(14) Find $\lim_{n\to\infty} \frac{n!\cos n}{(n+1)!}$.

$$= \lim_{n\to\infty} \frac{\cancel{n!}\cos n}{\cancel{n!}(n+1)}$$

Squeeze Theorem:

$$0 = \lim_{n\to\infty} \frac{-1}{n+1} \le \lim_{n\to\infty} \frac{\cos n}{n+1} \le \lim_{n\to\infty} \frac{1}{n+1} = 0$$

Thus $\lim_{n\to\infty} \frac{\cos n}{n+1} = \boxed{0}$.

(15) Find $\lim_{n\to\infty} \frac{(3+n)^n}{n^n}$.

$$= \lim_{n\to\infty} \left(\frac{3}{n}+1\right)^n$$

$$= \lim_{n\to\infty} \left(1+\frac{(3)}{n}\right)^n$$

$$= \boxed{e^3} \quad \left(\text{since } e^x = \lim_{n\to\infty}\left(1+\frac{x}{n}\right)^n\right)$$

(16) Describe the boundedness & monotonicity of $\langle 1/4, -1/6, 1/8, -1/10, 1/12, \ldots \rangle$.

The sequence is bounded since all terms are between ± 1.

The sequence is not monotonic since it decreases from $1/4$ to $-1/6$ and increases from $-1/6$ to $1/8$.

The Monotonic sequence theorem doesn't apply, but it still appears to converge to 0.