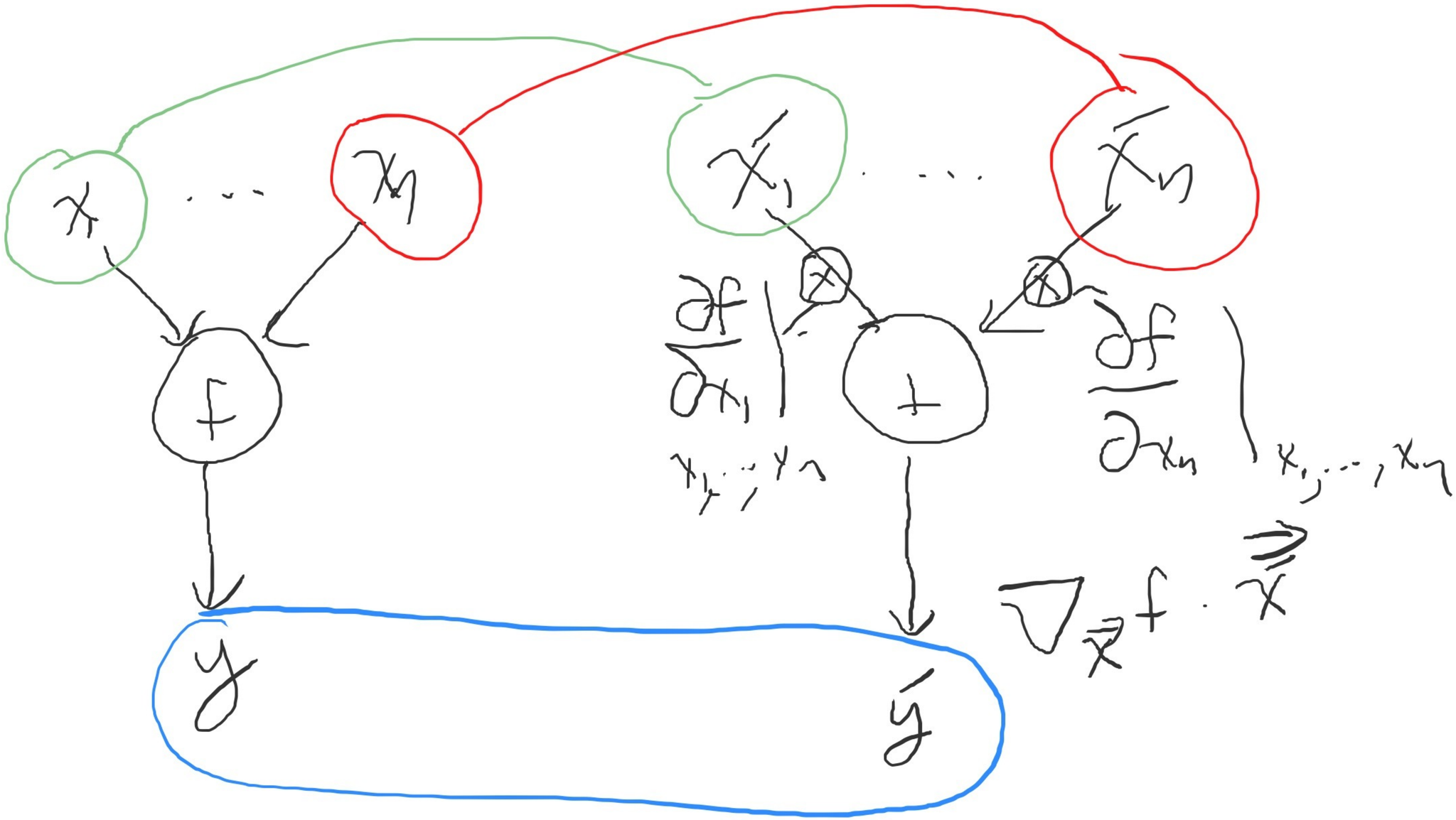
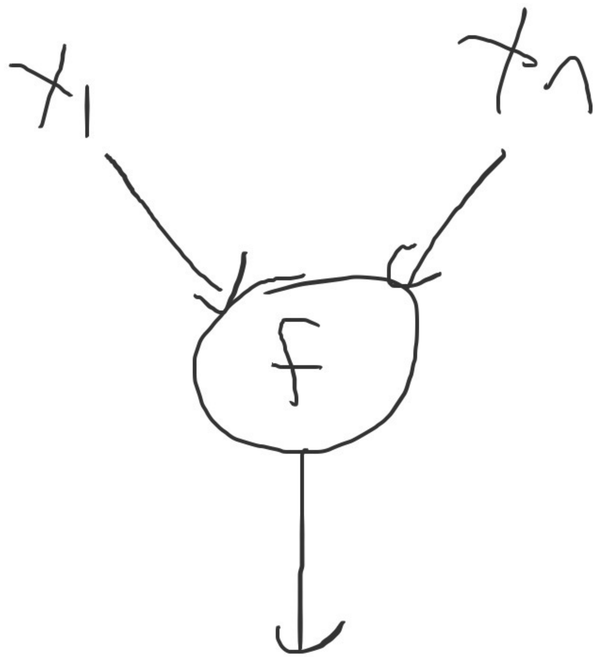
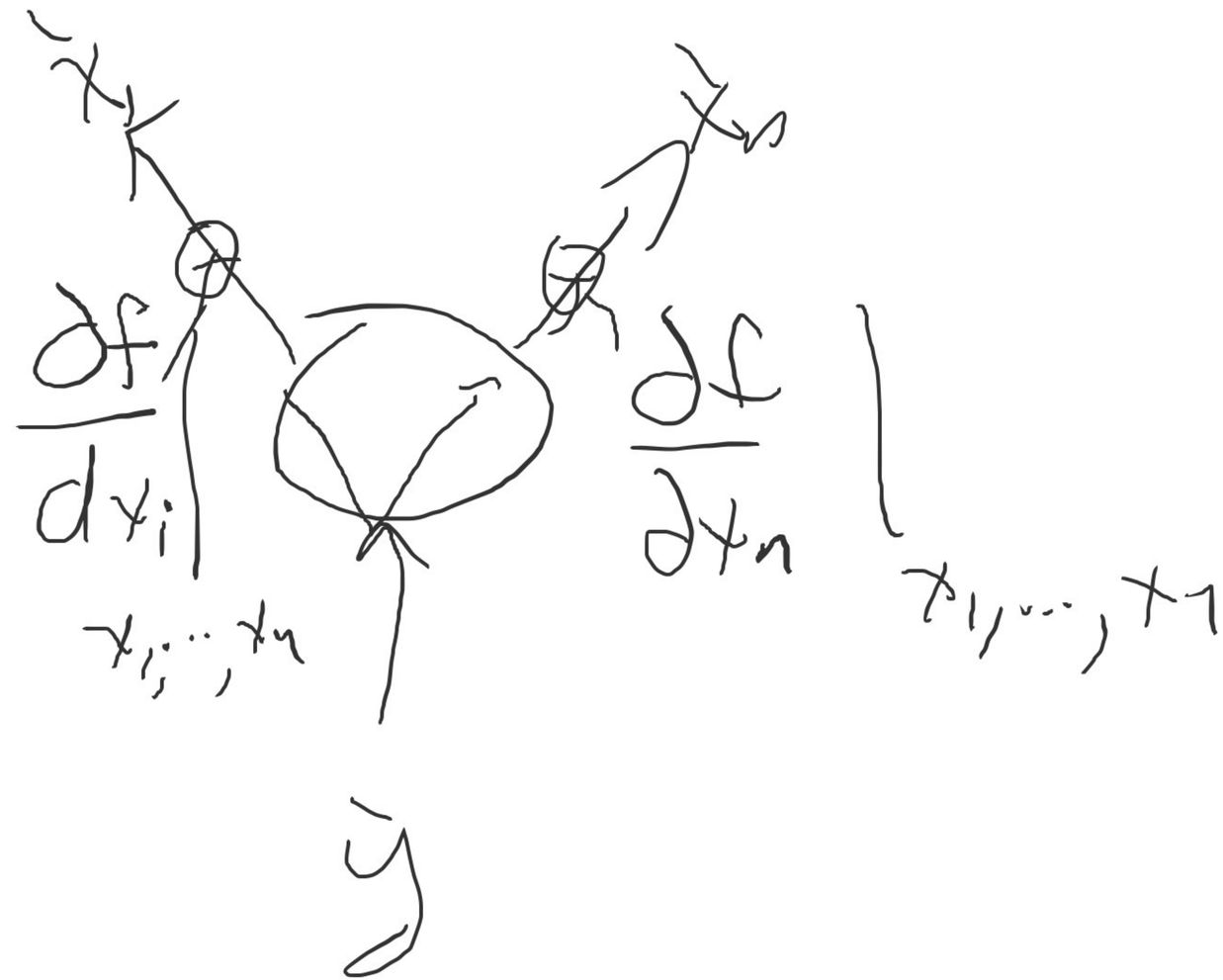
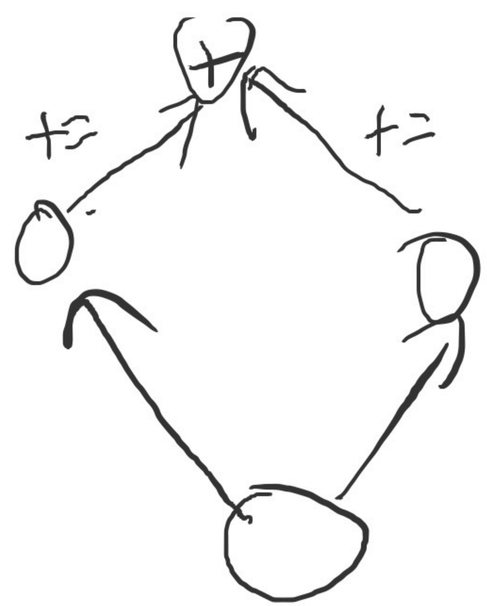

x_1
x_n
$\bar{x}_1$
$\bar{x}_n$
f
$\frac{\partial f}{\partial x_1}\Big|_{x_1,\dots,x_n}$
$\times$
$+$
$\times$
$\frac{\partial f}{\partial x_n}\Big|_{x_1,\dots,x_n}$
$\nabla_{\vec{x}} f \cdot \vec{\bar{x}}$
y
$\bar{y}$


x_1
x_n
f
y


$\frac{\partial f}{\partial x_1}$
$\frac{\partial f}{\partial x_n}$
$x_1, \dots, x_n$
$x_1, \dots, x_n$
$\bar{y}$


+
+=
+=

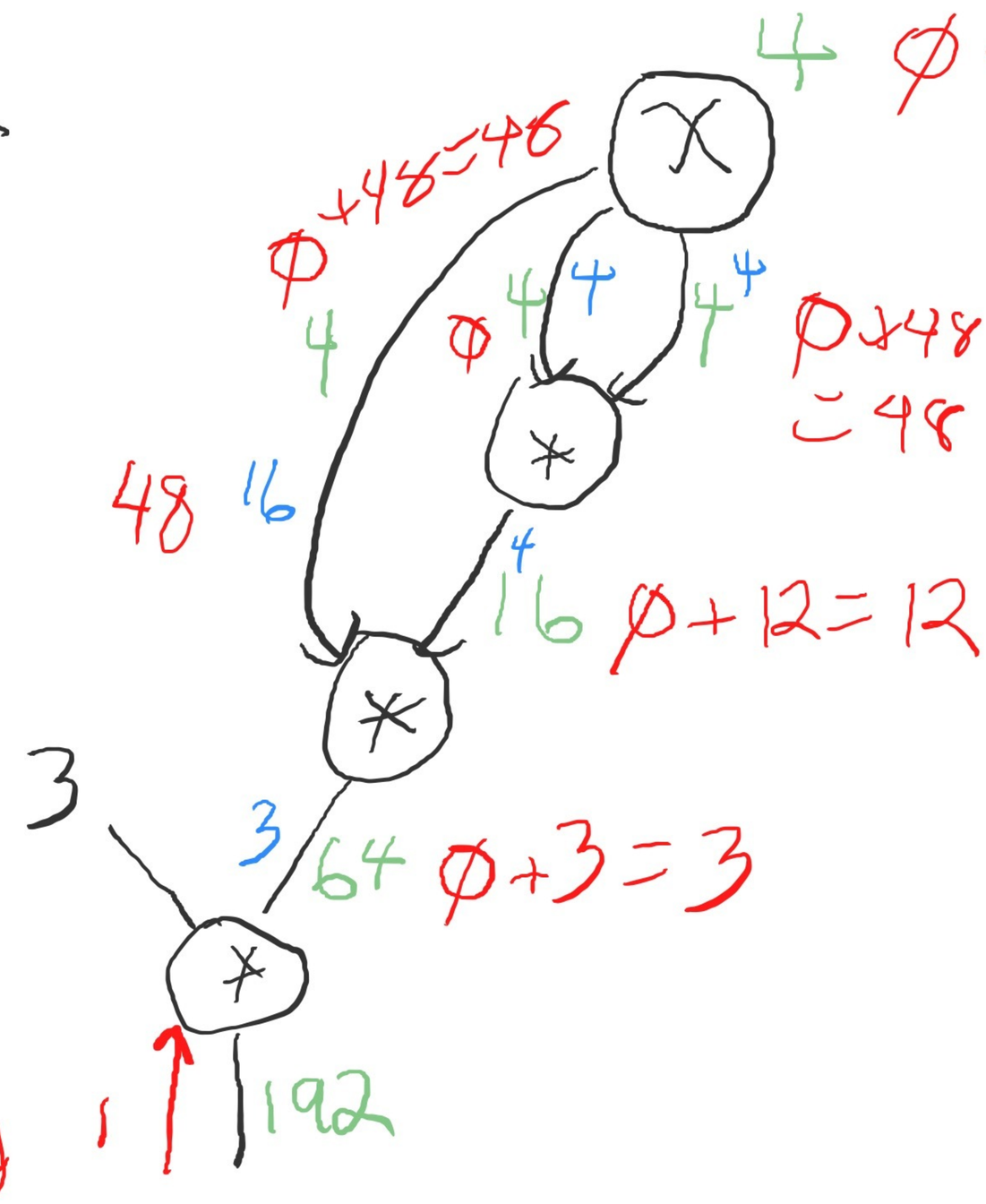
$f(x) = 3x^3$

$f'(x) = 9x^2$

$f(4) = 192$

$f'(4) = 144$

$uv' + vu'$



$0 + 4 \cdot 4 = 4 \cdot 6$

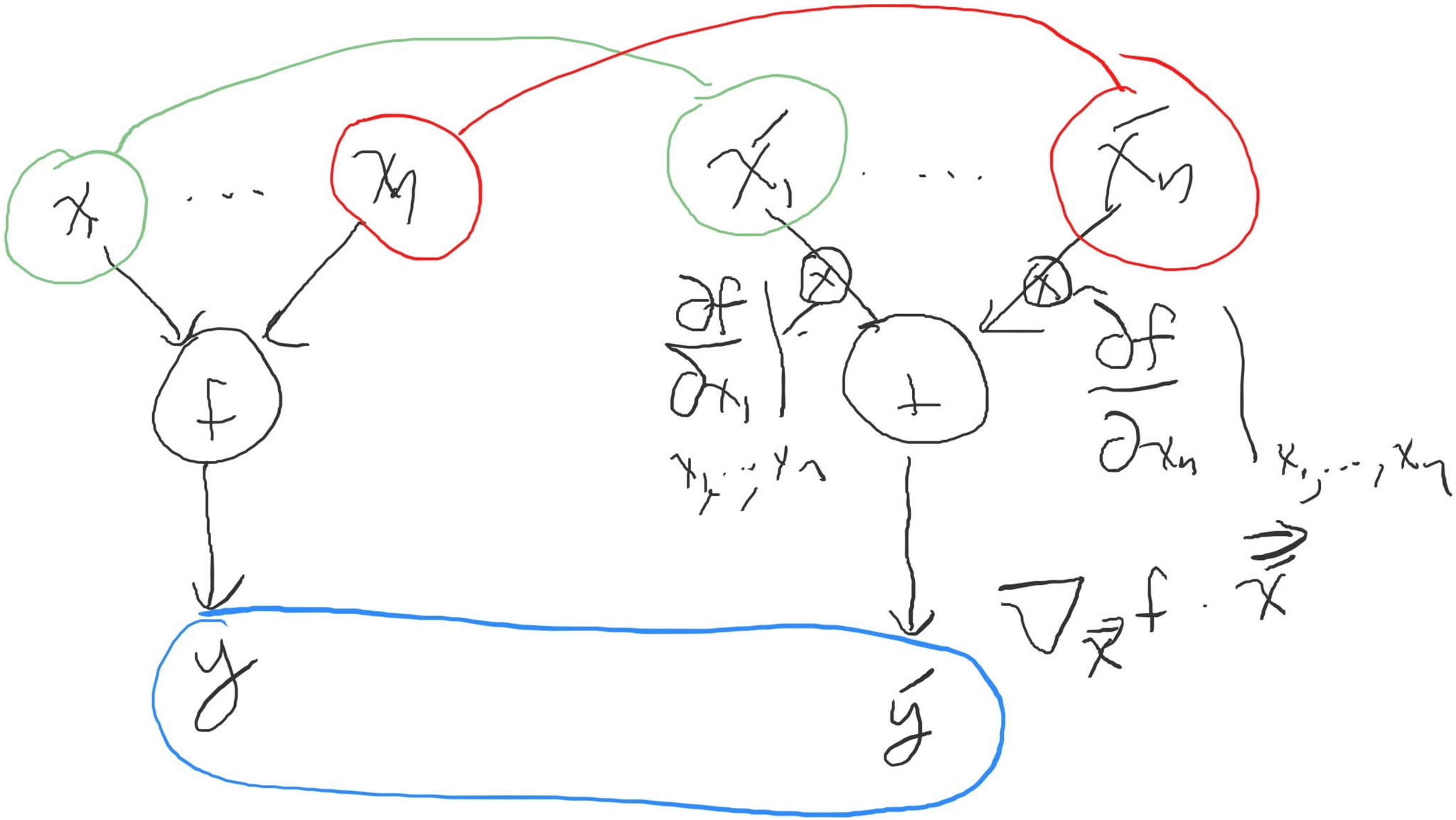
$+48$

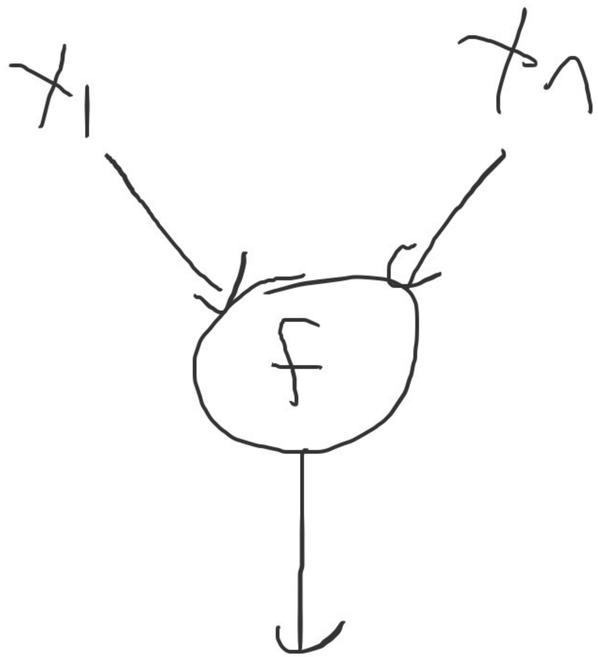
$= 96$

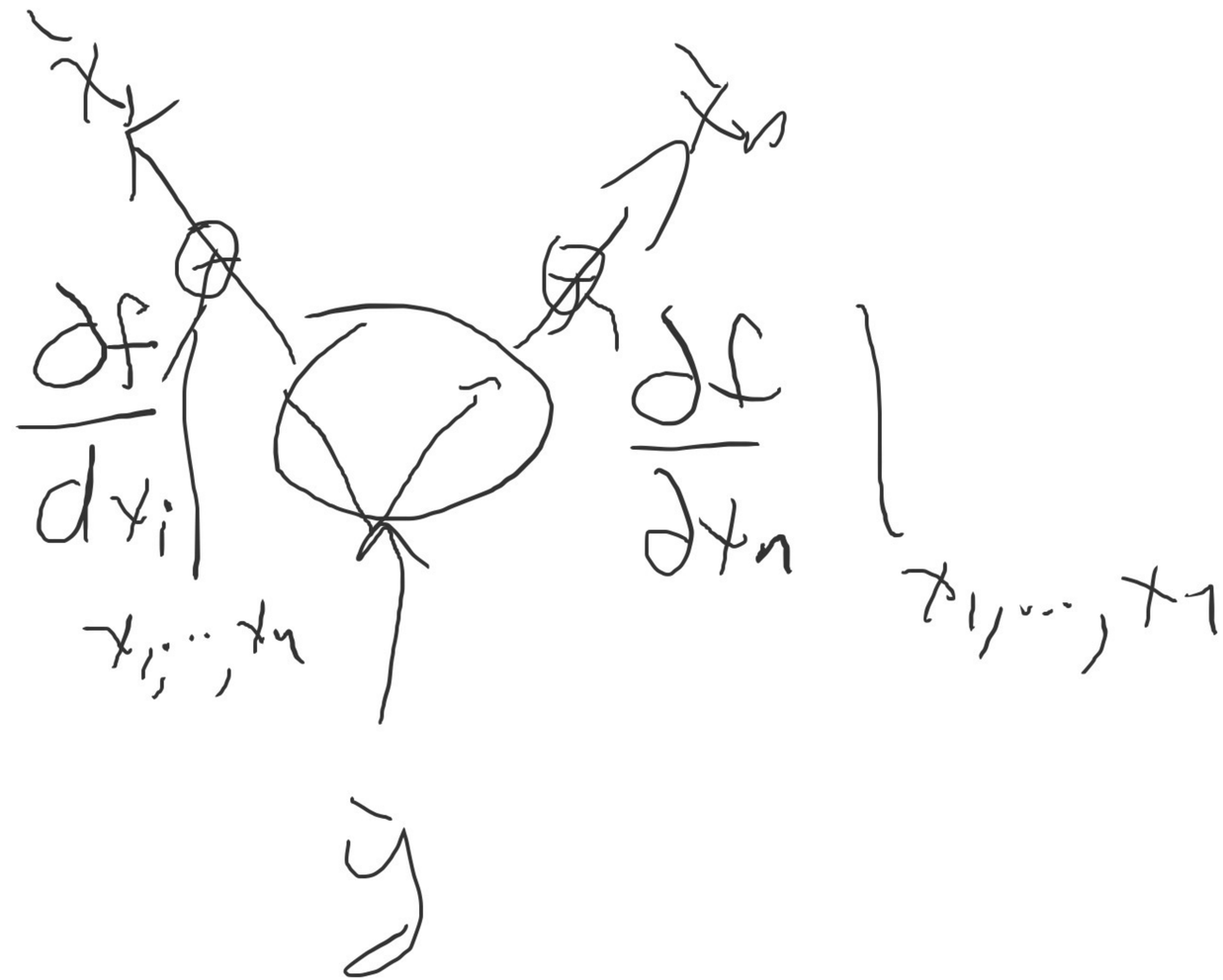
144

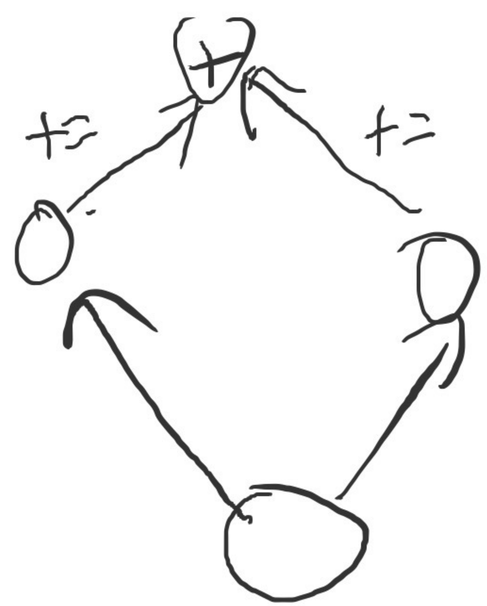
3×48

144


x_1
x_n
$\bar{x}_1$
$\bar{x}_n$
f
$\frac{\partial f}{\partial x_1}\Big|_{x_1,\dots,x_n}$
$\times$
$+$
$\times$
$\frac{\partial f}{\partial x_n}\Big|_{x_1,\dots,x_n}$
$\nabla_{\vec{x}} f \cdot \vec{\bar{x}}$
y
$\bar{y}$


x_1
x_n
f
y


$\frac{\partial f}{\partial x_1}$
$\frac{\partial f}{\partial x_n}$
$x_1, \dots, x_n$
$x_1, \dots, x_n$
$\bar{y}$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+=
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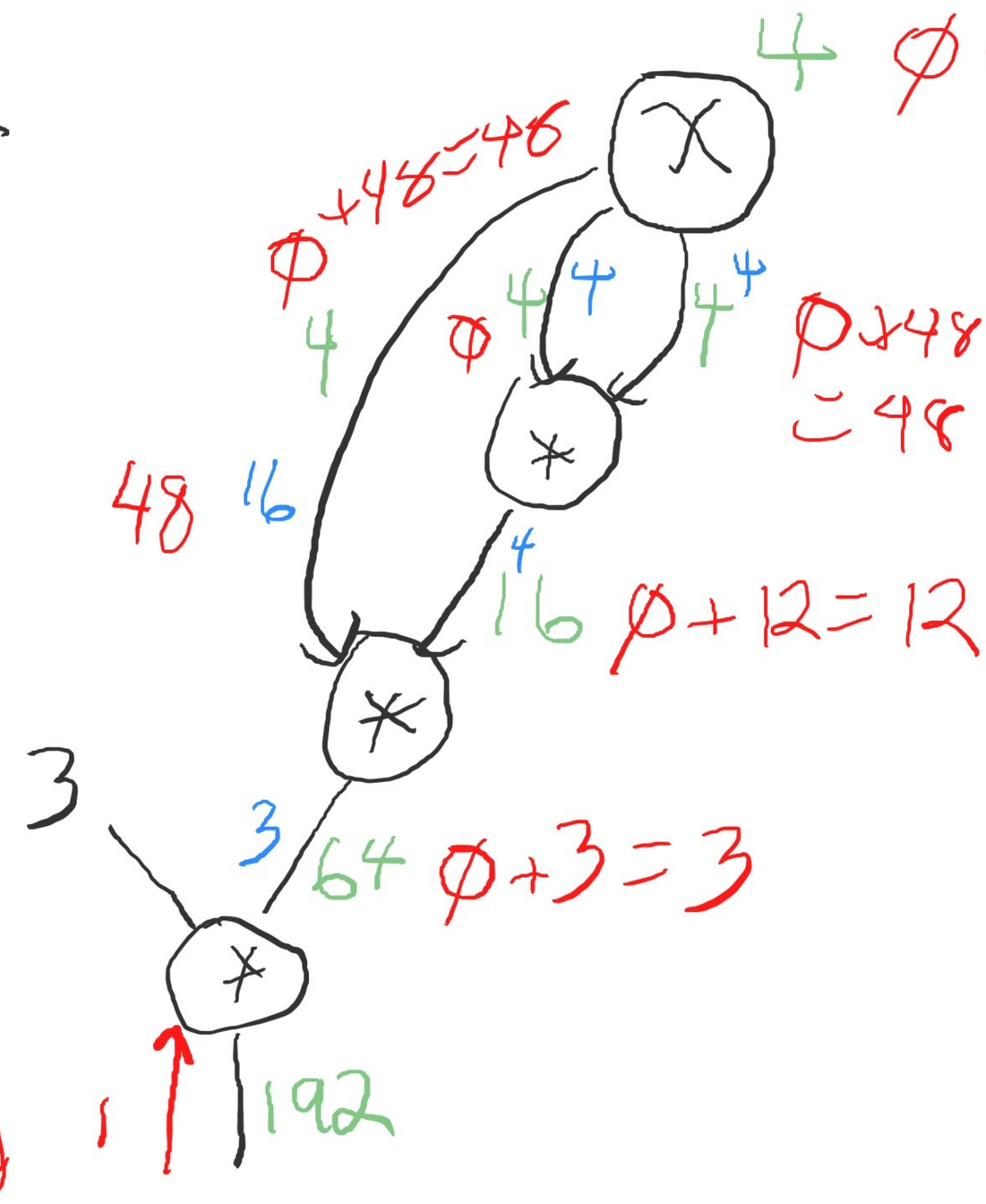

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$+48$

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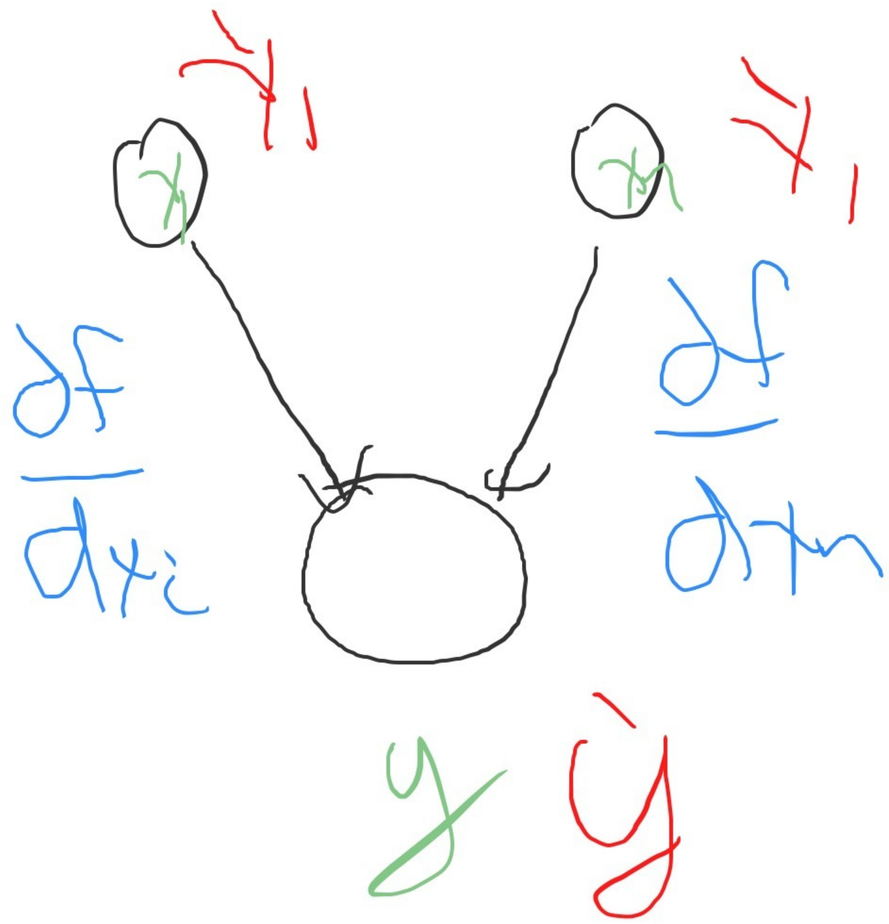
144

3×48

144



black tape

blue factor

green prim

red cotg