

Higher Check In - 1.03 Combining arithmetic operations

Do not use a calculator for these questions.

- Work out $3(9^2 - 2^4)$.
- Insert each symbol +, −, × and ÷ to make the statement correct.

$$30 \quad \square \quad 5 \quad \square \quad 4 \quad \square \quad 9 \quad \square \quad 3 \quad = \quad 13$$

- Insert each symbol +, −, × and ÷ to complete the equation.

$$3^3 \quad \square \quad 18 \quad \square \quad (2^3 + 1) = 8 \quad \square \quad 7 \quad \square \quad 3^3$$

- Insert brackets to make this statement true.

$$11 - 5 \times 8 + 6 \div 2 = 66$$

- Work out $2 \times 5^3 - 7(5 + 3)$.
- Show that $1^2 + 2^2 + 3^2 + 4^2 + 5^2 = \frac{2 \times 5^3 + 3 \times 5^2 + 5}{6}$.
- Show that the following can be made true by inserting one pair of brackets.

$$\frac{-6 + 4 \times 2}{\left(\sqrt{\frac{72}{8}} - 1\right)^3} = 2^3 \times \left(7 - 3^2 \times \sqrt{5 - 1}\right)^{-1}$$

- Maya thinks that the answer to the expression $\sqrt{(12^2 + (12 - 7)^2)}$ is 17. Explain why her answer is incorrect.
- Alana buys 5 bread rolls and 6 cakes. She gets £1.30 change from £20. If cakes are twice as expensive as bread rolls, how much would 2 bread rolls and 3 cakes cost?
- Put these calculations in order of size, from smallest to biggest.

$$\sqrt{\frac{2^6}{2(7-5)}} \quad \frac{\sqrt{(8^2 - 6^2)}}{\sqrt{7}} \quad \frac{(4^2 + 5)}{3(\sqrt{25 - 4})} \quad \frac{7^2 - 6 \times 4}{\sqrt{(3^2 + 4^2)}}$$

GCSE (9–1) **MATHEMATICS**

Extension

Use five 8s and any mathematical operations to make the following totals.

$$8 \ 8 \ 8 \ 8 \ 8 = 1$$

$$8 \ 8 \ 8 \ 8 \ 8 = 2$$

$$8 \ 8 \ 8 \ 8 \ 8 = 3$$

$$8 \ 8 \ 8 \ 8 \ 8 = 4$$

$$8 \ 8 \ 8 \ 8 \ 8 = 5$$

$$8 \ 8 \ 8 \ 8 \ 8 = 6$$

$$8 \ 8 \ 8 \ 8 \ 8 = 7$$

$$8 \ 8 \ 8 \ 8 \ 8 = 8$$

$$8 \ 8 \ 8 \ 8 \ 8 = 9$$

$$8 \ 8 \ 8 \ 8 \ 8 = 10$$

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Answers

1. 195

2. $30 - 5 \times 4 + 9 \div 3 = 13$

3. $3^3 + 18 \div (2^3 + 1) = 8 \times 7 - 3^3$

4. $(11 - 5) \times (8 + 6 \div 2) = 66$

5. 194

6. $1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 1 + 4 + 9 + 16 + 25 = 55$

$$\frac{2 \times 5^3 + 3 \times 5^2 + 5}{6} = \frac{250 + 75 + 5}{6} = \frac{330}{6} = 55$$

7. $\frac{-6 + 4 \times 2}{\left(\sqrt{\frac{72}{8}} - 1\right)^3} = 2^3 \times \left((7 - 3)^2 \times \sqrt{5 - 1}\right)^{-1}$

$$\frac{2}{8} = \frac{8}{32}$$

8. $\sqrt{(12^2 + (12 - 7)^2)} = \sqrt{(12^2 + 5^2)} = \sqrt{144 + 25} = \sqrt{169} = 13.$

Maya has worked out $\sqrt{(12 + 5)^2} = \sqrt{17^2} = 17$ which is incorrect.

9. $\frac{20 - 1.3}{5 + 2 \times 6} = 1.1$ so each bread roll costs £1.10 and each cake costs £2.20

$$2 \times 1.10 + 3 \times 2.20 = \text{£}8.80$$

10. $\frac{\sqrt{(8^2 - 6^2)}}{\sqrt{7}} = 2$ $\sqrt{\frac{2^6}{2(7-5)}} = 4$ $\frac{7^2 - 6 \times 4}{\sqrt{(3^2 + 4^2)}} = 5$ $\frac{(4^2 + 5)}{3(\sqrt{25} - 4)} = 7$

GCSE (9–1)

MATHEMATICS

Extension

E.g.

$$\frac{(8+8)}{8} - \frac{8}{8} = 1$$

$$\frac{8+8+8-8}{8} = 2$$

$$\frac{8+8}{8} + \frac{8}{8} = 3$$

$$\frac{8+8+8+8}{8} = 4$$

$$8 - \frac{8+8+8}{8} = 5$$

$$8 - \frac{8}{8} - \frac{8}{8} = 6$$

$$8 - 8 + 8 - \frac{8}{8} = 7$$

$$\frac{8 \times 8 \times 8}{8 \times 8} = 8$$

$$8 \times 8 \div 8 \div 8 + 8 = 9$$

$$\frac{8}{8} + 8 + \frac{8}{8} = 10$$

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Carry out a calculation involving powers and brackets			
AO1	2	Choose the correct operation to complete a calculation			
AO1	3	Choose the correct operation to make a number statement correct			
AO1	4	Insert brackets to make a calculation correct			
AO1	5	Carry out a calculation involving powers and brackets			
AO2	6	Carry out steps in a calculation in the correct order			
AO2	7	Insert brackets to make a calculation correct			
AO2	8	Explain the steps required for the correct calculation			
AO3	9	Solve a problem in context using the correct order of operations			
AO3	10	Use the correct order of operations and then put the answers in order			

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