

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	if the distance–time graph is horizontal — the object is not moving if the line is steep — the object is moving quickly if the line is not very steep — the object is moving slowly	one mark for one line correct two marks for all three lines correct	2	AO1 6.5.4.1.5
01.2	D		1	AO1 6.5.4.1.5
01.3	A		1	AO1 6.5.4.1.5
01.4	B		1	AO1 6.5.4.1.5
01.5	accelerating		1	AO1 6.5.4.1.5
02.1	car A the gradient of the line is greatest/steepest line		1 1	AO2 6.5.4.1.4
02.2	car C the line is horizontal		1 1	AO2 6.5.4.1.4
02.3	car C the line is curved/not a straight line/not a constant gradient or slope		1 1	AO2 6.5.4.1.4
02.4	car A it travelled the same distance in the shortest time		1 1	AO2 6.5.6.1.4
02.5	distance = speed × time		1	AO1 6.5.6.1.4

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02.6	4 minutes = 240 seconds, 7.5 km = 7500 m 7500 = speed × 240 speed = $\frac{7500}{240}$ = 31 (31.25 m/s)	accept 315 with no working for the two calculation marks accept answer that matches car given in question 02.4	1 1 1 1	AO1 x 1 AO2 x 2 6.5.6.1.4
03.1	20m to the right		1	6.5.4.1.1
03.2	displacement, distance magnitude, distance magnitude		1 1 1	AO1 6.5.4.1.1 6.5.4.1.3
03.3	10 m + 20 m = 30 m		1	AO1 6.5.4.1.1 6.5.4.1.3
03.4	10 - 20 = -10 m or -10 + 20 = 10 m 10 m to the right		1 1	AO2 6.5.4.1.1 6.5.4.1.3
04.1	1.5		1	AO1 6.5.4.1.2
04.2	speed = $\frac{\text{distance}}{\text{time}}$		1	AO1 6.5.4.1.2

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04.3	26 miles = 41 834 metres 1 hour and 14 minutes = 134 minutes = 8040 seconds $\frac{41834}{8040}$ = 5.2 m/s			AO2 6.5.4.1.2
04.4	fitness	accept answer around running having trained	1	AO1 6.5.4.1.2
04.5	$\frac{27000}{6}$ = 4500 seconds = 75 minutes		1 1 1	AO1 x 1 AO2 x 2 6.5.4.1.2
05.1	straight line of best fit		1	AO3 6.5.4.1.2
05.2	point plotted at (15, 0.08) curved line of best fit		1 1	AO2 x 1 AO3 x 1 6.5.4.1.2
05.3	A		1	AO3 6.5.4.1.2
05.4	no/will be different cars travelled different distance in the same time	accept calculations of both average speeds for two marks	1 1	AO2 AO3 6.5.4.1.2

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06.1	1.5 m/s		1	AO1 6.5.4.1.2
06.2	distance = speed × time		1	AO1 6.5.4.1.2
06.3	3 × 20 = 30 (m)		1 1	AO2 6.5.4.1.2
06.4	average changes		1 1	AO1 6.5.4.1.2
07.1	acceleration = $\frac{5-2}{6}$ = 0.5 m/s ²		1 1 1	AO1 AO2 6.5.4.1.5
07.2	decelerating decreasing	accept accelerating (negative acceleration)	1 1	AO2 6.5.4.1.5
07.3	$\frac{\text{change in } y}{\text{change in } x} = \frac{20}{10}$ = 2 m/s ²		1 1	AO2 6.5.4.1.5
08.1	the point at 4.2 cm/4.4 N		1	AO3 6.5.3
08.2	force = spring constant × extension		1	AO1 6.5.3

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08.3	5.6 cm = 0.056 m 4.5 = spring constant x 0.056 $\text{spring constant} = \frac{4}{0.056}$ = 80 N/m (or 0.8N/cm)		1 1 1 1	AO1 x 1 AO2 x 3 6.5.3
08.4	yes this is where the line starts to curve/bend/is no longer a straight line		1 1	AO3 6.5.3
09.1	B or D		1	AO2 6.5.4.1.4
09.2	$\text{speed} = \frac{\text{distance}}{\text{time}}$		1	AO1 6.5.4.1.2
09.3	10 minutes = 600 seconds $\frac{400}{600}$ = 0.67 m/s		1 1 1	AO1 AO2 6.5.4.1.2 6.5.4.1.4
09.4	between 14 mins and 22 mins the line is steepest		1 1	AO3 6.5.4.1.4
09.5	1000 m		1	AO3 6.5.4.1.4

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10.1	distance and speed are scalars		1	AO1 6.5.1.1 6.5.6.1.1 6.5.6.1.3
10.2	20 - 10 = 10 km south	accept ten with no working for the one calculation mark	1 1	AO2 6.5.6.1.1
10.3	displacement is the position relative to a particular point distance is the total distance that you move, which may not be the same as displacement if you change direction		1 1	AO1 AO2 6.5.6.1.1
10.4	velocity the cyclist is giving both a magnitude and a direction		1 1	AO1 AO2 6.5.6.1.1