Exercise walk-through

Casting and Range of Variables ▪ 1.5

eXercise

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`

Method — 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`.

Method — Range and overflow

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

Method — Rounding

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

Practice 2.1 ▪ 1 mark

State what casting a `double` to an `int` does to the fractional part.

Solution 2.1

Method: Casting

Worked steps

it drops (truncates) it B1.

Practice 2.2 ▪ 1 mark

Evaluate `(int) 8.7`.

Solution 2.2

Worked steps

8 B1.

Practice 2.3 ▪ 2 marks

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

Solution 2.3

Method: Rounding

Worked steps

`(int)(4.6 + 0.5) = (int) 5.1 = 5` M1 A1.

Exam-style 3.1 ▪ 1 mark

`(int) 3.99` evaluates to

A `4`

B `3`

C `3.99`

D `0`

Solution 3.1

A `4`

B `3` ✓

C `3.99`

D `0`

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

A result too large for the `int` type causes

A truncation

B integer overflow

C a syntax error

D rounding

Solution 3.2

Method: Range and overflow

A truncation

B integer overflow ✓

C a syntax error

D rounding

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

Let `double d = 5.8;`.
(a) State the value of `(int) d`.
(b) State the value of `(int)(d + 0.5)`.
(c) State what a cast from `double` to `int` drops.

Solution 3.3

Method: Casting

Worked steps

(a) 5 B1. (b) 6 B1. (c) the fractional part B1.