Calcolare i limiti per $n \to +\infty$ delle seguenti successioni

1) $\dfrac{2n^2 + 3n \cos n}{n^2 + 1}$

2) $n (\sin n - 2)$

3) $\dfrac{2^n + (-1)^n n^5}{2^n - \dfrac{n}{e^n}}$

4) $\left(\dfrac{\alpha n + 5}{n+3}\right)^n \qquad (\alpha \geq 0)$

5) $\dfrac{\log (e^n + 5)}{n + \sin n}$

6) $n \sqrt{1+n^2} - \sqrt{n^2 - 1}$

7) $\sqrt{2 + n^3} - \sqrt{-1 + 2n^2 + n^3}$

8) $\sqrt[3]{2 + n^3} - \sqrt[3]{-1 + 2n^2 + n^3}$

9) $\dfrac{n^3 \log \left(1 + \dfrac{3}{n^2}\right)}{\sqrt{n^2 + 1}}$

10) $\left(\dfrac{n - \alpha}{n + \alpha}\right)^n \qquad (\alpha \in \mathbb{R})$

11) $\dfrac{n^2 2^n}{3^n}$

12) $\left(1 - \dfrac{1}{n}\right)^{n^2}$

13) $\left(1 - \dfrac{1}{n^2}\right)^n$

14) $\frac{n^3}{n^2+1} - n$

15) $\left(1 + \frac{1}{n}\right)^{\frac{1+n}{n}}$

16) $\left(\frac{1+n}{3n+1}\right)^{\log n}$

E in più: Esercizi 2.8.1, 2.8.2, 2.9.2, 2.10.3, 2.11.6
del testo consigliato (Bertsch-Dall'Aglio-Giacomelli).