

Question			Answer	Marks	AO	Guidance	
5	(a)		$2a + b = 87, 5a + b = 108$	B1	3.3	State two correct equations soi	As far as eliminating one variable M1 implied by correct final answer, if no method shown
			$3a = 21$	M1	3.1a	Attempt to solve their two linear simultaneous equations	
			$a = 7$	A1	1.1	Obtain correct value for a	
			$14 + b = 87$ $b = 73$	A1	1.1	Obtain correct value for b	
			Alternative method (graphical approach)				M1 implied by correct a Intercept of line or algebraic method M1 implied by correct b
			gradient = $\frac{108-87}{5-2}$ oe	M1		Attempt gradient of line	
			gradient = $a = 7$	A1		Obtain $a = 7$	
			$87 = 14 + b$ or $108 = 35 + b$	M1		Attempt to find value for b	
			$b = 73$	A1		Obtain $b = 73$	
				[4]			
5	(b)	(i)	$h = 7 \times 4 + 73$	M1	3.4	Substitute $t = 4$ into their model	Or 1.01 (m)
			$= 101 \text{ (cm)}$	A1FT	1.1	Condone no units, but A0 if incorrect eg 101m FT their model	
				[2]			

Question			Answer	Marks	AO	Guidance	
5	(b)	(ii)	Model only for ‘average’ height so will be variations Sam could be exactly 4 years old or 4 years and 364 days – their height won’t stay the same throughout	B1 [1]	3.5a	Any sensible reason as to why the model for ‘average height’ may, or may not, be accurate in predicting Sam’s height eg height varies a lot between children of the same age eg could depend on different diets and lifestyle eg might be accurate as long as Sam is ‘average’ See appendix for exemplars	B0 for interpolation, including comments about Sam’s height being between 87cm and 108cm
5	(c)		Increase in growth unlikely to continue as a linear model	B1 [1]	3.5b	Any sensible comment eg growth spurt at 12 due to puberty eg people grow quicker when younger See appendix for exemplars	Extrapolation not reliable B0 for comments about individual variations as question refers to ‘average height’ model

Exemplar responses for Q5(b)(ii)

Response	Mark	Comment
Doesn't take into account factors that affect height, such as genetics	B1	Assume relevant to Sam
Not accurate as not all people will be the same height at the same age.	B1	Implies that Sam may not be the average height.
Not likely to be accurate as equation only predicts the average height. People have different heights so unlikely Sam has exactly the same height as the average.	B1	Comment that model is about average height and Sam may not be average
Sam may have a condition that stunts his growth. Therefore, he may not have the average height of a 4 year old.	B1	Comment that model is about average height and Sam may not be average
Not accurate as a lot of children will be below or above the average height.	B1	Comment that model is about average height and Sam may not be average
It is an average height prediction of 4 yr olds, so won't be exactly accurate	B1	Implies Sam may differ from the model
Model doesn't consider if Sam has just turned 4 or is nearly 5.	B1	Comment dealing with Sam's age not being a discrete value
Inaccurate as children are unlikely to grow at a constant rate throughout their life.	B0	Not relevant to predicting Sam's height at 4
Accurate since it is within the range of data.	B0	Interpolation
Not quite accurate as things like gender could affect height.	B0	Commenting on model not prediction
Inaccurate as children are unlikely to grow at a constant rate throughout their life.	B0	Not relevant to predicting Sam's height at 4

Exemplar responses for Q5(c)

Response	Mark	Comment
157cm is a very large average for a 12 year old as growth slows and comes to a stop at an age which this model doesn't show.	B1	For second comment acknowledging a change in the growth rate.
At 12 children start having growth spurts so don't grow at the same rate as those aged 2 - 5	B1	References change in growth rate
The child will not grow at the same rate throughout childhood	B1	References change in growth rate for children
Does not take into account the gender of the child as boys and girls can have growth spurts at different ages due to puberty	B1	References growth rate changing in all children due to puberty (only gender is not enough)
12 year olds will grow at a slower rate than toddlers	B1	References change in growth rate
Child may stop growing at age 12	B1	References change in growth rate
Children do not grow at a constant speed	B0	Does not reference a change in the model and seems to imply original model is wrong. "...continue to grow at constant speed.." would be B1
12 years of age is when children tend to hit puberty therefore the average height tends to vary very much	B0	Does not reference change in growth rate
$7(12) + 73 = 157\text{cm}$ which is too tall for a 12 year old	B0	Does not refer to a limitation of the model
Around 12 years old the different sexes start to display large differences in height so this would not be an accurate average	B0	Does not reference growth rate
Some children may grow slower than others due to different lifestyle	B0	References individual children rather than the average
At puberty boys tend to grow faster than girls	B0	Gender difference is not relevant as model is about average
Does not take into account the gender of the child	B0	Gender difference is not relevant as model is about average