2.3 Algebra: Sequences and Graphs: 30-minute Pack

Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A sequence starts 5, 9, 13, 17, ... Write down the next term.

(1)

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2 The nth term of a sequence is 4n + 1. Work out the 3rd term.

(1)

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3 A straight line has gradient 4 and passes through the point (0, -3).

(a) Write down the equation of the line in the form y = mx + c. **(1)**

.....

(b) A different straight line has gradient -2 and passes through the point (3, 1). Find the equation of this line. **(3)**

.....

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4 A conversion graph is used to change between £ (£) and euros (EUR). The graph is a straight line through the origin, showing that £10 is equivalent to 11.50 euros.

(a) Use the graph information to find how many euros are equivalent to £40. **(2)**

.....

(b) Find how many pounds are equivalent to 23 euros. **(2)**

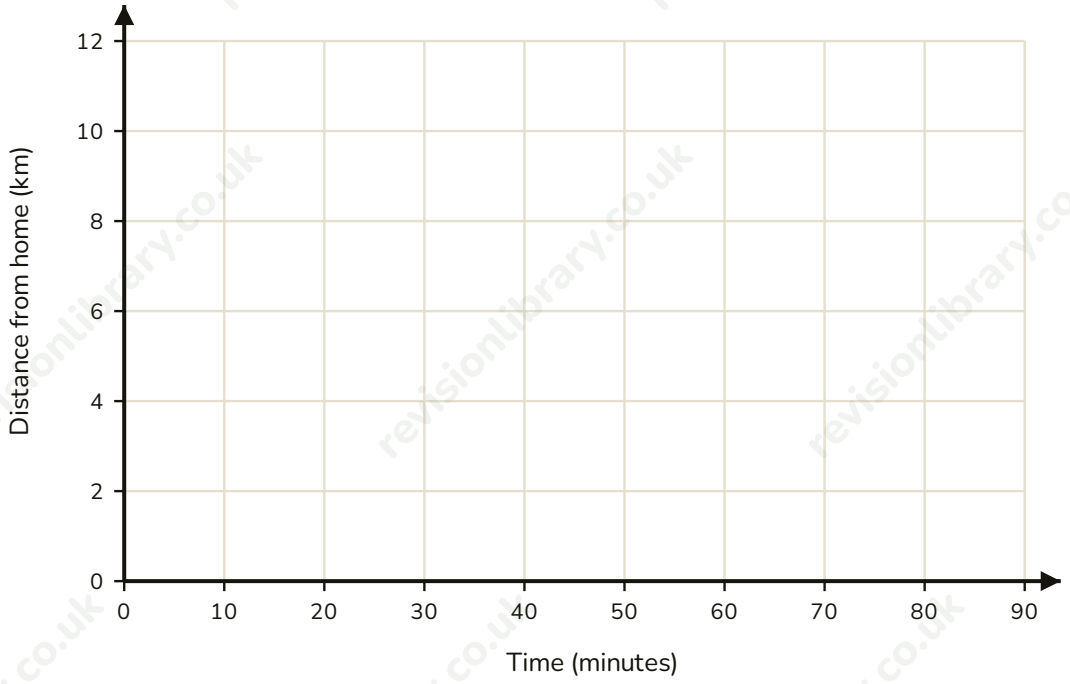
.....

(c) Write down an equation connecting E (euros) and P (pounds), in the form E = kP. **(1)**

.....

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5 Bilal cycles from his home to the shops, a distance of 12 km. He cycles at a constant speed and covers the 12 km in 40 minutes. He stays at the shops for 15 minutes, then cycles home again, covering the 12 km in 30 minutes.



(a) Work out Bilal's average speed, in km/h, on the journey to the shops. **(2)**

.....

(b) Work out Bilal's average speed, in km/h, on the journey home. **(2)**

.....

(c) Work out the total time, in minutes, for the whole trip (there and back, including the stop). **(1)**

.....

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6 Consider the equations $x = 3$, $y = -2$, $y = x$ and $y = -x$.

(a) Which equation gives a vertical line? **(1)**

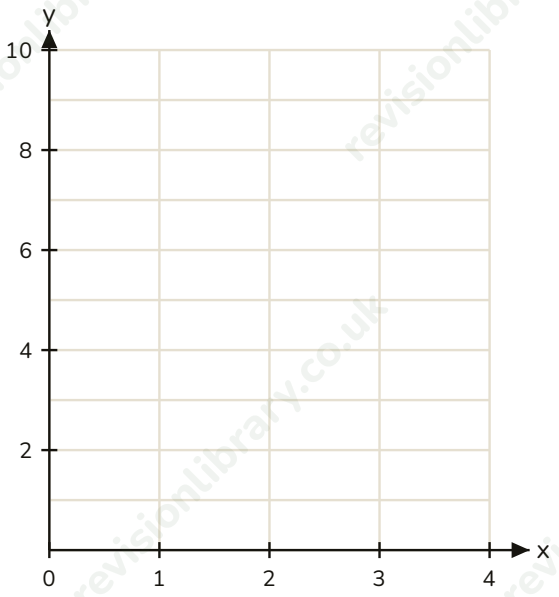
(b) Which equation gives a horizontal line? **(1)**

(c) Which equation gives a line through the origin with positive gradient? **(1)**

(d) Which equation gives a line through the origin with negative gradient? **(1)**

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7 Line A has equation $y = x + 2$. Line B has equation $y = -2x + 8$.



(a) Complete a table of values for Line A and Line B at $x = 0, 1, 2, 3$. **(2)**

(b) By comparing your tables, find the coordinates of the point where Line A and Line B intersect. **(1)**

.....

(c) Check your answer to part (b) algebraically by solving $x + 2 = -2x + 8$. **(2)**

.....

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Mark scheme · 2.3 Algebra: Sequences and Graphs: 30-minute Pack

Question 1

21 cao	B1
Answer: **21**	

Question 2

13 cao	B1
Answer: **13**	

Question 3

(a) y = 4x - 3	B1
(a) Answer: **y = 4x - 3**	
(b) substitution of (3, 1) into y = -2x + c	M1
(b) correct rearrangement to find c = 7	M1
(b) y = -2x + 7 cao	A1
(b) Answer: **y = -2x + 7**	

Question 4

(a) correct method, e.g. 40 x 1.15 or use of scale factor 11.5/10	M1
(a) 46 euros cao	A1
(a) Answer: **46 euros**	
(b) correct method, e.g. 23 / 1.15	M1
(b) £20 cao	A1
(b) Answer: **£20**	
(c) E = 1.15P oe	B1
(c) Answer: **E = 1.15P**	

Question 5

(a) correct method, e.g. 12 / (40/60)	M1
(a) 18 km/h cao	A1
(a) Answer: **18 km/h**	
(b) correct method, e.g. 12 / (30/60)	M1
(b) 24 km/h cao	A1
(b) Answer: **24 km/h**	
(c) 85 minutes cao	B1
(c) Answer: **85 minutes**	

Question 6

(a) x = 3	B1
(a) Answer: **x = 3**	
(b) y = -2	B1
(b) Answer: **y = -2**	
(c) y = x	B1
(c) Answer: **y = x**	
(d) y = -x	B1
(d) Answer: **y = -x**	

Question 7

(a) Line A values 2, 3, 4, 5 all correct	B1
(a) Line B values 8, 6, 4, 2 all correct	B1
(a) Answer: **Line A: 2, 3, 4, 5; Line B: 8, 6, 4, 2**	
(b) (2, 4) cao	B1
(b) Answer: **(2, 4)**	
(c) correct equation x + 2 = -2x + 8 solved to x = 2	M1
(c) y = 4 found and matches (2, 4)	A1
(c) Answer: **x = 2, y = 4, confirming (2, 4)**	

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