

# 1.4 Estimating Limit Values from Tables

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 9 marks

**KEY WORDS** table 表格 • limit 极限 • right-hand limit 右极限 • approaches 趋近

## Objective

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Build the skills to answer exam questions on **estimating limit values from tables**.

**You must be able to:**

- use a **table** 表格 of values approaching  $a$  to estimate a limit
- check the trend from both sides

## 1 Worked examples

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Study these first. Each one shows the method for a question type used later.

### ■ Limits from tables

Tabulate  $f(x)$  for  $x$  close to  $a$  on **both sides**. If the values settle toward one number, that is the estimated limit.

### ■ Example

$f(1.9) = 3.8$ ,  $f(1.99) = 3.98$ ,  $f(2.01) = 4.02$ : the values approach 4, so  $\lim_{x \rightarrow 2} f(x) \approx 4$ .

## 2 Practice

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**2.1** State how a table is used to estimate a limit. [1]

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**2.2** From  $f(1.9) = 3.8$ ,  $f(1.99) = 3.98$ ,  $f(2.01) = 4.02$ , estimate  $\lim_{x \rightarrow 2} f(x)$ . [2]

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**2.3** State why you check both sides of  $a$ . [1]

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## 3 Exam-style questions

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**3.1** To estimate a limit from a table, pick  $x$ -values [1]

- **A** far from  $a$
  - **B** approaching  $a$  from both sides
  - **C** only greater than  $a$
  - **D** equal to  $a$
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**3.2** If  $f(x)$  approaches 7 from both sides, the limit is [1]

- **A** 0
  - **B** 7
  - **C** undefined
  - **D** 14
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**3.3** Table:  $f(2.9) = 5.9$ ,  $f(2.99) = 5.99$ ,  $f(3.01) = 6.01$ .

(a) State the left-hand trend. [1]

(b) State the right-hand trend. [1]

(c) State  $\lim_{x \rightarrow 3} f(x)$ .

[1]

## Solutions

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**2.1** tabulate  $f(x)$  for  $x$  near  $a$  and see what value the outputs approach.

**2.2** the values approach 4, so  $\lim_{x \rightarrow 2} f(x) \approx 4$ .

**2.3** to confirm the left- and right-hand limits agree.

**3.1 B.**

**3.2 B.**

**3.3** (a) approaching 6. (b) approaching 6. (c) 6.