}{2} + 1 = \frac{x+5+2}{2} = \frac{x+7}{2} //$$

x	y
-1	3
0	$\frac{7}{2}$
1	4



$$6 - f(x, y) = y^3 - 2x^2 + 5xy$$

$$f_x(2, 2)$$

$$-4x + 5y = -4 \cdot 2 + 5 \cdot 2 = -8 + 10 = \boxed{2} //$$

$$f_y(1, 2)$$

$$3y^2 + 5x = 3 \cdot 2^2 + 5 \cdot 1 = 12 + 5 = \boxed{17} //$$

$$7- f(x, y) = x^2 + 3y^4 + 2xy^2$$

f_x

$$2x + 2y^2 //$$

f_y

$$3 \cdot 4y^3 + 2 \cdot 2xy = 12y^3 + 4xy //$$

$$8- f(x, y) = x^2 \cdot \cos(xy^2)$$

f_x

$$2x \cdot \cos(xy^2) + x^2 \cdot$$

$$u = xy^2$$

$$f(u) = \cos(u)$$

$$f'(u) = -\sin(u)$$

$$g(x) = xy^2$$

$$g'(x) = 1 \cdot y^2 + x \cdot 0$$

$$- \sin(xy^2) \cdot y^2$$

$$F_x = 2x \cos(xy^2) - x^2 y^2 \sin(xy^2) //$$

f_y

$$\cancel{0 \cdot \cos(xy^2) + x^2 \cdot}$$

$$g_y = xy^2$$

$$g'(y) = 2xy$$

$$- \sin(xy^2) 2xy$$

$$F_y = -x^2 \sin(xy^2) 2xy$$

$$= -2x^3 y \sin(xy^2) //$$