



KS3.M-N8 Order of Operations and Calculator Methods

AQA KS3.M-N8 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Work out each of these. Write down the answers.

(a) $7 + 3 \times 2$ (1)

(b) $12 - 4 \div 2$ (1)

2 Calculate $5^2 + (8 - 3) \times 2$.

(1)

3 Work out $18 \div (3 + 3)$.

(1)

4 Evaluate each expression. Remember BIDMAS.

(a) $4 \times (2 + 5)$ (1)

(b) $(9 - 4) \times 3$ (1)

5 Simplify $3 + 6 \times 2 - (4 + 1)$.

(2)

6 A calculator display shows 2.5×10^3 . Write this value as an ordinary number.

(2)

7 Calc method check. State whether the calculator step shown is correct, and if not give the correct result.

Ben types $(6 + 4) \times 2$ into his calculator. The display shows 20. Is Ben correct? Explain briefly and give the correct answer if needed.

(3)

8 Use order of operations to simplify: $2^3 + 4 \times (3 + 1)$.

(2)

9 A student writes $8 - 3 \times 2 = (8 - 3) \times 2$. Explain the mistake and give the correct answer.

(2)

10 Calculate the value of $5 + 2 \times (9 - 6^1) - 3$.

(3)

11 A scientific calculator applies the standard order of operations (BIDMAS). Show what it will display for the key sequence: $7 + 5 \times 2 =$. What number appears and why?

(2)

12 Calculate and show working: $(14 - 6) \div 2 + 3^2$.

(2)

13 Two calculator displays are given. Which is more reliable for $1/3$ and why? A: 0.3333 B: 0.3333333333. Give a brief reason and state which display you would record for an exam answer.

(3)

14 A sequence of calculator steps is used to compute $(25 - 5) \times (2 + 3)$. Suggest an efficient sequence of key presses for a scientific calculator and give the final result.

(3)

- 15** Multi-step problem. A recipe needs 3^2 grams of sugar and $2 \times (4 + 1)$ grams of flour. What is the total mass of sugar and flour? Give your answer in grams.

(4)

- 16** A student uses a calculator and types $50 - 12\% =$ to find 12% of 50. Explain the mistake and give the correct method and answer for 12% of 50.

(3)

- 17** Stretch: Work out and show all steps: $(3 \times 4)^2 \div (6 - 2) + 5$.

(4)

- 18** Stretch: Sophie evaluates $2^4 \times (5 - 3) - 10 \div 2$. Find the correct answer and show a one-line explanation of the order used.

(4)

Mark scheme · KS3.M-N8 Order of Operations and Calculator Methods

Question 1

- (a) **B1** 13 cao
- (a) Answer: **13**
- (b) **B1** 10 cao
- (b) Answer: **10**

Question 2

- **B1** 35 cao
- Answer: **35**

Question 3

- **B1** 3 cao
- Answer: **3**

Question 4

- (a) **B1** 28 cao
- (a) Answer: **28**
- (b) **B1** 15 cao
- (b) Answer: **15**

Question 5

- **M1** correct method: $6 \times 2 = 12$ and $(4+1)=5$ or equivalent
- **A1** 10 cao
- Answer: **10**

Question 6

- **M1** recognition that $10^3 = 1000$ or shifting decimal 3 places
- **A1** 2500 cao
- Answer: **2500**

Question 7

- **M1** identifies that $(6+4)=10$ then times 2 should give 20 OR recognises order applied correctly
- **A1** 20 cao
- **B1** clear explanation that calculator is correct because brackets were used oe
- Answer: **20**

Question 8

- **M1** method: $2^3 = 8$ and $(3+1)=4$ or $4 \times 4 = 16$
- **A1** 24 cao
- Answer: **24**

Question 9

- **M1** explanation that multiplication has priority so 3×2 must be done before subtraction
- **A1** 2 cao
- Answer: **2**

Question 10

- **M1** correct handling of power: $6^1 = 6$ and brackets evaluated $9 - 6 = 3$
- **M1** then multiply $2 \times 3 = 6$
- **A1** 8 cao
- Answer: **8**

Question 11

- **M1** recognition that a scientific calculator applies BIDMAS, so the multiplication 5×2 is done before the addition; accept explanation
- **A1** 17 cao ($5 \times 2 = 10$, then $7 + 10 = 17$)
- **Answer: 17**

Question 12

- **M1** method: $(14-6)=8$ then $8 \div 2=4$ and $3^2=9$
- **A1** 13 cao
- **Answer: 13**

Question 13

- **M1** identifies that $1/3$ is recurring so both are approximations
- **M1** notes that B shows more digits and is closer to the true value
- **A1** record 0.333... or $1/3$ as exact answer cao
- **Answer: B is closer; record $1/3$ or 0.333... in an exam**

Question 14

- **M1** method showing use of brackets or compute sub-results first e.g. $(25-5)=20$ then $(2+3)=5$
- **M1** shows key presses or steps: $25 - 5 = \rightarrow 20$; $2 + 3 = \rightarrow 5$; $20 \times 5 =$
- **A1** 100 cao
- **Answer: 100**

Question 15

- **M1** compute sugar: $3^2 = 9$ g or recognise 3^2
- **M1** compute flour: $4+1=5$ then $2 \times 5=10$ g
- **M1** method to add masses: $9 + 10$
- **A1** 19 g cao
- **Answer: 19 g**

Question 16

- **M1** states mistake: $50 - 12\%$ subtracts a percent from 50 instead of finding 12% of 50
- **M1** gives correct method: 50×0.12 or $12/100 \times 50$
- **A1** 6 cao
- **Answer: 6**

Question 17

- **M1** compute inside brackets: $3 \times 4 = 12$ and $6 - 2 = 4$
- **M1** square the result: $12^2 = 144$
- **M1** divide: $144 \div 4 = 36$
- **A1** 41 cao
- **Answer: 41**

Question 18

- **M1** power first: $2^4 = 16$ and bracket: $(5-3)=2$
- **M1** multiply: $16 \times 2 = 32$
- **M1** division then subtraction: $10 \div 2 = 5$ and $32 - 5$
- **A1** 27 cao
- **Answer: 27**