Solutions

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

2.1

- $x = 3$

2.2

- $\dfrac{x^2}{x-1} = x + 1 + \dfrac{1}{x-1}$, so oblique asymptote $y = x + 1$

3.1 A

- $\dfrac{x^2-4}{x} = x - \dfrac{4}{x}$, so the oblique asymptote is $y = x$

3.2

(a)

- vertical $x = 1$; divide: $\dfrac{x^2+2}{x-1} = x + 1 + \dfrac{3}{x-1}$, oblique $y = x + 1$

(b)

- $y(x-1) = x^2+2 \Rightarrow x^2 - yx + (y+2) = 0$; real x needs $y^2 - 4(y+2) \geqslant 0 \Rightarrow y^2 - 4y - 8 \geqslant 0$; roots $y = 2 \pm 2\sqrt{3}$; so y cannot take values in $2 - 2\sqrt{3} < y < 2 + 2\sqrt{3}$

3.3

- $y(x^2+1) = x \Rightarrow yx^2 - x + y = 0$; for real x (with $y \neq 0$), $1 - 4y^2 \geqslant 0$; $-\frac{1}{2} \leqslant y \leqslant \frac{1}{2}$