

BIDMAS and inverse operations

Foundation tier

Total marks: 53

Marks

- M** Method mark, for a correct method. It can be implied by a correct answer.
- A** Accuracy mark, for a correct answer. It needs the method mark before it.
- B** A mark for a correct value or statement, with or without working.
- ft** Follow through: the mark is given for using an earlier wrong answer correctly.
- oe** Or equivalent.
- [a, b]** Any value from a to b inclusive.

Questions

Q	Skill	Spec	Tier	Grade	Calculator	Marks
1	Order of operations	N3	Foundation	1	No	2
2	Powers in the order of operations	N3	Foundation	2	No	1
3	Using brackets	N3	Foundation	2	No	2
4	Number machines and inverse operations	N3	Foundation	2	No	2
5	Spotting an order of operations error	N3	Foundation	2	No	2
6	Using a known fact and inverse operations	N3	Foundation	3	No	3
7	Choosing operations	N3	Foundation	3	No	2
8	Reciprocals, and powers with negative numbers	N3	Foundation	4	No	3
9	Cancelling to simplify a calculation	N3	Foundation	4	No	2
10	Order of operations: largest answer	N3	Foundation	4	No	2
11	Using a calculator with roots and powers	N3 N15	Foundation	3	Yes	2
12	Order of operations on a calculator	N3	Foundation	3	Yes	3
13	Inverse operations with a power	N3	Foundation	4	Yes	3
14	Estimating to check a calculator answer	N3 N14 N15	Foundation	4	Yes	4
15	Typing a calculation into a calculator	N3 N6	Foundation	4	Yes	3
16	Comparing calculations with powers, roots and reciprocals	N3 N6	Foundation	4	Yes	3

Q	Skill	Spec	Tier	Grade	Calculator	Marks
17	Inverse operations with squares and cubes	N3 N6	Foundation	5	Yes	4
18	Powers of negative numbers on a calculator	N3 N2	Foundation	5	Yes	3
19	Reciprocals	N3	Foundation	5	Yes	3
20	Writing instructions as one calculation	N3 N6 N15	Foundation	5	Yes	4
	Total					53

Question 1 N3 · Foundation · Grade 1 · 2 marks

Q	Answer	Mark	Comments
1(a)	17	B1	
1(b)	18	B1	

Question 2 N3 · Foundation · Grade 2 · 1 mark

Q	Answer	Mark	Comments
2	18	B1	

Question 3 N3 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
3(a)	$(6 + 4) \times 5 - 2$	B1	
3(b)	$36 \div (4 + 5) \times 2$	B1	

Question 4 N3 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
4(a)	17	B1	
4(b)	9	B1	from $(29 + 7) \div 4$

Question 5 N3 · Foundation · Grade 2 · 2 marks

Q	Answer	Mark	Comments
5(a)	she has subtracted and added before dividing	B1	oe, such as she worked it out as $(18 - 6) \div (3 + 1)$, or she should divide first
5(b)	17	B1	

Question 6 N3 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
6(a)	23	B1	
6(b)	57	B1	
6(c)	1368	B1	$1311 + 57$

Question 7 N3 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
7	$8 \times 6 - 2 \times 3$	B2	B1 for a correct trial evaluated with the right order of operations

Question 8 N3 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
8(a)	$\frac{7}{2}$	B1	oe, 3.5 or $3\frac{1}{2}$
8(b)	$(3 - 5)^2 = 4$	M1	oe, or $2 \times 4 \div 4$ or $6 - 2$
	4	A1	

Question 9 N3 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
9	a correct cancelling step, such as $\frac{4 \times 45}{3 \times 15}$ or $\frac{36 \times 3}{27}$	M1	or $1620 \div 405$
	4	A1	

Question 10 N3 · Foundation · Grade 4 · 2 marks

Q	Answer	Mark	Comments
10	evaluates at least two different arrangements correctly	M1	such as $2 \times (3 + 5)^2 = 128$ and $5 \times (2 + 3)^2 = 125$
	$3 \times (2 + 5)^2 = 147$	A1	or $3 \times (5 + 2)^2$

Question 11 N3 N15 · Foundation · Grade 3 · 2 marks

Q	Answer	Mark	Comments
11(a)	2.8611881328...	B1	accept 2.861...
11(b)	2.86	B1ft	ft their (a) to 3 sf

Question 12 N3 · Foundation · Grade 3 · 3 marks

Q	Answer	Mark	Comments
12(a)	39.3375	B1	
12(b)	$(12.4 + 9.75 + 15.1 + 8.35) \div 4 =$	B1	oe, such as $12.4 + 9.75 + 15.1 + 8.35 =$ then $\div 4 =$
12(c)	11.4	B1	

Question 13 N3 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
13(a)	should square root, not halve	B1	oe
13(b)	$11.25 \times 4 - 7$ or 38	M1	oe
	6.16	A1	6.16 only: the rounding is part of the answer

Question 14 N3 N14 N15 · Foundation · Grade 4 · 4 marks

Q	Answer	Mark	Comments
14(a)	$\frac{50 \times 3}{6 + 4}$	M1	oe, at least three of the four numbers rounded to 1 sf
	15 and a conclusion such as 30.2 is about double the estimate	A1	
14(b)	has not put brackets round $5.86 + 4.27$	B1	oe, such as she divided by 5.86 and then added 4.27
14(c)	15.0	B1	accept 14.999...

Question 15 N3 N6 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
15(a)	C	B1	
15(b)	57.0025 or 4.64	M1	oe
	12.29	A1	accept 12.29 or [12.285, 12.286]

Question 16 N3 N6 · Foundation · Grade 4 · 3 marks

Q	Answer	Mark	Comments
16	two of A = 14.184..., B = 14.0625, C = 14.1	M1	
	all three values correct	M1	accept truncated or rounded to at least 2 dp
	B, C, A	A1	

Question 17 N3 N6 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
17(a)	$\sqrt{59.29}$ or 7.7	M1	
	2.95	A1	
17(b)	$\sqrt[3]{42.875}$ or 3.5	M1	or 5.8
	9.28	A1	

Question 18 N3 N2 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
18(a)	the square is worked out before the negative sign is applied	B1	oe, such as he needs brackets, $(-3.5)^2$, or a negative times a negative is positive so the answer should be 12.25
18(b)	12.25 or -1.728 or -7.776	M1	
	4.474	A1	

Question 19 N3 · Foundation · Grade 5 · 3 marks

Q	Answer	Mark	Comments
19	$0.625 + 0.4$ or 1.025	M1	
	$1 \div 1.025$	M1	oe, ft their 1.025
	0.976	A1	accept [0.9756, 0.9757]. 4.1 from $1.6 + 2.5$ is M0

Question 20 N3 N6 N15 · Foundation · Grade 5 · 4 marks

Q	Answer	Mark	Comments
20(a)	$20 - (3.7 + 2.15)^2 \div \sqrt[3]{9.8}$	B1	oe, such as $20 - \frac{(3.7 + 2.15)^2}{\sqrt[3]{9.8}}$
20(b)	$(3.7 + 2.15)^2$ or 34.2225	M1	
	their $34.2225 \div \sqrt[3]{9.8}$ or 15.99...	M1	$\sqrt[3]{9.8} = 2.139...$
	4.01	A1	accept [4.007, 4.008]