1.8 Order of Operations and Calculator Methods: Test Pack

Calculator 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 x 2 **(1)**

.....

(b) 12 - 4 ÷ 2 **(1)**

.....

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

(3)

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

(2)

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4 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)

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

(3)

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

(4)

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7 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)

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8 Work out 5 x 6 - 8 x 3.

(3)

9 Write down the value of the cube root of 216.

(1)

10 Evaluate each expression. Remember BIDMAS.

(a) 4 x (2 + 5) **(1)**

(b) (9 - 4) x 3 **(1)**

11 Simplify 3 + 6 x 2 - (4 + 1).

(2)

12 Use a calculator to work out (5.9 + 1.3) ÷ (2.2 x 7.1).
Give your answer correct to 2 decimal places.

(2)

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13 Calc method check. State whether the calculator step shown is correct, and if not give the correct result.
Ben types (6 + 4) x 2 into his calculator. The display shows 20. Is Ben correct? Explain briefly and give the correct answer if needed.

(3)

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14 A student uses a calculator and types 80 - 25% = to try to find 25% of 80. Explain the mistake and give the correct method and answer for 25% of 80.

(3)

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15 A calculator shows 5/7 = 0.714285714286. Give this value correct to 2 decimal places, and correct to 4 decimal places. Explain why using the full calculator display gives a more accurate rounded answer than rounding in two separate steps.

(3)

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16 Give a correct key-press order for a scientific calculator to compute (16 - 4) x (3 + 5), and state the final result.

(3)

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17 A calculator display shows 3.2×10^4. Write this value as an ordinary number.

(2)

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Mark scheme · 1.8 Order of Operations and Calculator Methods: Test Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

(a) 13 cao — **B1**

(a) Answer: **13**

(b) 10 cao — **B1**

(b) Answer: **10**

Question 2

correct handling of power: $6^1 = 6$ and brackets evaluated 9 - 6 = 3 — **M1**

then multiply 2 x 3 = 6 — **M1**

8 cao — **A1**

Answer: **8**

Question 3

recognition that a scientific calculator applies BIDMAS, so the multiplication 5 x 2 is done before the addition; accept explanation — **M1**

17 cao (5 x 2 = 10, then 7 + 10 = 17) — **A1**

Answer: **17**

Question 4

identifies that 1/3 is recurring so both are approximations — **M1**

notes that B shows more digits and is closer to the true value — **M1**

record 0.333... or 1/3 as exact answer cao — **A1**

Answer: **B is closer; record 1/3 or 0.333... in an exam**

Question 5

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 = -> 20; 2 + 3 = -> 5; 20 x 5 = — **M1**

100 cao — **A1**

Answer: **100**

Question 6

compute inside brackets: 3 x 4 = 12 and 6 - 2 = 4 — **M1**

square the result: $12^2 = 144$ — **M1**

divide: 144 ÷ 4 = 36 — **M1**

41 cao — **A1**

Answer: **41**

Question 7

power first: $2^4 = 16$ and bracket: (5-3)=2 — **M1**

multiply: 16 x 2 = 32 — **M1**

division then subtraction: 10 ÷ 2 = 5 and 32 - 5 — **M1**

27 cao — **A1**

Answer: **27**

Question 8

correct first operation applied by the order of operations (brackets, indices, then x and ÷) — **M1**

second correct stage of working — **M1**

6 cao — **A1**

Answer: **6**

Question 9

6 cao — **B1**

Answer: **6**

Question 10

(a) 28 cao — **B1**

(a) Answer: **28**

(b) 15 cao — **B1**

(b) Answer: **15**

Question 11

correct method: 6 x 2 = 12 and (4+1)=5 or equivalent — **M1**

10 cao — **A1**

Answer: **10**

Question 12

correct use of brackets and order of operations (method shown or unrounded value seen) — **M1**

0.46 cao — **A1**

Answer: **0.46**

Question 13

identifies that (6+4)=10 then times 2 should give 20 OR recognises order applied correctly — **M1**

20 cao — **A1**

clear explanation that calculator is correct because brackets were used oe — **B1**

Answer: **20**

Question 14

identifies that this key sequence subtracts 25% of 80 from 80, rather than finding 25% of 80 itself — **B1**

correct method, 0.25 x 80 — **M1**

20 cao — **A1**

Answer: **20**

Question 15

0.71 cao (correct to 2 decimal places) — **M1**

0.7143 cao (correct to 4 decimal places) — **M1**

valid reason, e.g. rounding only once from the full display avoids compounding rounding errors — **A1**

Answer: **0.71 (2dp), 0.7143 (4dp)**

Question 16

recognises each bracket must be entered as a group, e.g. (1 6 - 4) x (3 + 5) = — **M1**

correctly evaluates each bracket, 16-4 = 12 and 3+5 = 8 — **M1**

96 cao — **A1**

Answer: **96**

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Question 17

correct method, moving the decimal point 4 places **M1**

32000 cao **A1**

Answer: **32,000**

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