

1.5 Casting and Range of Variables

Name: _____ Class: _____ Date: _____

Total: 9 marks

Objective

Build the skills to answer exam questions on **casting and the range of variables**.

You must be able to:

- use a **cast** 强制类型转换 such as `(int)` or `(double)` to convert a numeric type
- understand that casting a **double** to an **int** **truncates** 截断 the fraction
- describe how **integer overflow** 整数溢出 occurs
- round a **double** by adding 0.5 before casting to **int**

1 Worked examples

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

■ Casting

A **cast** converts a value from one numeric type to another. Casting a **double** to an **int** **truncates** (drops) the fractional part: `(int) 7.9` is 7.

■ Range and overflow

An **int** can only hold values within a fixed **range**; a result too large causes **integer overflow**.

■ Rounding

To round to the nearest integer, add 0.5 first: `(int)(x + 0.5)`.

2 Practice

2.1 State what casting a **double** to an **int** does to the fractional part. [1]

2.2 Evaluate `(int) 8.7`. [1]

2.3 Show how to round 4.6 to the nearest `int` using a cast, and give the result. [2]

3 Exam-style questions

3.1 `(int) 3.99` evaluates to [1]

- **A** 4
 - **B** 3
 - **C** 3.99
 - **D** 0
-

3.2 A result too large for the `int` type causes [1]

- **A** truncation
 - **B** integer overflow
 - **C** a syntax error
 - **D** rounding
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3.3 Let `double d = 5.8;`

(a) State the value of `(int) d`. [1]

(b) State the value of `(int)(d + 0.5)`. [1]

(c) State what a cast from `double` to `int` drops. [1]

4 Go further

- work through the **1.5 Casting and Range of Variables** lesson on the **Learn** page;
- read the **Primitive Types** section of the AP Computer Science A handout on the **Know** page.

Solutions

2.1 it drops (truncates) it.

2.2 8.

2.3 `(int)(4.6 + 0.5) = (int) 5.1 = 5.`

3.1 B.

3.2 B.

3.3 (a) 5. (b) 6. (c) the fractional part.