

## Exercises I.1

Brief solutions end of Exercises.

Complete solutions at [www.oup.co.uk/companion/NumberTheory](http://www.oup.co.uk/companion/NumberTheory)

1. Which of the following are propositions?

The ones that are propositions state whether they are true or false.

- (a)  $2 + 2 = 4$
- (b)  $2 + 2 = 3$
- (c) All Swedish subjects have blonde hair.
- (d) She looks beautiful.
- (e)  $x^2 - 1 = 0$

2. Negate the following propositions:

- (i) Man can be pregnant.
- (ii) Grass is green.
- (iii) Lecturers annual salary is over £45 000.
- (iv) There are integers  $a$  and  $b$  such that  $\frac{a}{b} = \pi$ .
- (v) There are integers  $a$  and  $b$  such that  $\frac{a}{b} = e$ .

3. Write the following in words:

$$\begin{aligned}x^2 - 9 = 0 &\Rightarrow x^2 = 9 \\ &\Rightarrow x = \sqrt{9} \\ &\Rightarrow x = \pm 3\end{aligned}$$

4. Let  $P : x < 3$ ,  $Q : x^2 < 9$ . Write a sentence for

- (i)  $P \Rightarrow Q$
- (ii)  $Q \Rightarrow P$

Do you think either of them, (i) and (ii), is true?

5. Let  $P$ : ABC is an equilateral triangle. $Q$ : All the angles inside the triangle ABC are equal.

Write a sentence for

- (i)  $P \Rightarrow Q$
- (ii)  $Q \Rightarrow P$

*Are both of these, (i) and (ii), true?*

