2.57-5 Number Puzzles and Logic Set E: Test Pack

GL ASSESSMENT GL · Calculators not allowed · about 20 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 In a chess tournament, Priya won fewer games than Zach. Zach won fewer games than Wren. Write the three players in order from most games won to fewest games won.

(2)

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2 A two-digit number has tens digit X and units digit Y. When its digits are reversed, the new two-digit number is 27 more than the original number. The sum of the two digits is 9. Find the original two-digit number.

(4)

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3 The combined age of a father and his two children is 42. The father is 3 times as old as his elder child. The younger child is two-thirds the age of the elder child. How old is each person?

(4)

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4 In a survey of 60 pupils: 28 like apples, 25 like bananas, 26 like cherries, 10 like both apples and bananas, 11 like both bananas and cherries, 9 like both apples and cherries, and 4 like all three fruits. How many pupils like none of the three fruits, and how many like exactly one of the three fruits?

(5)

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5 The nth term of a sequence is given by the formula $n^2 + 4n$. Find the first three terms of the sequence, and find the value of n for which the nth term equals 140.

(5)

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6 Look at this sequence: 4, 9, 14, 19, ... What is the next term?

(1)

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Mark scheme · 2.57-5 Number Puzzles and Logic Set E: Test Pack

Question 1

correctly identifies Zach is in the middle position oe	**B1**
fully correct order: Wren, Zach, Priya cao	**B1**

Answer: Wren, Zach, Priya

Question 2

sets up (10Y + X) - (10X + Y) = 27, which simplifies to 9(Y - X) = 27, so Y - X = 3 oe	**M1**
uses the digit sum X + Y = 9 oe	**M1**
solves simultaneously: Y = X + 3 substituted into X + Y = 9 gives 2X + 3 = 9, so X = 3 oe	**M1**
36 cao	**A1**

Answer: 36

Question 3

sets up elder child = e, father = 3e, younger child = (2/3)e	**M1**
forms the equation e + 3e + (2/3)e = 42, i.e. (14/3)e = 42 oe	**M1**
solves to e = 9 oe	**M1**
father = 27, elder child = 9, younger child = 6 cao	**A1**

Answer: Father = 27, elder child = 9, younger child = 6

Question 4

finds the number liking exactly two fruits: apples-and-bananas only = 10 - 4 = 6, bananas-and-cherries only = 11 - 4 = 7, apples-and-cherries only = 9 - 4 = 5	**M1**
finds the number liking exactly one fruit: apples only = 28 - 6 - 5 - 4 = 13, bananas only = 25 - 6 - 7 - 4 = 8, cherries only = 26 - 5 - 7 - 4 = 10 oe	**M1**
exactly one fruit = 13 + 8 + 10 = 31 cao	**A1**
total liking at least one fruit = 31 + 6 + 7 + 5 + 4 = 53 oe	**M1**
none = 60 - 53 = 7 cao	**A1**

Answer: 31 pupils like exactly one fruit; 7 pupils like none of the three fruits

Question 5

substitutes n = 1, 2, 3 into $n^2 + 4n$ oe	**M1**
first three terms: 5, 12, 21 cao	**A1**
sets up the equation $n^2 + 4n = 140$, i.e. $n^2 + 4n - 140 = 0$ oe	**M1**
factorises to (n - 10)(n + 14) = 0, or solves using the quadratic formula, giving n = 10 or n = -14 oe	**dM1**
n = 10 cao (rejecting the negative solution as n must be a positive whole number)	**A1**

Answer: First three terms: 5, 12, 21. n = 10

Question 6

24 cao	**B1**

Answer: 24

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