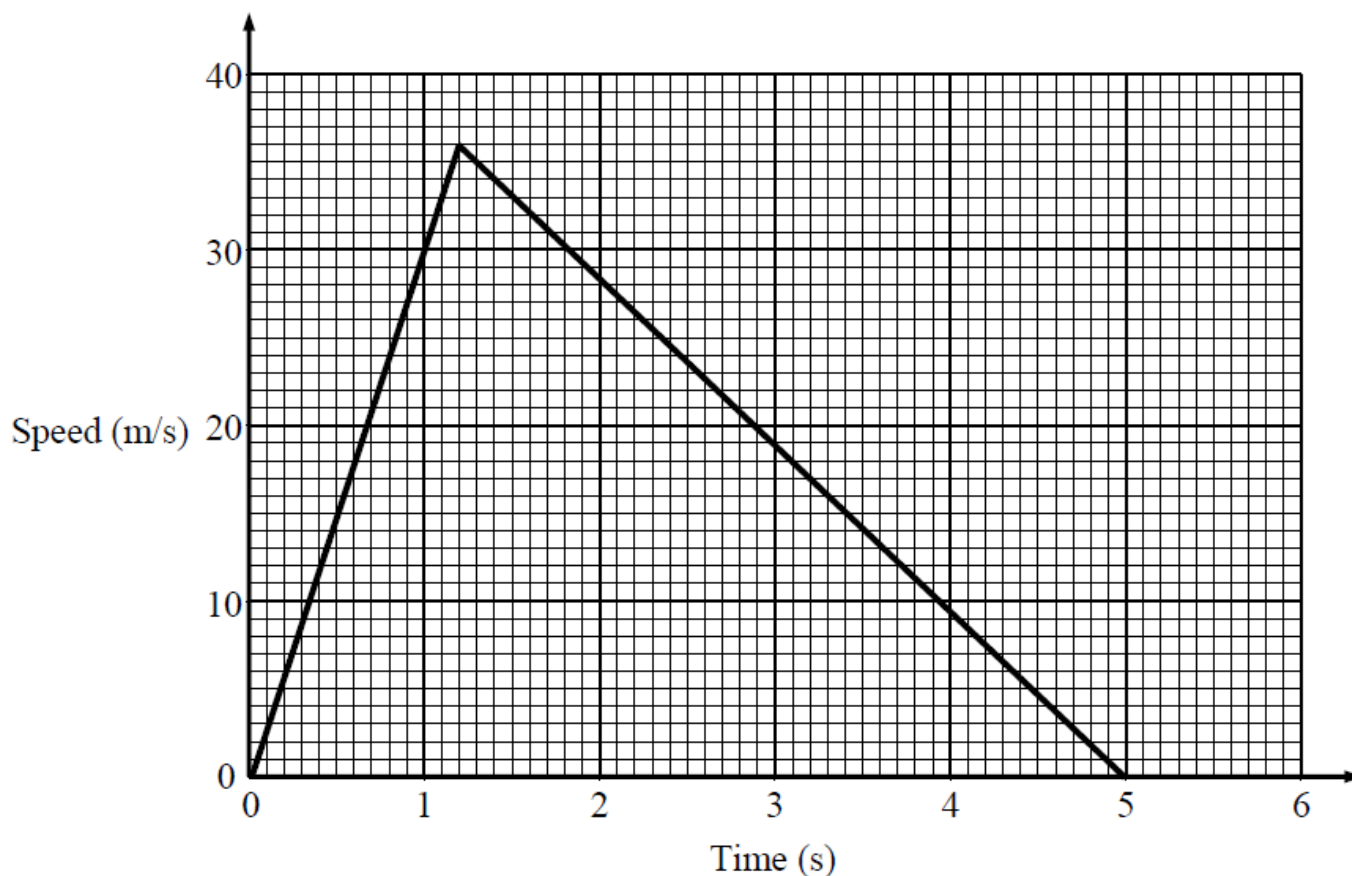


Level 3 Algebra – Distance Time Graphs - Answers

June 2013 - Question 19

Question	Working	Answer	Mark	Notes
19	Line drawn from (0, 0) to (1.2, 36) Line drawn from (1.2, 36) to (5, 0)	graph drawn	3	M1 for suitable scaling of axes to include ranges 0 to 5 seconds and 0 to 30 m/s M1 for line with correct gradient to represent acceleration or line with correct gradient to represent deceleration or line with negative gradient to the point (5, 0) A1 fully correct graph

Q19



Jan 2014 - Question 20

Question	Working	Answer	Mark	Notes
20 (a)		between 10 38 and 10 39	1	B1 for between 10 38 and 10 39 (accept "in the first minute of the journey" oe)
(b)	$\frac{12}{2 \times 60}$	$\frac{1}{10}$	2	M1 for attempt to find gradient by using a right angled triangle or using the formula or using $\frac{12 (m/s)}{2(min)}$ or $\frac{12}{120}$ A1 for $\frac{1}{10}$ oe
(c)	$\frac{1}{2} \times 60 \times 26$ $\frac{1}{2} \times (26 + 38) \times 120$ 780 + 3840	4620	3	M1 for attempt to find the area under the graph, eg $\frac{1}{2} \times 60 \times 26$, $\frac{1}{2} \times (26 + 38) \times 120$ M1 for complete and correct method A1 cao (SCB1 for 77 if no other marks awarded)

Jan 2015 - Question 4

Question	Working	Answer	Mark	Notes
4 (a)		2	1	B1 cao
(b)		1.15 – 1.30	1	B1 for 1.15 -1.30
(c)	$2 \times \text{maximum height} - 2$	16.6	2	M1 for $9.2 - 9.4$ or $7.2 - 7.4$ or $18.4 - 18.8$ A1 for 16.5 – 16.7

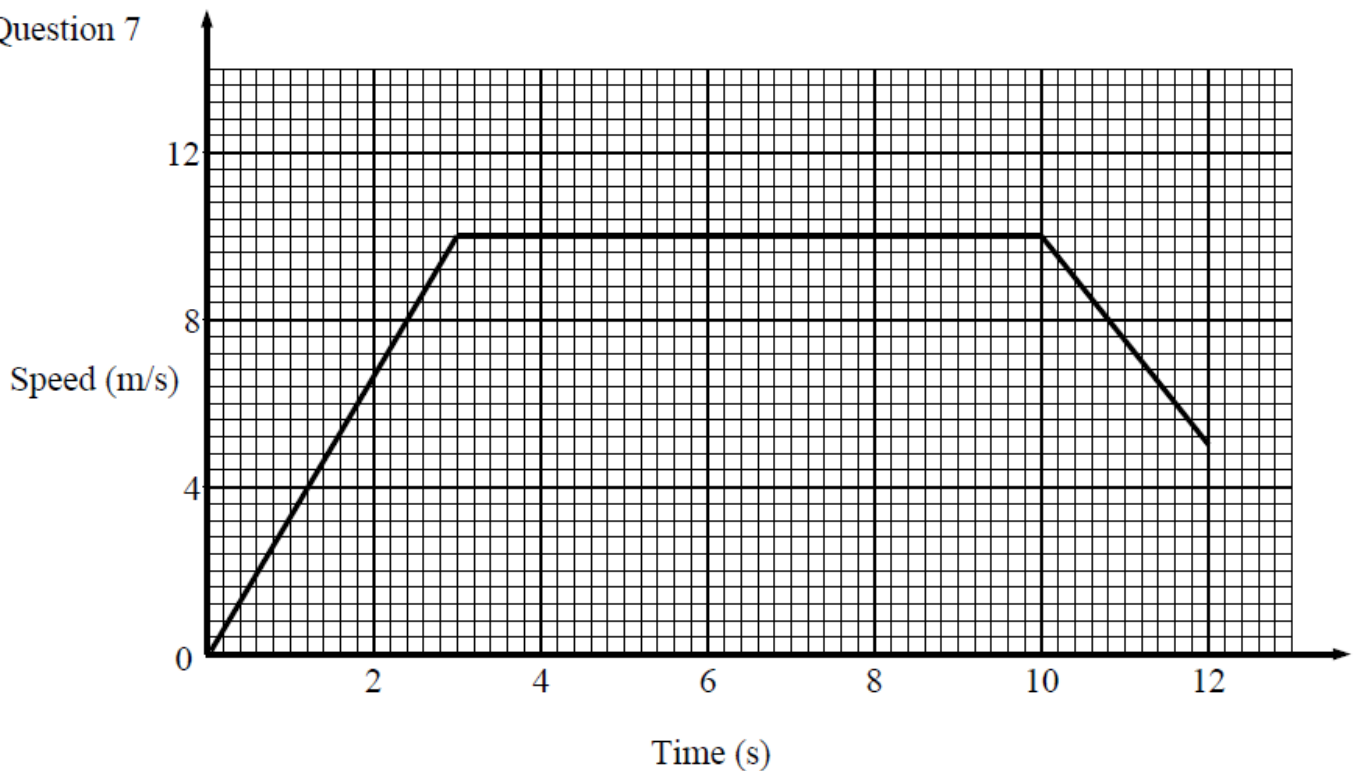
June 2015 - Question 18

18 (a)	$15 \div 20$		0.75	2	M1 complete method to find the gradient A1 for 0.75
(b)			Line from (20,15) to (35,15)	1	B1 correct line to 35 seconds
(c)	$0.5 \times 10 \times 7.5$		37.5	2	M1 for method to calculate correct area A1 37.5 oe

Jan 2016 - Question 7

Question	Working	Answer	Mark	Notes
7 (a)		$\frac{10}{3}$	1	B1 for $\frac{10}{3}$ oe
(b)	$(\frac{1}{2} \times 3 \times 10) + (7 \times 10)$ $= 15 + 70$	85	3	M1 for a correct method to calculate an area representing a relevant distance M1 for correct and complete method A1 for 85
(c)		line drawn from (10, 10) to (12, 5)	2	M1 for line drawn from (10, 10) with gradient -2.5 A1 cao

Question 7



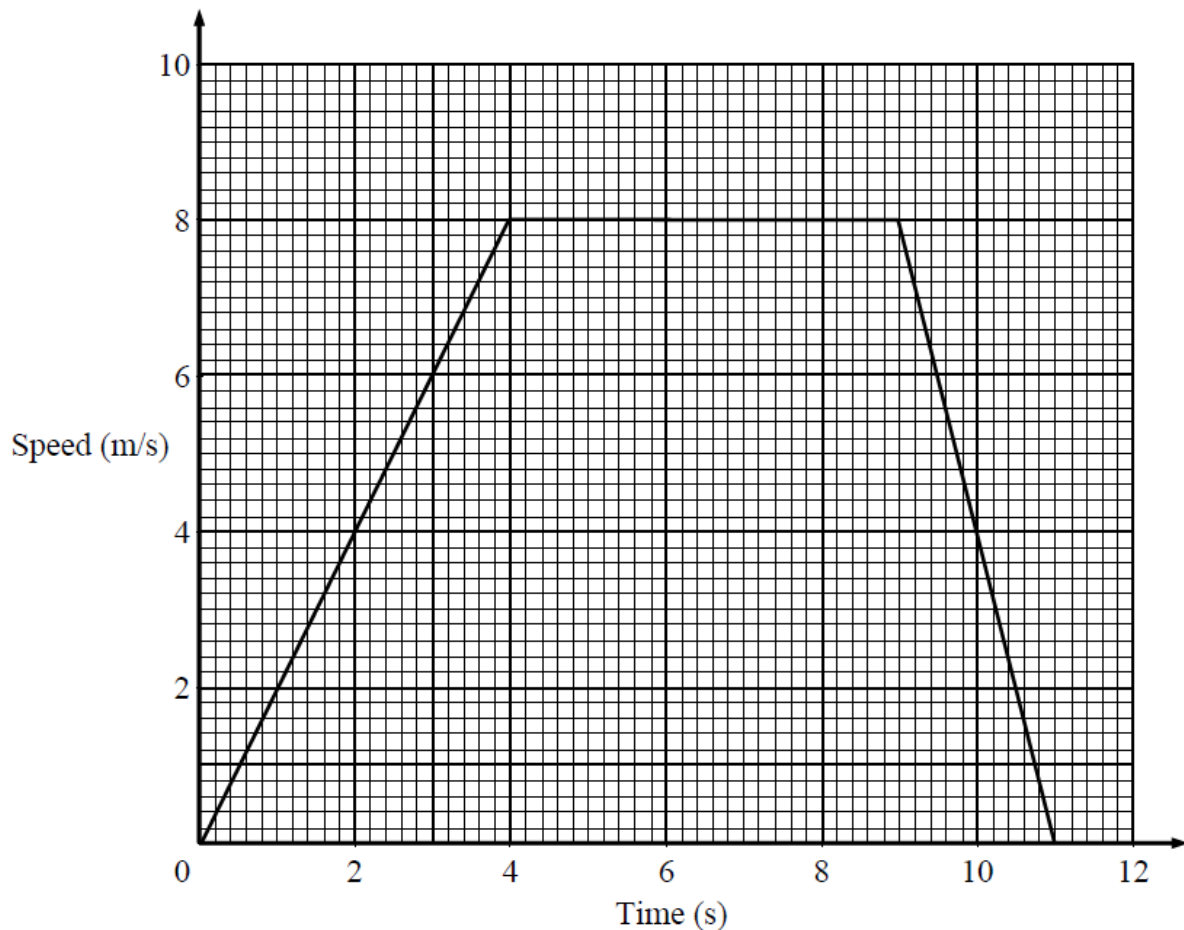
June 2016 - Question 20

Question	Working	Answer	Mark	Notes
20 (a)		10 30 to 10 45	1	B1 cao
(b)		360	2	M1 for a method to find the gradient, eg $\frac{90}{0.25}$, $\frac{90}{15}$ A1 cao
(c)	$\frac{1}{2} \times 90 \times \frac{1}{4} + \frac{1}{2}(90 + 120) \times \frac{1}{2}$ $= 11.25 + 52.5$ or $\frac{1}{2} \times 90 \times \frac{1}{4} + \frac{1}{2} \times 90 + \frac{1}{2} \times 30 \times \frac{1}{2}$ $= 11.25 + 45 + 7.5$	63.75	2	M1 a complete method to find the correct area A1 cao

Jan 2017 - Question 11,16

Question	Working	Answer	Mark	Notes
11 (a)		Speed	1	B1 for speed (of the particle) oe
(b)		Tangent drawn	1	B1 for tangent drawn at $t = 0.3$
16 (a)		Graph drawn	4	B1 for appropriate scaling and labelling of graph M1 for line drawn with gradient 2 or a line drawn with gradient -4 M1 for line from "(4, 8)" showing constant speed for 5 seconds A1 for fully correct and complete graph
(b)	$(\frac{1}{2} \times 3 \times 6)$	9m	2	M1 for a correct method to calculate area A1 (accept 9)

Q16



June 2017 - Question 18

Question	Working	Answer	Mark	Notes
18		Graph drawn	2	B1 for line from (0, 0) to (30, 20) B1 for a complete and fully correct graph

Jan 2018 - Question 16

Question	Working	Answer	Mark	Notes
16 (a)		127.5	3	M1 for stating area under the graph represents the distance travelled or calculate one area M1 for complete method to calculate total area A1 oe
(b)		3.75	2	M1 for a method to find gradient A1 oe

June 2018 - Question 17

Question	Working	Answer	Mark	Notes
17 (a)		2.5	2	M1 for method to find the gradient eg sight of right angled triangle with their height divided by their base A1 2.5 or $\frac{5}{2}$ or $2\frac{1}{2}$
(b)	$\frac{1}{2} \times 5 \times 12.5$ $+\frac{1}{2} \times (12.5 + 15) \times 5$ $+ 10 \times 15$ $+\frac{1}{2} \times 8 \times 15$ $31.25 + 68.75 + 150 + 60$	310	3	M1 for method to work out an area under the graph, eg $\frac{1}{2} \times 5 \times 12.5 (= 31.25)$ M1 for a complete method to work out the area under the graph A1 cao
(c)		8	1	B1 cao

June 2019 - Question 12

12 (a)		0	1	B1 cao
(b)		Distance covered	1	B1 explanation
(c)		20	1	B1 cao

Jan 2020 - Question 13

Question	Working	Answer	Mark	Notes
13 (a)(i)		82.4	3	M1 for using values, eg ($v_0 =$) 0, ($v_1 =$) 1 to 1.2, ($v_2 =$) 3.6, ($v_3 =$) 8, ($v_4 =$) 16 (condone 1 error) M1(dep M1) for substituting "values" and $h = 4$ into trapezium rule, eg $\frac{1}{2} \times 4 \{ (0 + 16) + 2(1 + 3.6 + 8) \}$ A1 for 82.4 to 83.2 oe from correct values
(ii)		distance	1	B1 for distance travelled (between 0 seconds and 16 seconds)
(b)(i)		Tangent drawn	1	B1 professional judgement
(ii)		1.4 – 1.5	2	M1(dep on B1 in (b)(i)) for method to find the gradient eg sight of right angled triangle with their height divided by their base A1 for 1.4 – 1.5 oe or ft
(c)		Acceleration (of the particle at $t = 12$)	1	B1 oe

Jan 2021 - Question 17

17	(a)(i)		6	1	B1 cao
	(ii)		0	1	B1 cao
	(b)		1.5 – 1.9	2	M1 tangent drawn at $t = 3$ A1 for value in the range 1.5 – 1.9
	(c)		72	3	M1 for using 5 strips to find the area between $t = 0$ and $t = 10$ and states values ($v_0 =$) 0, ($v_1 =$) 5.6, ($v_2 =$) 8.8, ($v_3 =$) 10 ($v_4 =$) 8.8, ($v_5 =$) 5.6 (condone 1 error) M1(dep) for substituting “values” and $h = 2$ into trapezium rule, eg $\frac{2}{2}((0 + 5.6) + 2(5.6 + 8.8 + 10 + 8.8))$ A1
	(d)		Distance (travelled between $t = 0$ and $t = 10$)	1	B1 explanation

Jan 2022 - Question 7

Question	Working	Answer	Mark	Notes
7 (a)		0	1	B1 cao
(b)		2	2	M1 for method to find area under graph, eg 6×20 or $6 \times \frac{1}{3}$ A1
(c)		Correct line drawn	2	M1 for straight line with positive gradient drawn through (0, 0) A1 correct line drawn between (0, 0) and (20, 2) with clear labelling on axis eg 2 and distance

June 2022 - Question 22

22	(a)		27	1	B1 cao
	(b)		80	2	M1 for recognition that the gradient of the first section of the graph represents the acceleration eg $\frac{20}{15}$ or $\frac{20}{0.25}$ A1 cao
	(c)		Description	1	B1 for reference to distance without contradiction

June 2023 - Question 16

16	(a)		12	3	M1 for correct method to calculate a relevant area, eg $\frac{1}{2} \times 2 \times 8$ or 8×0.5 M1 for a complete method, eg $\frac{1}{2} \times 2 \times 8 + 8 \times 0.5$ A1 cao
	(b)		$\frac{8}{3}$	2	M1 for complete method to find the gradient, eg $(-)\frac{8-0}{5.5-2.5}$ or for 2.6 A1 for $\frac{8}{3}$ oe, accept 2.7 or better, accept + or –

Jan 2024 - Question 21

21	(a)	7.6	1	B1 cao
	(b)	7	1	B1 for 6.8 – 7.2
	(c)	18 – 18.4	2	M1 for recognising area gives distance, eg 9×2 A1 for 18 – 18.4