1. Schreibe mittels binomische Formeln als Summe!
   a) $(2a+3b)^2 = 4a^2+12ab+9b^2$
   b) $(4x+\frac{3}{2}y)^2 = 16x^2+12xy+\frac{9}{4}y^2$
   c) $(\frac{3}{2}u-\frac{2}{3}v)^2 = \frac{9}{4}u^2-2uv+\frac{4}{9}v^2$
   d) $(\frac{5}{3}a+\frac{3}{4}b)\cdot(\frac{5}{3}a-\frac{3}{4}b) = \frac{25}{9}a^2-\frac{9}{16}b^2$
   e) $\left((3x-\frac{5}{2})\cdot(3x+\frac{5}{2})\right)^2 = (9x^2-\frac{25}{4})^2 = 81x^4-\frac{225}{2}x^2+\frac{625}{16}$

2. Wandle folgende Summen in Produkte um!
   a) $81a^2+36ab+4b^2 = (9a+2b)^2$
   b) $\frac{4}{49}x^2+\frac{16}{7}xy+16y^2 = (\frac{2}{7}x+4y)^2$
   c) $\frac{1}{100}s^2-\frac{8}{15}s+\frac{64}{9} = (\frac{1}{10}s-\frac{8}{3})^2$
   d) $\frac{25}{16}-100t^2 = (\frac{5}{4}+10t)\cdot(\frac{5}{4}-10t)$
   e) $\frac{1}{4}x^2-10 = (\frac{1}{2}x+\sqrt{10})\cdot(\frac{1}{2}x-\sqrt{10})$

3. Vereinfache folgende Brüche!
   a) $\frac{9a^2-16b^2}{3a-4b} = \frac{(3a+4b)\cdot(3a-4b)}{3a-4b} = 3a+4b$
   b) $\frac{0{,}01-100t^2}{10t+0{,}1} = \frac{(0{,}1+10t)\cdot(0{,}1-10t)}{0{,}1+10t} = 0{,}1-10t$
   c) $\frac{144u^2-0{,}25}{0{,}5-12u} = \frac{(12u+0{,}5)\cdot(12u-0{,}5)}{-(12u-0{,}5)} = -12u-0{,}5$
   d) $\frac{121v^2-8{,}8v+0{,}16}{121v^2+8{,}8v+0{,}16} = \frac{(11v-0{,}4)^2}{(11v+0{,}4)^2} = \left(\frac{11v-0{,}4}{11v+0{,}4}\right)^2$
   e) $\frac{0{,}18-50x^2}{0{,}6+10x} = \frac{2\cdot(0{,}09-25x^2)}{2\cdot(0{,}3+5x)} = \frac{(0{,}3+5x)\cdot(0{,}3-5x)}{0{,}3+5x} = 0{,}3-5x$

4. Löse folgende quadratische Gleichungen mittels binomischer Formeln!
   a) $100x^2+10x+\frac{1}{4}=0 \rightarrow (10x+\frac{1}{2})^2=0 \rightarrow x=-\frac{1}{20}$
   b) $4x^2-\frac{16}{3}x+\frac{16}{9}=0 \rightarrow (2x-\frac{4}{3})^2=0 \rightarrow x=\frac{2}{3}$
   c) $x^2-\frac{3}{4}=0 \rightarrow (x+\sqrt{\frac{3}{4}})\cdot(x-\sqrt{\frac{3}{4}})=0 \rightarrow x_1=-\frac{1}{2}\sqrt{3}$ $x_2=\frac{1}{2}\sqrt{3}$