2.22 Multi-Step Reasoning Challenge: 30-minute Pack

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

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Leila, Ben and Aisha share a sum of money in the ratio 5:3:4. Ben receives £18 less than Leila. How much money did they share in total?

(3)

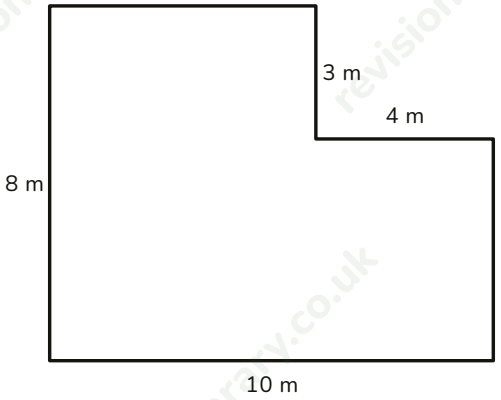
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2 In a class, everyone who plays chess also plays draughts. Sara plays draughts but does not play chess. Tom plays chess. Which statement must be true?

- ☐ A) Sara plays chess
- ☐ B) Tom plays draughts
- ☐ C) Everyone who plays draughts also plays chess
- ☐ D) Sara and Tom play the same games
- ☐ E) No one plays both chess and draughts

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3 A garden is L-shaped, formed from a 10 m by 8 m rectangle with a 4 m by 3 m rectangular corner cut away. What is the perimeter of the L-shaped garden?



(3)

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4 The four-digit number formed by the digits 3, an unknown digit, 7 and 4, in that order, is exactly divisible by 9. What is the unknown digit?

(2)

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5 Jug A contains orange squash and water in the ratio 1:4. Jug B contains 600 ml of the same squash and 900 ml of water. When Jug A and Jug B are combined, the mixture contains 800 ml of squash in total. How much water was in Jug A before the jugs were combined?

(3)

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6 A cyclist travels from Norbridge to Elmstead, a distance of 60 km, at an average speed of 15 km/h. She rests for 45 minutes, then continues to Fenwick, a further 40 km, arriving at 15:15 having started her journey at 10:00. What was her average speed, in km/h, for the second part of the journey (Elmstead to Fenwick)?

(4)

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7 A fruit drink is made by mixing orange juice and water in the ratio 2:5. If 400 ml of orange juice is used, how much water is needed?

(2)

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8 A rectangle has a perimeter of 50 cm. Its length is 5 cm more than its width. If the width is increased by 2 cm and the length is decreased by 3 cm, the new rectangle is a square. What is the area of the original rectangle?



length = width + 5 cm

Perimeter = 50 cm

(4)

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9 In a sequence, each term after the first two is found by adding the two previous terms. The first term is 4 and the fourth term is 30. What is the second term?

(3)

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10 The first four terms of a sequence are 5, 11, 21, 35. The differences between consecutive terms increase in a regular pattern. If this pattern continues, what is the 6th term of the sequence?

(3)

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11 Six years ago, Tomasz was three times as old as his sister Ola. In four years' time, he will be twice as old as her. How old is Tomasz now?

(4)

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

Question 1

finds Leila's share minus Ben's share = 2 parts = £18, so 1 part = £9	**M1**
finds the total number of parts = 5 + 3 + 4 = 12	**M1**
£108, from 12 x £9	**A1**

Answer: £108

Question 2

applies the rule 'chess implies draughts' to Tom, who plays chess	**M1**
B) Tom plays draughts	**A1**

Answer: B) Tom plays draughts

Question 3

recognises that the two edges removed by the notch (4 m and 3 m) are replaced by two new edges of the same total length	**M1**
finds the perimeter of the original rectangle: 2 x (10 + 8) = 36 m	**M1**
36 m	**A1**

Answer: 36 m

Question 4

uses the rule that a number is divisible by 9 when its digit sum is a multiple of 9, forming 3 + d + 7 + 4 = 14 + d	**M1**
4, since 14 + 4 = 18, a multiple of 9	**A1**

Answer: 4

Question 5

finds the squash in Jug A = 800 - 600 = 200 ml	**M1**
uses the ratio 1:4 to scale 200 ml of squash to the matching amount of water	**M1**
800 ml, from 200 x 4	**A1**

Answer: 800 ml

Question 6

finds the time for the first leg: 60 / 15 = 4 hours, arriving at Elmstead at 14:00	**M1**
adds the 45-minute rest to find the departure time from Elmstead: 14:45	**M1**
finds the travel time for the second leg: 15:15 - 14:45 = 30 minutes = 0.5 hours	**M1**
80 km/h, from 40 / 0.5	**A1**

Answer: 80 km/h

Question 7

finds 1 part = 400 / 2 = 200 ml	**M1**
1000 ml (1 litre) of water, from 5 x 200	**A1**

Answer: 1000 ml (1 litre)

Question 8

lets the width be w and the length be w + 5	**M1**
uses the perimeter to form 2(w + w + 5) = 50, giving w = 10 and length = 15	**M1**
checks the square condition: (w + 2) = (length - 3), i.e. 12 = 12	**M1**
150 cm², from 10 x 15	**A1**

Answer: 150 cm^2

Question 9

lets the second term be x and forms the third term as 4 + x	**M1**
forms the fourth term as x + (4 + x) = 2x + 4, and sets 2x + 4 = 30	**M1**
13, from x = 13	**A1**

Answer: 13

Question 10

finds the differences 6, 10, 14 and spots they increase by 4 each time	**M1**
extends the differences to 18 and 22	**M1**
75, from 35 + 18 = 53 then 53 + 22 = 75	**A1**

Answer: 75

Question 11

forms T - 6 = 3(O - 6), i.e. T = 3O - 12; accept an equivalent route to the same value without algebra, such as trial and improvement	**M1**
forms T + 4 = 2(O + 4), i.e. T = 2O + 4	**M1**
solves simultaneously: 3O - 12 = 2O + 4, giving O = 16	**M1**
36, from T = 2 x 16 + 4	**A1**

Answer: Tomasz is 36 now

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