ch4. 20 $\sigma^2 = \frac{(b-a)^2}{12}$

$$\int_a^b x^2 \frac{1}{b-a}\,dx - \left[\int_a^b x \frac{1}{b-a}\,dx\right]^2$$

$$= \frac{b^3-a^3}{3(b-a)} - \left(\frac{b^2-a^2}{2(b-a)}\right)^2 = \frac{b^3-a^3}{3(b-a)} - \left(\frac{(b-a)(b+a)}{2^2(b-a)}\right)^2$$

$$= \frac{b^3-a^3}{3(b-a)} - \frac{(b+a)^2}{4} = \frac{b^3}{3(b-a)} - \frac{a^3}{3(b-a)} - \frac{(b+a)^2}{4}$$

$$= \frac{4b^3}{12(a-b)} + \frac{4a^3}{12(a-b)} - \frac{3(b+a)^2(a-b)}{12(a-b)}$$

$$= \frac{-4b^3 + 4a^3 - 3(b^2+2ab+a^2)(a-b)}{12(a-b)} = \frac{4b^3+4a^3-(3b^2+6ab+3a^2)(a-b)}{12(a-b)}$$

$$= \frac{-4b^3+4a^3+(-3ab^2+6a^2b-3a^3+3b^2+6ab^2+3a^2b)}{12(a-b)}$$

$$= \frac{(4b^3+3b^3)+(4a^3-3a^3)+(-3ab^2+6ab^2)+(-6a^2b+3a^2b)}{12(a-b)}$$

$$= \frac{-b^3+3ab^2-3a^2b+a^3}{12(-b+a)} = \frac{(-b+a)^3}{12(-b+a)} = \frac{(b-a)^2}{12}$$