Solutions

2.1

- roots $x = 3$ and $x = 7$; ≤ 0 means between the roots
- $\boldsymbol{3 \leq x \leq 7}$

2.2

- $(x-4)(x+4) > 0$: roots ± 4; > 0 means outside the roots
- $\boldsymbol{x < -4}$ or $\boldsymbol{x > 4}$

2.3

- factorise: $(x+5)(x-3) < 0$
- roots $x = -5$ and $x = 3$; < 0 means between them
- $\boldsymbol{-5 < x < 3}$

2.4

- $y > 2x$: $4 > 2 \times 2 = 4$ is **false**
- so the point does **not** satisfy both; it lies on the dashed line $y = 2x$

2.5

- $x = 1$ solid and $(2, 2.5)$ is to the right: $\boldsymbol{x \geq 1}$
- $y = 3$ dashed and $2.5 < 3$: $\boldsymbol{y < 3}$
- $y = x$ solid and $2.5 > 2$: $\boldsymbol{y \geq x}$

3.1

- $x^2 > 9$ is also true for negative numbers such as $x = -4$, since $(-4)^2 = 16$
- $\boldsymbol{x < -3}$ or $\boldsymbol{x > 3}$

3.2

- factorise: $(2x+1)(x-3) \geq 0$
- roots $x = -\frac{1}{2}$ and $x = 3$; ≥ 0 means outside, roots included
- $\boldsymbol{x \leq -\frac{1}{2}}$ or $\boldsymbol{x \geq 3}$

3.3

- solid lines along the axes $x = 0$ and $y = 0$
- dashed line $2x + y = 6$ through $(3, 0)$ and $(0, 6)$
- R is the triangle between the axes and the dashed line; test $(0, 0)$: $0 < 6$ is true

3.4

- $n^2 < 20$ means $-\sqrt{20} < n < \sqrt{20}$, and $\sqrt{20} \approx 4.47$
- $\boldsymbol{-4, -3, -2, -1, 0, 1, 2, 3, 4}$

3.5

- $y = 1$: $x \leq 4$, so $x = 1, 2, 3, 4$; $y = 2$: $x \leq 2$, so $x = 1, 2$; $y = 3$: $x \leq 0$, none
- $\boldsymbol{(1,1), (2,1), (3,1), (4,1), (1,2), (2,2)}$