WONDERLEARNERZ PRIMARY ACADEMY â€" OFFICIAL ANSWER KEY & MARKING SCHEME

Mathematical Reasoning and Puzzles - Worksheet 3 [ANSWER KEY]

Grade 3 | Mathematics | Ch 19: Mathematical Reasoning and Puzzles | Total Marks: 19 | Time: 30 Minutes

Q1. In a 3x3 magic square using digits 1 to 9, what is the sum of any row, column, or diagonal? [1 Mark]

Correct Answer: 15

Explanation: The magic sum of a standard 1-9 3x3 square is 15.

Q2. A function machine rule is: 'Multiply input by 4 and add 3'. What is the output for input 5? [1 Mark]

Correct Answer: 23

Explanation: (5 x 4) + 3 = 20 + 3 = 23.

Q3. If 1 Star + 1 Star + 1 Star = 27, what is the value of 1 Star? [1 Mark]

Correct Answer: 9

Explanation: 27 / 3 = 9.

Q4. If 1 Circle + 1 Square = 20 and 1 Circle = 14, what is the value of 1 Square? [1 Mark]

Correct Answer: 6

Explanation: 20 - 14 = 6.

Q5. At the Math Olympiad Arena, a balance scale shows that 2 identical brass weights balance a 50g weight and a 30g weight. What is the weight of one brass weight? [1 Mark]

Correct Answer: 40g

Explanation: 50g + 30g = 80g. 80g / 2 = 40g each.

Q6. A lock combination riddle: 'I am a 3-digit number. My hundreds digit is 3. My tens digit is twice my hundreds digit. My ones digit is 1 less than my tens digit.' What is the code? [1 Mark]

Correct Answer: 365

Explanation: Hundreds = 3. Tens = 3 x 2 = 6. Ones = 6 - 1 = 5. The number is 365.

Q7. An input-output conveyor machine converts: Input 2 -> 8, Input 4 -> 16, Input 6 -> 24. What will the machine output when the input is 9? [1 Mark]

Correct Answer: 36

Explanation: The rule is 'Multiply by 4'. 9 x 4 = 36.

Q8. A magic square row contains the numbers [8], [?], and [6]. If the magic sum is 30, what number is missing in the middle? [1 Mark]

Correct Answer: 16

Explanation: 8 + 6 = 14. 30 - 14 = 16.

Q9. Find the missing input: The function rule is 'Subtract 7, then multiply by 2'. The output is 16. What was the input? [1 Mark]

Correct Answer: 15

Explanation: Work backwards: 16 / 2 = 8. 8 + 7 = 15.

Q10. Oliver claims that 7, 7, 7 can never form a row in a magic square with sum 21 because magic squares must always have 3 different numbers. Is Oliver correct? [1 Mark]

Correct Answer: Yes, standard magic squares require all numbers in the grid to be distinct (unique)

Explanation: In a standard mathematical magic square, all entries must be distinct unique numbers.

Q11. Maya solves an input-output puzzle where Input 2 -> 5 and Input 3 -> 6. She announces the rule is '+ 3'. Then Input 4 gives 7, but for Input 5 the table shows 10. What did Maya overlook? **[1 Mark]**

Correct Answer: The inputs might not be consecutive, or the rule might not apply to non-consecutive jumps without checking the input step size

Explanation: Always check that the rule works consistently for every single row in the table.

Q12. Why must the center number of a 3x3 magic square with digits 1 to 9 always be 5? **[2 Marks]**

Correct Answer: The center cell belongs to 4 lines (1 row, 1 column, 2 diagonals) and 5 is the exact median/average of numbers 1 to 9

Explanation: The center cell participates in 4 equations, requiring the exact arithmetic mean of 1 to 9, which is 5.

Q13. If Scale 1 shows: 1 Triangle = 2 Squares, and Scale 2 shows: 1 Square = 3 Circles, how many Circles will balance 1 Triangle? **[2 Marks]**

Correct Answer: 6 Circles

Explanation: 1 Triangle = 2 Squares = 2 x (3 Circles) = 6 Circles.

Q14. I am thinking of a 2-digit number. It is an odd multiple of 7. The sum of its digits is 10. What is my number? **[2 Marks]**

Correct Answer: 91

Explanation: Multiples of 7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91 (9 + 1 = 10, odd). The number is 91.

Q15. In a farmyard puzzle, there are 10 heads and 28 legs among chickens (2 legs) and cows (4 legs). How many cows are there in the farmyard? **[2 Marks]**

Correct Answer: 4 cows

Explanation: If all 10 were chickens, there would be 20 legs. 28 - 20 = 8 extra legs. Each cow adds 2 extra legs: 8 / 2 = 4 cows (and 6 chickens).