$$\frac{\partial}{\partial a}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)=\frac{1000}{a^2\sqrt{c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1}}$$

$$\frac{\partial}{\partial b}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)=\frac{1000\,c^2\left(-\frac{x}{b^2}-\frac{1}{x}\right)\left(\frac{x}{b}-\frac{b}{x}\right)}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}$$

$$\frac{\partial}{\partial c}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)=\frac{1000\,c\left(\frac{x}{b}-\frac{b}{x}\right)^2}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}$$

$$\frac{\partial}{\partial a}\left(\frac{\partial}{\partial a}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=-\frac{2000}{a^3\sqrt{c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1}}$$

$$\frac{\partial}{\partial a}\left(\frac{\partial}{\partial b}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=-\frac{1000\,c^2\left(-\frac{x}{b^2}-\frac{1}{x}\right)\left(\frac{x}{b}-\frac{b}{x}\right)}{a^2\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}$$

$$\frac{\partial}{\partial a}\left(\frac{\partial}{\partial c}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=-\frac{1000\,c\left(\frac{x}{b}-\frac{b}{x}\right)^2}{a^2\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}$$

$$\frac{\partial}{\partial b}\left(\frac{\partial}{\partial b}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=$$
$$\frac{2000\,c^2\,x\left(\frac{x}{b}-\frac{b}{x}\right)}{a\,b^3\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}+\frac{1000\,c^2\left(-\frac{x}{b^2}-\frac{1}{x}\right)^2}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}-\frac{3000\,c^4\left(-\frac{x}{b^2}-\frac{1}{x}\right)^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{5/2}}$$

Alternate forms:

$$-\frac{1000\,c^2\left(2\,b^6\,c^2+2\,b^4\,c^2\,x^2-b^4\,x^2-10\,b^2\,c^2\,x^4+6\,c^2\,x^6-3\,x^6\right)}{a\,b^4\,x^4\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{5/2}}$$

$$\frac{\partial}{\partial b}\left(\frac{\partial}{\partial c}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=\frac{2000\,c\left(-\frac{x}{b^2}-\frac{1}{x}\right)\left(\frac{x}{b}-\frac{b}{x}\right)}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}-\frac{3000\,c^3\left(-\frac{x}{b^2}-\frac{1}{x}\right)\left(\frac{x}{b}-\frac{b}{x}\right)^3}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{5/2}}$$

$$\frac{\partial}{\partial c}\left(\frac{\partial}{\partial c}\left(-\frac{1000}{a\sqrt{1+c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2}}\right)\right)=\frac{1000\left(\frac{x}{b}-\frac{b}{x}\right)^2}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{3/2}}-\frac{3000\,c^2\left(\frac{x}{b}-\frac{b}{x}\right)^4}{a\left(c^2\left(\frac{x}{b}-\frac{b}{x}\right)^2+1\right)^{5/2}}$$

Alternate forms:

$$\frac{1000\left(\frac{b}{x}-\frac{x}{b}\right)^2\left(1-2\,c^2\left(\frac{b}{x}-\frac{x}{b}\right)^2\right)}{a\left(c^2\left(\frac{b}{x}-\frac{x}{b}\right)^2+1\right)^{5/2}}$$