Elementary algebra

1. Simplify the following fractions:

   a) $\dfrac{a^3 - 3a^2b + 3ab^2 - b^3}{a - b}$

   b) $\dfrac{m^2 - 49}{6m - 42} : \dfrac{m^2 + 14m + 49}{12m + 84}$

   c) $\dfrac{m}{m+1} + \dfrac{2m}{m^2 - 1} + m$

   d) $1 - \dfrac{1}{1 - \dfrac{a}{a - b}}$

2. Simplify by using root or power rules:

   a) $\sqrt{2\sqrt{2\sqrt{2}}}$

   b) $\sqrt{\sqrt{256}}$

   c) $\dfrac{\sqrt{72}}{\sqrt{2}}$

   d) $\sqrt{\dfrac{18}{5}\sqrt{\dfrac{2}{5\sqrt{5}}\sqrt{\dfrac{4}{5}}}}$

   e) $\dfrac{\sqrt{108p^3}}{\sqrt{3p}}$

   f) $\sqrt{16x^2 + 3\sqrt{(3x^2+3)(3x^2+3)}}$

   g) $3 \cdot 3^5 - 8 \cdot 3^5 + 5 \cdot 3^5$

   h) $(4^3)^2$

   i) $\dfrac{a^{3n}b^m}{a^n b^{3m}}$

   j) $\dfrac{9^5}{12^4}$

   k) $\dfrac{(p^2q)(pq^2r)}{(pqr)^2}$

   l) $\dfrac{6a^5c^{-7}d}{15a^{-2}b^{-5}c^3d^5}$

3. Use the binomial formulae to convert either to a sum or product:

   a) $(3m + 2n)^2$

   b) $x^2 - 6x + 9$

   c) $4a^2 + 24ab + 36b^2$

   d) $(2 + 3a^2)(2 - 3a^2)$

   e) $d^2 - f^2$

   f) $27x^3 - 27x^2y + 9xy^2 - y^3$