FOUNDATION & HIGHER

HIGHER EXTENDS

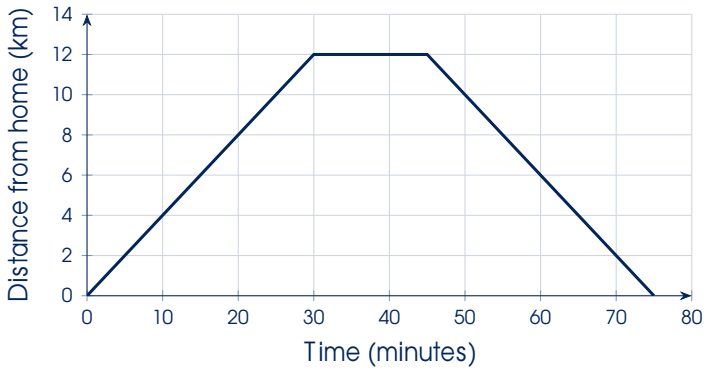
Name ..... Class .....

A14: Graphs in real contexts

Interpret graphs of real situations

20 marks · 25 minutes · Non-calculator

1) Ella cycles from home to a lake and back.



(a) Explain what the horizontal section shows.

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(1)

(b) Show that her speed on the way home was 24 km/h.

(2)

(c) Ella says she cycled faster on the way to the lake. Is she right? Explain.

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(2)

[Question 1: 5 marks]

2) Water is poured at a steady rate into a vase that gets narrower towards the top. Explain why the graph of depth against time gets steeper.

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[Question 2: 2 marks]

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3) The value of a car is $V = 20\,000 \times 0.8^t$ after t years. Explain why the value never reaches zero.

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[Question 3: 2 marks]

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4) A ball's height is $h = 20t - 5t^2$ metres after t seconds. Show that its greatest height is 20 m at $t = 2$

[Question 4: 3 marks]

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5) The graphs of the costs of two phone plans cross. Explain what the crossing point means.

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[Question 5: 2 marks]

6) Kai says a horizontal line on a speed–time graph means the object has stopped. Explain his mistake.

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[Question 6: 2 marks]

7) Explain why a conversion graph passes through the origin.

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[Question 7: 1 marks]

8) Car hire costs $C = 25 + 0.2m$ pounds for m miles. Show that 150 miles costs £55.

[Question 8: 2 marks]

9) What are the units of the gradient of a distance–time graph in km and hours? Explain.

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[Question 9: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	(a) She stopped (b) Shown (c) No	(a) C1. (b) 12 km in 0.5 h (M1); C1. (c) Way out: 12 km in 30 min is also 24 km/h (M1); same speed (C1).
2	Explanation	Same volume each second (C1); narrower part fills faster (C1).
3	Explanation	Each year multiplies by 0.8 (C1); a positive amount times 0.8 is never 0 (C1).
4	Shown	$h = 20 - 5(t - 2)^2$ or symmetry of roots 0 and 4 (M1); $t = 2$ (M1); $h = 20$ (C1).
5	Explanation	Both plans cost the same for that amount (C2).
6	Explanation	It means constant speed (C1); stopped would be speed 0 (C1).
7	Explanation	0 of one unit is 0 of the other (C1).
8	Shown	25 + 30 (M1); C1.
9	km/h	Gradient is km divided by hours, which is speed (C1).