Номер 10

а)

$$f(x,y) = \ln(x+y^2)$$
$$\frac{\sigma f}{\sigma x} = \frac{1}{x+y^2}$$
$$\frac{\sigma f}{\sigma y} = \frac{2y}{x+y^2}$$
$$\frac{\sigma^2 f}{\sigma x^2} = -\frac{1}{(x+y^2)^2}$$
$$\frac{\sigma^2 f}{\sigma y^2} = \frac{2(x-y^2)}{(x+y^2)^2}$$
$$\frac{\sigma^2 f}{\sigma x \sigma y} = -\frac{2y}{(x+y^2)^2}$$
$$\frac{\sigma^2 f}{\sigma y \sigma x} = -\frac{2y}{(x+y^2)^2}$$

b)

$$f(x,y,z) = \sin(xy+z^2)x$$

$$\frac{\sigma f}{\sigma x} = y\cos(xy+z^2)$$

$$\frac{\sigma f}{\sigma y} = x\cos(xy+z^2)$$

$$\frac{\sigma f}{\sigma z} = 2z\cos(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma x^2} = -y^2\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma y^2} = -x^2\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma z^2} = 2(\cos(xy+z^2) - 2z^2\sin(xy+z^2))$$

$$\frac{\sigma^2 f}{\sigma y \sigma x} = \cos(xy+z^2) - xy\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma z \sigma x} = -2yz\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma x \sigma y} = \cos(xy+z^2) - xy\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma z \sigma y} = -2xz\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma x \sigma z} = -2yz\sin(xy+z^2)$$

$$\frac{\sigma^2 f}{\sigma y \sigma z} = -2xz\sin(xy+z^2)$$

Номер 11

a)

$$f(x,y) = x\ln(xy),\ \text{найти}\ \frac{\sigma^3 f}{\sigma x^2 \sigma y}$$

$$\frac{\sigma f}{\sigma y} = \frac{x}{y}$$

$$\frac{\sigma^2 f}{\sigma x \sigma y} = \frac{1}{y}$$

$$\frac{\sigma^3 f}{\sigma x^2 \sigma y} = \frac{1}{y} = 0$$

Ответ: 0

b)

$$f(x,y,z) = \sin(xy + z^2),\ \text{найти}\ \frac{\sigma^3 f}{\sigma x \sigma y \sigma z}$$

$$\frac{\sigma f}{\sigma z} = 2z\cos(xy + z^2)$$

$$\frac{\sigma^2 f}{\sigma y \sigma z} = -2xz\sin(xy + z^2)$$

$$\frac{\sigma^3 f}{\sigma x \sigma y \sigma z} = -2z(xy\cos(xy + z^2) + \sin(xy + z^2))$$

Ответ:

$$-2z(xy\cos(xy + z^2) + \sin(xy + z^2))$$