2.22-3 Multi-Step Reasoning Challenge Set 3: 30-minute Pack

Total Marks

GL ASSESSMENT GL-11PLUS-MATHS · Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Priya, Sam and Talia have 6, 9 and 13 marbles between them, though not necessarily in that order.
- Priya has fewer marbles than Sam.
- Talia does not have the fewest marbles.
- Sam does not have 13 marbles.

Work out how many marbles each person has.

(3)

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2 A three-digit number is formed by choosing 3 of the 4 digits 1, 4, 6 and 8, with no digit repeated. How many of the possible three-digit numbers are both greater than 400 and even?

(3)

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3 A tiling pattern follows the rule 6, 11, 16, 21, ... with the same difference between consecutive terms. How many tiles are needed for the 14th pattern in the sequence?

(3)

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4 Four friends - Aaliyah, Ben, Cass and Dev - each saved a different amount of money for a trip: £20, £35, £50 and £65.

- Aaliyah saved more than Ben but less than Dev.
- Cass saved the least amount of the four.

Work out how much each person saved.

(4)

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5 Two friends, Tom and Sana, together have £52. After Tom gives Sana £8, Sana then has exactly 3 times as much money as Tom. How much money did Tom have originally?

(3)

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6 Hana thinks of a number. She doubles it, then adds 9. She then subtracts 5 and divides the result by 2, giving a final answer of 14. What number did Hana start with?

(3)

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7 A paint mixture is made by mixing blue paint and white paint in the ratio 2:7. If 45 litres of the mixture are made in total, how many more litres of white paint than blue paint are used?

(3)

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8 The sum of the ages of a father and his son is 56. In 4 years' time, the father will be exactly 3 times as old as the son. How old is the son now?

(3)

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9 Marcus spent 1/4 of his money on a book. He then spent 1/3 of what remained on a game, which left him with £15. How much money did Marcus start with?

(3)

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10 Ravi is 8 years old. His mother is exactly 4 times Ravi's age. How old will Ravi be when his mother is exactly 2 times Ravi's age?

(2)

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11 A jar contains only 10p and 50p coins. There are 19 coins in total, worth £4.30 altogether. How many 50p coins are in the jar?

(3)

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Mark scheme · 2.22-3 Multi-Step Reasoning Challenge Set 3: 30-minute Pack

Question 1

uses 'Sam does not have 13' to show Sam has 6 or 9 marbles (oe) **M1**

tests Sam = 6 and rejects it, since Priya would then need fewer than 6, which is impossible, so Sam = 9 (oe) **M1**

Priya = 6, Sam = 9, Talia = 13, all cao **A1**

Answer: Priya has 6 marbles, Sam has 9 marbles, Talia has 13 marbles

Question 2

identifies the hundreds digit must be 4, 6 or 8 for the number to exceed 400 (digit 1 is too small) (oe) **M1**

for each of the 3 hundreds digits, finds 2 choices of even units digit and 2 remaining choices of tens digit, giving 3 x 2 x 2 (oe) **M1**

12 cao **A1**

Answer: 12

Question 3

finds the common difference is 5 (oe) **M1**

forms the nth term rule 5n + 1, or builds the sequence up to the 14th term systematically (oe) **M1**

71 cao **A1**

Answer: 71

Question 4

Cass saved £20, the least amount, cao **B1**

recognises the remaining three amounts must be assigned in increasing order Ben < Aaliyah < Dev (oe) **M1**

Ben = £35 and Aaliyah = £50 cao **A1**

Dev = £65 cao **A1**

Answer: Cass £20, Ben £35, Aaliyah £50, Dev £65

Question 5

forms t + s = 52 and s + 8 = 3(t - 8), where t and s are Tom's and Sana's original amounts (oe) **M1**

substitutes s = 52 - t and solves to give t = 21 (oe) **M1**

£21 cao **A1**

Answer: £21

Question 6

forms the equation (2x + 9 - 5) / 2 = 14, where x is the starting number (oe) **M1**

simplifies to 2x + 4 = 28 (oe) **M1**

12 cao **A1**

Answer: 12

Question 7

finds the total number of parts = 2 + 7 = 9 (oe) **M1**

finds 1 part = 45 / 9 = 5 litres, so blue paint = 10 litres and white paint = 35 litres (oe) **M1**

25 litres cao **A1**

Answer: 25 litres

Question 8

sets up f + s = 56, so f = 56 - s (oe) **M1**

forms (56 - s) + 4 = 3(s + 4) (oe) **M1**

12 cao **A1**

Answer: The son is 12 now (the father is 44)

Question 9

recognises the £15 remaining is 2/3 of the amount left after the book, so finds 15 divided by 2/3 = £22.50 (oe) **M1**

recognises £22.50 is 3/4 of the original amount, so finds 22.50 divided by 3/4 = £30 (oe) **M1**

£30 cao **A1**

Answer: £30

Question 10

forms an equation such as 32 + t = 2(8 + t), where t is the number of years from now (oe) **M1**

24 cao **A1**

Answer: Ravi will be 24 years old (his mother will be 48)

Question 11

forms x + y = 19 and 10x + 50y = 430, where x is the number of 10p coins and y the number of 50p coins (oe) **M1**

divides the value equation by 10 to get x + 5y = 43, then subtracts x + y = 19 to get 4y = 24 (oe) **M1**

6 fifty pence coins cao **A1**

Answer: 6 fifty pence coins (and 13 ten pence coins)

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