Solutions

Each answer shows the steps, then the **result**.

2.1

- $\sum \dfrac{1}{n^3}$ (a convergent p-series, $p = 3$)

2.2

- Yes; since the larger series $\sum \frac{1}{n^3}$ converges, so does $\sum \frac{1}{n^3+2}$

2.3

- $\dfrac{a_n}{b_n} = \dfrac{n/(n^2+1)}{1/n} = \dfrac{n^2}{n^2+1} \to 1$

3.1 B

- they converge or diverge together

3.2

- $\dfrac{1}{2^n+1} \le \dfrac{1}{2^n}$; $\sum \left(\frac{1}{2}\right)^n$ is geometric with $r = \frac{1}{2} < 1$, converges; so by direct comparison the series converges

3.3

- $\dfrac{a_n}{b_n} = \dfrac{(n+2)n}{n^2+3} = \dfrac{n^2+2n}{n^2+3} \to 1$; finite positive, and $\sum \frac{1}{n}$ diverges, so the series **diverges**