Question	Scheme	Marks	AOs
7 (a)	Uses or implies that $V = ad + b$	B1	3.3
	Uses both $40 = 80a + b$ and $25 = 200a + b$ to get either a or b	M1	3.1b
	Uses both $40 = 80a + b$ and $25 = 200a + b$ to get both a and b	dM1	1.1b
	$\Rightarrow V = -\dfrac{1}{8}d + 50$ o.e.	A1	1.1b
		(4)	
(b)(i)(ii)	States **either** that the initial volume was 50 {litres} **or** that the distance travelled was 400 {km}	B1 ft	3.4
	Attempts to find **both** answers by solving $$0 = -\frac{1}{8}d + 50 \quad \textbf{and} \quad 0 = 400 - 8V$$	M1	3.4
	States **both** that the initial volume was 50 litres **and** that the distance travelled was 400 km	A1	3.2b
		(3)	
(c)	States, e.g., "Poor model" as 320km is significantly less than 400 km.	B1ft	3.5a
		(1)	
		(8 marks)	

Notes:

(a)

B1: Attempts a linear model, i.e., uses or implies that $V = ad + b$ or $d = mV + c$ which may be in terms of, e.g., y and x

M1: Awarded for translating the problem in context and starting to solve.

It is scored when both $40 = 80a + b$ and $25 = 200a + b$ are written down and the candidate proceeds to find either a or b

Alternatively, scored when both $200 = 25m + c$ and $80 = 40m + c$ are written down and the candidate proceeds to find either m or c

You may just see $\pm\dfrac{25 - 40}{200 - 80}$ or $\pm\dfrac{200 - 80}{25 - 40}$ or 8km for every litre o.e. so check carefully for attempts at the gradient.

dM1: Uses $40 = 80a + b$ and $25 = 200a + b$ to find both a and b (or m and c)

Alternatively, if the gradient is found, proceeds to use one of the bullet points to find c, with the usual rules applying for straight line (coordinates must be used the correct way round, i.e., they would lead to the correct answer).

A1: $V = -\dfrac{1}{8}d + 50$ or exact equivalent, e.g., $d = 400 - 8V$ or $d + 8V = 400$ etc.

Withhold this mark if their answer is not stated in terms of V and d

Mark parts (b)(i) and (b)(ii) together. Note that they may restart and not use an equation.

B1ft: States **either** the initial volume was 50 {litres} **or** the distance travelled was 400 {km} but it must be clearly for the correct part, e.g., $V = 50$.

Follow through on their a and b (or m and c). This may be scored from $40 + \dfrac{80}{8}$ or $\dfrac{400}{8}$

M1: Complete attempt to find both answers. Must be from a **linear** model.

Substitutes $V = 0$ and finds d by attempting to solve their $0 = -\dfrac{1}{8}d + 50$

and substitutes $d = 0$ and finds V by attempting to solve their $0 = 400 - 8V$

Note that one (or both) of these attempts may be implied by correct values ft their equations.

A1: States both 50 litres and 400 km. Units are required to be correct for both values.
It must be clear which answer applies to each part, which may be simply by correct units.
Accept *l* or *L* for litres.

(c)

B1ft: Main Scheme (comparing (b)(ii) with 320)

This mark is only available for answers from (b)(ii) if they are < 290 **or** > 350

Concludes **poor** model (o.e.) and states that 320 is **significantly** less than "400" (o.e.)

Note that $320 \ll 400$ so it is a poor model is acceptable.

It is not sufficient to say $320 \neq 400$ or $320 < 400$ so it is a poor model.

Condone "the 400 is **too** far away from 320".

Alternative (finding remaining fuel after 320 km)

States **poor** model (o.e.) because after 320 km the model predicts there will be 10 litres left, which is **significantly** more than an empty tank / **much** too high compared to an empty tank (o.e.).