1) Gib die ersten 5 Folgeglieder an

a) $a_n = 2n^2 + 1$

$a_1 = 2 \cdot 1^2 + 1 = 3$

$a_2 = 2 \cdot 2^2 + 1 = 9$

$a_3 = 2 \cdot 3^2 + 1 = 19$

$a_4 = 2 \cdot 4^2 + 1 = 33$

$a_5 = 2 \cdot 5^2 + 1 = 51$

b) $a_0 = 2 \qquad a_{n+1} = 2a_n$

$a_1 = 2 \cdot 2 = 4$

$a_2 = 2 \cdot 4 = 8$

$a_3 = 2 \cdot 8 = 16$

$a_4 = 2 \cdot 16 = 32$

$a_5 = 2 \cdot 32 = 64$

2) Berechne die Grenzwerte der Folgen

a) $a_n = \frac{3}{n}$

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{3}{n} = \frac{3}{\infty} = 0$$

b) $a_n = \frac{3n^2+2n-1}{n^2-4n+1}$

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{3n^2 + 2n - 1}{n^2 - 4n + 1} = \lim_{n\to\infty} \frac{3 + \frac{2}{n} - \frac{1}{n^2}}{1 - \frac{4}{n} + \frac{1}{n^2}} = \frac{3 + 0 - 0}{1 - 0 + 0} = 3$$

c) $a_n = \frac{2n-5}{4}$

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{2n - 5}{4} = \frac{\infty}{4} = \infty$$

d) $a_n = \frac{3n^4+2n-8}{3n^4-4n-7}$

$$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{3n^4 + 2n - 8}{3n^4 - 4n - 7} = \lim_{n\to\infty} \frac{3 + \frac{2}{n^3} - \frac{8}{n^4}}{3 - \frac{4}{n^3} - \frac{7}{n^4}} = \frac{3 + 0 - 0}{3 - 0 - 0} = 1$$