∑ DANEMATHICS
FREE CAPS MATHS RESOURCES

GRADE 8 · GRAPHS
Interpreting & Drawing Graphs

MARKING GUIDELINE

MARKS	DURATION	QUESTIONS
38	1 hour	3

Name: _____ Class: _____

Date: _____

MARK _____ / 38

INSTRUCTIONS AND INFORMATION

1. Answer **ALL** the questions in this question paper.
2. Answer QUESTION 1 by **circling** the letter (A–D) in the answer grid at the end of that section.
3. Show **ALL** calculations clearly.
4. Show all units where applicable.
5. Number the answers correctly according to the numbering system used in this question paper.
6. A non-programmable calculator may be used, unless stated otherwise.
7. Write neatly and legibly.

QUESTION 1 [10 MARKS]

Four options are given as possible answers to the following questions. Choose the correct answer and circle the letter (A–D) in the grid at the end of this section. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1 On a distance-time graph, a HORIZONTAL section means the object is ... (1)

A) not moving ✓ B) moving backwards
C) slowing down D) speeding up

> **Answer: A** — The distance is not changing, so no progress is being made.
> - **B** — that would make the distance decrease
> - **C** — that would make it less steep, but still rising
> - **D** — that would make the graph steeper

1.2 On a distance-time graph, the STEEPER the line, the ... (1)

A) slower the speed B) shorter the journey
C) longer the rest **D) faster the speed ✓**

> **Answer: D** — A steeper line covers more distance in the same time.
> - **A** — a gentler slope means slower
> - **B** — steepness measures speed, not length
> - **C** — a rest is a flat section

1.3 A cyclist travels 40 km in the first 2 hours. Her average speed is ... (1)

A) 20 km/h ✓ B) 38 km/h
C) 42 km/h D) 80 km/h

> **Answer: A** — Speed = distance ÷ time = 40 ÷ 2.
> - **B** — subtracted the two numbers
> - **C** — added the two numbers
> - **D** — MULTIPLIED instead of dividing

1.4 "The number of cars in a parking lot" is ... (1)

A) continuous
B) **discrete ✓**
C) neither
D) both

> **Answer: B** — Cars are counted in whole numbers — there is no half a car.
> - **A** — continuous data can take any in-between value, and half a car does not exist
> - **C** — every set of data is one or the other
> - **D** — it cannot be both at once

1.5 "The temperature during the day" is ... (1)

A) always negative
B) **continuous ✓**
C) discrete
D) neither

> **Answer: B** — It can take any value in between, such as $21{,}4$ °C.
> - **A** — temperature can be positive or negative
> - **C** — discrete data is counted, not measured
> - **D** — every set of data is one or the other

1.6 The highest point on a graph is called the ... (1)

A) minimum
B) intercept
C) gradient
D) **maximum ✓**

> **Answer: D** — Maximum means greatest.
> - **A** — that is the LOWEST point
> - **B** — an intercept is where it crosses an axis
> - **C** — the gradient is its steepness

1.7 The point $(2\ ;\ -5)$ lies in the ... quadrant. (1)

A) third
B) first
C) **fourth ✓**
D) second

> **Answer: C** — x is positive and y is negative.
> - **A** — both would have to be negative
> - **B** — both would have to be positive
> - **D** — x would have to be negative

1.8 Reflecting the point $(2\ ;\ -5)$ in the x-axis gives ... (1)

A) $(-5\ ;\ 2)$
B) $(-2\ ;\ 5)$
C) **$(2\ ;\ 5)$ ✓**
D) $(-2\ ;\ -5)$

> **Answer: C** — Reflecting in the x-axis changes the sign of y only.
> - **A** — that swaps the coordinates
> - **B** — that is a rotation of $180°$
> - **D** — that is a reflection in the y-axis

1.9 A graph made up of straight sections with DIFFERENT steepness is ... (1)

A) linear
B) discrete
C) horizontal
D) non-linear ✓

> **Answer: D** — A linear graph is ONE straight line all the way.
> - **A** — a linear graph has a single constant gradient
> - **B** — that describes the data, not the shape
> - **C** — horizontal means one flat line

1.10 A journey of 60 km takes 5 hours including a 1-hour rest. The average speed for the WHOLE journey is ... (1)

A) 15 km/h
B) 10 km/h
C) 12 km/h ✓
D) 60 km/h

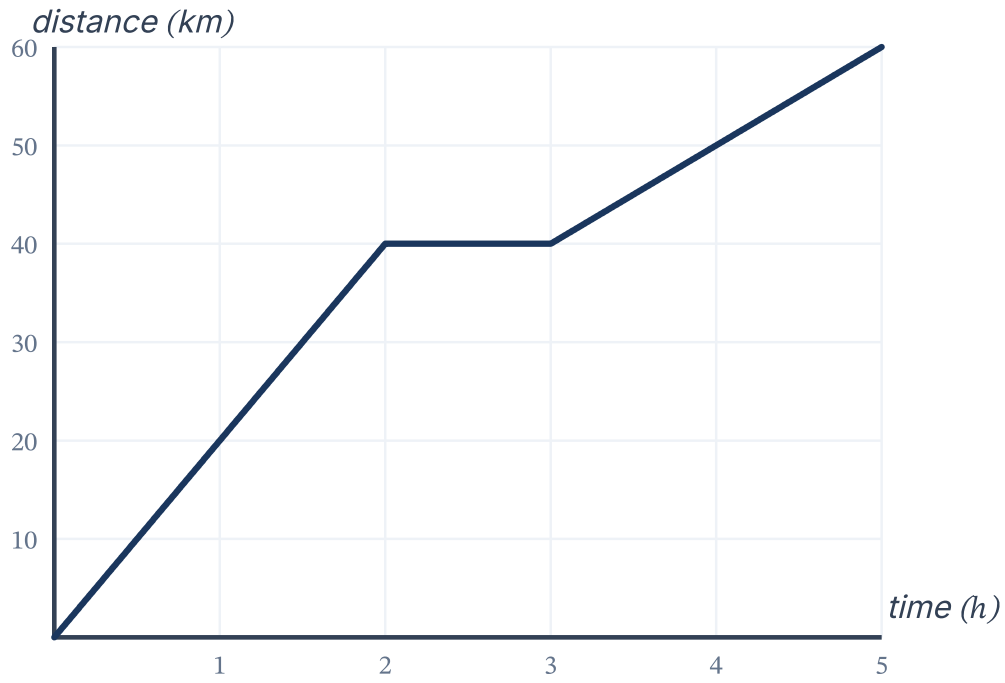
> **Answer: C** — Average speed uses the TOTAL time, rest included: $60 \div 5$.
> - **A** — left the rest hour out of the total time
> - **B** — divided by 6 hours
> - **D** — used the distance as the speed

ANSWER GRID — MARKING GUIDELINE

1.1	(A)	B	C	D
1.2	A	B	C	(D)
1.3	(A)	B	C	D
1.4	A	(B)	C	D
1.5	A	(B)	C	D
1.6	A	B	C	(D)
1.7	A	B	(C)	D
1.8	A	B	(C)	D
1.9	A	B	C	(D)
1.10	A	B	(C)	D

QUESTION 2 [16 MARKS]

The graph below shows the distance a cyclist travelled during one afternoon.



2.1 Write down the distance the cyclist had travelled after 2 hours, and hence calculate her average speed over those first 2 hours. **(3)**

> **40 km** *(1)*
> Speed = distance ÷ time = 40 ÷ 2 *(1)*
> = **20 km/h** *(1)*

2.2 Describe what the flat (horizontal) section of the graph tells you about the cyclist, and write down how long it lasted. **(3)**

> The distance is not changing *(1)*
> so the cyclist was resting — not moving *(1)*
> The flat section runs from 2 h to 3 h, so it lasted **1 hour** *(1)*

2.3 During which interval was the cyclist travelling fastest? Give a reason for your answer, and calculate her speed over the LAST 2 hours for comparison. **(4)**

> During the **first 2 hours** *(1)*
> That section of the graph is the STEEPEST *(1)*
> Last 2 hours: (60 − 40) ÷ (5 − 3) *(1)*
> = **10 km/h**, which is half the speed of the first section *(1)*

2.4 Determine the total distance travelled and the total time taken, and hence her average speed for the WHOLE journey. **(4)**

> Total distance = **60 km** *(1)*
> Total time = **5 hours** *(1)*
> Average speed = 60 ÷ 5 *(1)*
> = **12 km/h** — less than either riding speed, because the rest hour counts as time *(1)*

2.5 Is this graph linear or non-linear? Give a reason for your answer. **(2)**

> **Non-linear** *(1)* — it is made of straight sections with different steepness, so it is not one single straight line *(1)*

QUESTION 3 [12 MARKS]

Answer the questions below.

3.1 State whether 'the number of cars in a parking lot' is discrete or continuous, give a reason, and give ONE other example of the same kind of quantity. **(3)**

> **Discrete** *(1)*
> Cars are counted in whole numbers — there is no half a car *(1)*
> Another example: the number of learners in a class *(1)*

3.2 State whether 'the temperature during the day' is discrete or continuous, give a reason, and explain why its graph may be drawn as an unbroken line. **(3)**

> **Continuous** *(1)*
> Temperature can take ANY value in between, such as $21{,}4$ °C *(1)*
> Because every in-between value really occurs, the points may be joined into an unbroken line *(1)*

3.3 Write down the name given to the highest point on a graph and to the lowest point, and state which of the two $y = x^2$ has. **(3)**

> The highest point is the **maximum** *(1)*
> The lowest point is the **minimum** *(1)*
> $y = x^2$ has a MINIMUM, at $(0\ ;\ 0)$, because x^2 is never negative *(1)*

3.4 In which quadrant does the point $(2\ ;\ -5)$ lie? Give a reason, and write down the coordinates of its reflection in the x-axis. **(3)**

> The **fourth** quadrant *(1)*
> x is positive and y is negative *(1)*
> Reflecting in the x-axis changes the sign of y only: **(2 ; 5)** *(1)*

TOTAL: 38 marks

This question paper consists of 3 questions.

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