2.15-2 Logic and Puzzle Problems: Practice Set 2: 30-minute Pack

Total Marks

GL ASSESSMENT GL11-MATHS-LOGIC · Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 If 3rd March 2027 falls on a Wednesday, what day of the week is 20th March 2027?

- ☐ A) Thursday
- ☐ B) Monday
- ☐ C) Sunday
- ☐ D) Friday
- ☐ E) Saturday

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2 In a number code, a letter's value is found using 3n-2, where n is its position in the alphabet (A=1, B=2, ...). For example, the word BAD has value 4+1+10=15.

(a) Find the total code value of the word FIG. **(2)**

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(b) A three-letter word has the form S _ N. Its first letter has value 55, its last letter has value 40, and the total code value of the whole word is 138. Find the missing middle letter. **(3)**

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3 The sum of two whole numbers is 34. One number is 6 more than the other. What is the smaller number?

- ☐ A) 10
- ☐ B) 14
- ☐ C) 17
- ☐ D) 20
- ☐ E) 28

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4 Two whole numbers have a sum of 20 and a product of 91. What are the two numbers?

- ☐ A) 15 and 5
- ☐ B) 12 and 8
- ☐ C) 14 and 6
- ☐ D) 13 and 7
- ☐ E) 10 and 10

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5 In a hiking and cycling club with 40 members, 24 enjoy hiking, 19 enjoy cycling, and 9 enjoy both hiking and cycling.

(a) Find the number of members who enjoy hiking only, and the number who enjoy cycling only. **(3)**

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(b) How many members enjoy neither hiking nor cycling? **(2)**

.....

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6 A sequence is formed using the rule 'multiply by 2, then add 4', starting at 3: 3, 10, 24, ...

(a) Find the next two terms of the sequence. **(2)**

(b) Explain why every term from the second term onwards will always be an even number. **(2)**

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7 Four parcels W, X, Y and Z each have a different weight, using the numbers 4, 8, 12 and 16 kilograms once each. (1) Parcel W is heavier than parcel Y. (2) The heaviest parcel is either X or Z. (3) Parcel X is lighter than parcel W. (4) Parcel Z is not the lightest. (5) Parcel Y is heavier than parcel X. What is the weight of parcel W?

- ☐ A) 12 kg
- ☐ B) 16 kg
- ☐ C) 10 kg
- ☐ D) 4 kg
- ☐ E) 8 kg

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8 The value of a word is found by adding the alphabet positions of its letters, then subtracting twice the number of vowels (A, E, I, O, U) in the word. For example, the word BIRD has letters B=2, I=9, R=18, D=4, sum=33, and 1 vowel (I), so its value is 33-2x1=31.

(a) Find the value of the word STONE. **(3)**

(b) Which has the greater value: CLOUD or GRAPE? Show your working. **(3)**

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Mark scheme · 2.15-2 Logic and Puzzle Problems: Practice Set 2: 30-minute Pack

Question 1

find the number of days from 3 March to 20 March: 20-3=17 (oe) **M1**

17 divided by 7 leaves remainder 3 (oe) **M1**

E cao **A1**

Answer: E) Saturday

Question 2

(a) F=16, I=25, G=19 (oe) **M1**

(a) 60 cao **A1**

(a) Answer: 60

(b) 138-55-40=43 (oe) **M1**

(b) solve 3n-2=43 to get n=15 (oe) **M1**

(b) O cao **A1**

(b) Answer: O (the word is SON)

Question 3

form 2x+6=34 (oe) **M1**

14 cao **A1**

Answer: 14

Question 4

trial pairs summing to 20 and test the product (oe) **M1**

D cao **A1**

Answer: D) 13 and 7

Question 5

(a) 24-9=15 (hiking only) (oe) **M1**

(a) 19-9=10 (cycling only) (oe) **M1**

(a) hiking only=15 and cycling only=10, both cao **A1**

(a) Answer: Hiking only: 15, Cycling only: 10

(b) 15+10+9=34 enjoying at least one activity (ft from a) **M1**

(b) 40-34=6 cao **A1**

(b) Answer: 6 members

Question 6

(a) 52 cao **B1**

(a) 108 cao **B1**

(a) Answer: 52, 108

(b) recognise that doubling any whole number always gives an even number (oe) **B1**

(b) recognise that adding 4 (an even number) to an even number always gives an even number, so every term after the first must be even (oe) **B1**

(b) Answer: Doubling any number gives an even result; adding 4 to an even number keeps it even, so every term from the second one onwards is even

Question 7

from clue 3 X is not the heaviest, so by clue 2 the heaviest parcel is Z, giving Z=16 (oe) **M1**

from clues 1 and 5 deduce X < Y < W (oe) **M1**

assign the remaining weights 4, 8, 12 in order: X=4, Y=8, W=12 (oe) **M1**

check clue 4: Z=16 is not the lightest, consistent (oe) **A1**

A cao **A1**

Answer: A) 12 kg

Question 8

(a) S=19, T=20, O=15, N=14, E=5, sum=73 (oe) **M1**

(a) subtract 2x2 for the 2 vowels O and E (oe) **M1**

(a) 69 cao **A1**

(a) Answer: 69

(b) CLOUD: C=3, L=12, O=15, U=21, D=4, sum=55, 2 vowels (O, U), value=55-4=51 (oe) **M1**

(b) GRAPE: G=7, R=18, A=1, P=16, E=5, sum=47, 2 vowels (A, E), value=47-4=43 (oe) **M1**

(b) CLOUD is greater (51 compared with 43) cao **A1**

(b) Answer: CLOUD is greater (51 versus 43)

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