VV1 og VV2 - Stærðfræði og reiknifræði

ttb3@hi.is

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VV1

a)

$$\frac{\delta}{\delta x}(e^{xy}\log xy)$$
$$\log xy(\frac{\delta}{\delta x}(e^{xy})) + e^{xy}(\frac{\delta}{\delta x}\log xy)$$
$$e^{xy}(\frac{\delta}{\delta x}\log xy) + y(\frac{\delta}{\delta x}(x))e^{xy}\log xy$$
$$e^{xy}(\frac{\delta}{\delta x}\log xy) + 1e^{xy}y\log xy$$
$$e^{xy}y\log xy + y(\frac{\delta}{\delta x}(x))\frac{e^{xy}}{xy}$$
$$e^{xy}y\log xy + 1\frac{e^{xy}}{x}$$
$$\frac{e^{xy}(xy\log xy + 1)}{x}$$

b)

$$Dy((x+y^3)^5 - sin(x-y))$$
$$\frac{\delta}{\delta y}((x+y^3) - sin(x-y))$$
$$\frac{\delta}{\delta y}((x+y^3)^5) - \frac{\delta}{\delta y}(sin(x-y))$$
$$(5(x+y^3)^4(\frac{\delta}{\delta y}(x+y^3)) - \frac{\delta}{\delta y}(sin(x-y))$$
$$(\frac{\delta}{\delta y}(x) + \frac{\delta}{\delta y}(y^3))5(x+y^3)^4 - \frac{\delta}{\delta y}(sin(x-y))$$
$$3y^2 5(x+y^3)^4 - \frac{\delta}{\delta y}(sin(x-y))$$
$$15y^2(x+y^3)^4 - (cos(x-y)(\frac{\delta}{\delta y}(x-y)))$$
$$15y^2(x+y^3)^4 - cos(x-y)(-(\frac{\delta}{\delta y}(y) + \frac{\delta}{\delta y}(x)))$$
$$15y^2(x+y^3)^4 + cos(x-y)$$

c)

$$\frac{\delta}{\delta z}(\frac{log(xz)}{z^2})$$
$$log(xz)(\frac{\delta}{\delta z}(\frac{1}{z^2})) + \frac{\frac{\delta}{\delta z}(log(xz))}{z^2}$$
$$-\frac{2}{z^3}log(xz) + \frac{\frac{\delta}{\delta z}(log(xz))}{z^2}$$
$$-\frac{2log(xz)}{z^3} + \frac{\frac{\delta}{\delta z}(xz)}{xz}\frac{1}{z^2}$$
$$-\frac{2log(xz)}{z^3} + \frac{\frac{\delta}{\delta z}(xz)}{xz^3}$$
$$-\frac{2log(xz)}{z^3} + x(\frac{\delta}{\delta z}(z))\frac{1}{xz^3}$$
$$-\frac{2log(xz)}{z^3} + \frac{\frac{\delta}{\delta z}(z)}{z^3}$$
$$-\frac{2log(xz)}{z^3} + \frac{1}{z^3}$$
$$-\frac{1-2log(xz)}{z^3}$$

VV2

a)

finnum stærsta mögulega formengi fallsins

$$f(x,y) = \sqrt{x^2 - 5x + 6}\sqrt{y^2 + 5y - 6}$$

það er ekki hægt að finna rót af tölu minni en 0

breytum innri föllunum í jöfnur

$$x^2 + 6 = 5x$$

$$y^2 + 5y = 6$$

þá sést greinilega að

$$\{(x,y) \in \mathbb{R}^2 : x^2 + 6 \geq 5x, y^2 + 5y \geq 6\}$$