2.22-2 Multi-Step Reasoning Challenge Set 2: 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 Sasha, Ben and Chidi have 5, 8 and 11 stickers between them, though not necessarily in that order.
- Sasha has fewer stickers than Ben.
- Chidi does not have the fewest stickers.
- Ben does not have 11 stickers.

Work out how many stickers each person has.

(3)

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2 A three-digit number is formed using each of the digits 3, 4 and 6 exactly once. How many of the possible three-digit numbers are both greater than 400 and even?

(3)

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3 A sequence of matchstick patterns follows the rule 4, 7, 10, 13, ... with the same difference between consecutive terms. How many matchsticks are needed for the 12th pattern in the sequence?

(3)

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4 Four friends - Owen, Priti, Quinn and Reema - each ran a different distance in a charity run: 5 km, 8 km, 10 km and 15 km.
- Owen ran further than Priti but less far than Reema.
- Quinn ran the shortest distance of the four.
Work out how far each person ran.

(4)

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5 Two sisters, Nadia and Zara, together have £45. After Nadia gives Zara £6, Zara then has exactly twice as much money as Nadia. How much money did Nadia have originally?

(3)

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6 Tariq thinks of a number. He doubles it, then adds 7. He then subtracts 3 and divides the result by 2, giving a final answer of 15. What number did Tariq start with?

(3)

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7 A fruit drink is made by mixing orange juice and lemonade in the ratio 3:5. If 40 litres of the drink are made in total, how many more litres of lemonade than orange juice are used?

(3)

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8 The sum of the ages of a father and his daughter is 52. In 6 years' time, the father will be exactly 3 times as old as the daughter. How old is the daughter now?

(3)

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9 Freya spent half of her money on a book. She then spent £4 on a magazine, which left her with £9. How much money did Freya start with?

(3)

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10 Priya is 7 years old. Her mother is exactly 5 times Priya's age. How old will Priya be when her mother is exactly 3 times Priya's age?

(2)

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11 A jar contains only 10p and 20p coins. There are 23 coins in total, worth £3.30 altogether. How many 20p coins are in the jar?

(3)

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Mark scheme · 2.22-2 Multi-Step Reasoning Challenge Set 2: 30-minute Pack

Question 1

uses 'Ben does not have 11' to show Ben has 5 or 8 stickers (oe)	**M1**
tests Ben=5 and rejects it, since Sasha would then need fewer than 5, which is impossible, so Ben=8 (oe)	**M1**
Sasha=5, Ben=8, Chidi=11, all cao	**A1**

Answer: Sasha has 5 stickers, Ben has 8 stickers, Chidi has 11 stickers

Question 2

lists all 6 permutations of 3, 4 and 6: 346, 364, 436, 463, 634, 643 (oe)	**M1**
identifies which are greater than 400 (first digit 4 or 6): 436, 463, 634, 643 (oe)	**M1**
2 cao, since only 436 and 634 also end in an even digit	**A1**

Answer: 2 (the numbers 436 and 634)

Question 3

finds the common difference is 3 (oe)	**M1**
forms the nth term rule 3n+1, or builds the sequence up to the 12th term systematically (oe)	**M1**
37 cao	**A1**

Answer: 37

Question 4

Quinn ran 5 km, the shortest distance, cao	**B1**
recognises the remaining three distances must be assigned in increasing order Priti < Owen < Reema (oe)	**M1**
Priti=8 km and Owen=10 km cao	**A1**
Reema=15 km cao	**A1**

Answer: Quinn 5 km, Priti 8 km, Owen 10 km, Reema 15 km

Question 5

forms n+z=45 and z+6=2(n-6), where n and z are Nadia's and Zara's original amounts (oe)	**M1**
substitutes z=45-n and solves to give n=21 (oe)	**M1**
£21 cao	**A1**

Answer: £21

Question 6

forms the equation (2x+7-3)/2=15, where x is the starting number (oe)	**M1**
simplifies to 2x+4=30 (oe)	**M1**
13 cao	**A1**

Answer: 13

Question 7

finds the total number of parts = 3+5=8 (oe)	**M1**
finds 1 part = 40/8=5 litres, so orange juice=15 litres and lemonade=25 litres (oe)	**M1**
10 litres cao	**A1**

Answer: 10 litres

Question 8

sets up f+d=52, so f=52-d (oe)	**M1**
forms (52-d)+6=3(d+6) (oe)	**M1**
10 cao	**A1**

Answer: The daughter is 10 now (the father is 42)

Question 9

adds back the £4 spent on the magazine: 9+4=13 (oe)	**M1**
recognises £13 is half of the original amount, so doubles it: 13x2=26 (oe)	**M1**
£26 cao	**A1**

Answer: £26

Question 10

forms an equation such as 35+t=3(7+t), where t is the number of years from now (oe)	**M1**
14 cao	**A1**

Answer: Priya will be 14 years old (her mother will be 42)

Question 11

forms x+y=23 and 10x+20y=330, where x is the number of 10p coins and y the number of 20p coins (oe)	**M1**
divides the value equation by 10 to get x+2y=33, then subtracts x+y=23 to get y=10 (oe)	**M1**
10 twenty pence coins cao	**A1**

Answer: 10 twenty pence coins (and 13 ten pence coins)

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