Exercise walk-through

Mathematical Expressions ▪ 3.3

eXercise

You must be able to

- evaluate an **arithmetic expression** 算术表达式
- apply the **order of operations** 运算顺序
- use the **modulus** 取模 operator (the remainder of integer division)
- reason about **integer** versus decimal results

Method — Arithmetic and order of operations

Use $+$, $-$, $\times$, $\div$. Do $\times$ and $\div$ **before** $+$ and $-$; brackets first: $(2+3)\times 4 = 20$.

Method — Modulus

`MOD` returns the **remainder** of integer division: $17 \bmod 5 = 2$ (since $17 = 3 \times 5 + 2$).

Method — Integer vs decimal

Combining whole numbers may give a whole or a decimal result — keep track of which.

Practice 2.1 ▪ 2 marks

Evaluate $2 + 3 \times 4$.

Solution 2.1

Worked steps

$\times$ first: $3 \times 4 = 12$, then $2 + 12 = 14$ M1 A1.

Practice 2.2 ▪ 1 mark

Find $17 \bmod 5$.

Solution 2.2

Worked steps

$17 \bmod 5 = 2$ B1.

Practice 2.3 ▪ 1 mark

State what the modulus operator returns.

Solution 2.3

Method: Modulus

Worked steps

the remainder of an integer division B1.

Exam-style 3.1 ▪ 1 mark

The modulus operator returns the

A quotient

B remainder

C sum

D product

Solution 3.1

Method: Modulus

A quotient

B remainder ✓

C sum

D product

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

Using the order of operations, $10 - 2 \times 3$ equals

A 24

B 4

C 8

D 6

Solution 3.2

Method: Arithmetic and order of operations

A 24

B 4 ✓

C 8

D 6

Worked steps

B — $2 \times 3 = 6$, then $10 - 6 = 4$.

Exam-style 3.3 ▪ 1 mark

Evaluate the following.
(a) $(6 + 4) \div 2$.
(b) $20 \bmod 6$.
(c) State whether $20 \bmod 6$ shows that 20 is a multiple of 6.

Solution 3.3

Worked steps

(a) $10 \div 2 = 5$ B1. (b) $20 \bmod 6 = 2$ B1. (c) no — the remainder is 2, not 0, so 20 is not a multiple of 6 B1.