Cambridge Assessment International Education

Cambridge International AS & A Level

MATHEMATICS **9709/42**

Paper 4 Mechanics **October/November 2022**

MARK SCHEME

Maximum Mark: 50

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:
Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:
Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:
Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:
Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:
Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:
Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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	Mathematics Specific Marking Principles
1	Unless a particular method has been specified in the question, full marks may be awarded for any correct method. However, if a calculation is required then no marks will be awarded for a scale drawing.
2	Unless specified in the question, answers may be given as fractions, decimals or in standard form. Ignore superfluous zeros, provided that the degree of accuracy is not affected.
3	Allow alternative conventions for notation if used consistently throughout the paper, e.g. commas being used as decimal points.
4	Unless otherwise indicated, marks once gained cannot subsequently be lost, e.g. wrong working following a correct form of answer is ignored (isw).
5	Where a candidate has misread a number in the question and used that value consistently throughout, provided that number does not alter the difficulty or the method required, award all marks earned and deduct just 1 mark for the misread.
6	Recovery within working is allowed, e.g. a notation error in the working where the following line of working makes the candidate's intent clear.

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Mark Scheme Notes

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method mark, awarded for a valid method applied to the problem. Method marks are not lost for numerical errors, algebraic slips or errors in units. However, it is not usually sufficient for a candidate just to indicate an intention of using some method or just to quote a formula; the formula or idea must be applied to the specific problem in hand, e.g. by substituting the relevant quantities into the formula. Correct application of a formula without the formula being quoted obviously earns the M mark and in some cases an M mark can be implied from a correct answer.

A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. Accuracy marks cannot be given unless the associated method mark is earned (or implied).

B Mark for a correct result or statement independent of method marks.

DM or **DB** When a part of a question has two or more 'method' steps, the M marks are generally independent unless the scheme specifically says otherwise; and similarly, when there are several B marks allocated. The notation DM or DB is used to indicate that a particular M or B mark is dependent on an earlier M or B (asterisked) mark in the scheme. When two or more steps are run together by the candidate, the earlier marks are implied and full credit is given.

FT Implies that the A or B mark indicated is allowed for work correctly following on from previously incorrect results. Otherwise, A or B marks are given for correct work only.

- A or B marks are given for correct work only (not for results obtained from incorrect working) unless follow through is allowed (see abbreviation FT above).
- For a numerical answer, allow the A or B mark if the answer is correct to 3 significant figures or would be correct to 3 significant figures if rounded (1 decimal place for angles in degrees).
- The total number of marks available for each question is shown at the bottom of the Marks column.
- Wrong or missing units in an answer should not result in loss of marks unless the guidance indicates otherwise.
- Square brackets [ ] around text or numbers show extra information not needed for the mark to be awarded.

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Abbreviations

AEF/OE	Any Equivalent Form (of answer is equally acceptable) / Or Equivalent
AG	Answer Given on the question paper (so extra checking is needed to ensure that the detailed working leading to the result is valid)
CAO	Correct Answer Only (emphasising that no 'follow through' from a previous error is allowed)
CWO	Correct Working Only
ISW	Ignore Subsequent Working
SOI	Seen Or Implied
SC	Special Case (detailing the mark to be given for a specific wrong solution, or a case where some standard marking practice is to be varied in the light of a particular circumstance)
WWW	Without Wrong Working
AWRT	Answer Which Rounds To

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Question	Answer	Marks	Guidance
1	Work done by cyclist = 50 × 100 (= 5000 J)	**B1**	
	Their $5000 - 3560 = \frac{1}{2}m \times 6^2$	**M1**	Work energy equation. Three terms. Allow sign errors. Dimensionally correct.
	mass = 80 kg	**A1**	
		3	
	SC: Acceleration considered as a constant		
	$6^2 = 0 + 2a \times 50$ $[\Rightarrow a = 0.36]$ $100 - \frac{3560}{50} = m \times \textit{their}\, 0.36$	**M1**	From use of $v = 6$, $u = 0$, $s = 50$. Must be using correct suvat formulae. For equation involving mass using N2L with three terms. Allow sign errors in N2L.
	mass = 80 kg	**A1**	

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Question	Answer	Marks	Guidance
2(a)	$R = 0.4g\cos 30\ \left[=2\sqrt{3}\right]$ or F or $\mu R = 0.4g\sin 30\ \left[=2\right]$	**B1**	Use of m instead of 0.4 condoned.
	$0.4g\sin 30 - \mu\ 0.4g\cos 30 = 0$	**M1**	For using $F = \mu R$. Allow sin/cos mix. Both must be different components of their weight only, not a 2 term R. Allow sign errors. Allow g omitted.
	$\mu\left[=\dfrac{4\sin 30}{4\cos 30}\right] = \dfrac{1}{3}\sqrt{3}$ or $\dfrac{\sqrt{3}}{3}$.	**A1**	**AG** (exact answer only) If zero scored then **SC B1** for [Angle of friction = 30° so] μ = tan 30 = $\dfrac{1}{3}\sqrt{3}$. Allow full marks if using m in place of 0.4 or W in place of mg or $0.4g$ A0 for $\mu = 0.577\ldots = \dfrac{1}{3}\sqrt{3}$, but A1(ISW) for $\mu = \dfrac{1}{3}\sqrt{3} = 0.577\ldots$
		3	

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Question	Answer	Marks	Guidance
2(b)	$7.2 - 0.4g\sin 30 - F = 0.4a$	**M1**	Newton's second law. Four terms. Second term must be a component of their weight. $F \neq 0$ and $F \neq \mu$. Allow sin/cos mix. Allow sign errors. F must be a numerical expression May use their F from part **(a)**.
	$a = 8$	**A1**	
	$1 = 0 + \frac{1}{2} \times (\textit{their}\ \text{positive}\ 8) \times t^2$	**M1**	For use of constant acceleration formula(e) and solving for t. $a \neq \pm 10, a \neq \pm g$. Allow if a is negative in part **(a)** and use $\lvert a \rvert$ here.
	Time = 0.5 s	**A1**	
		4	

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Question	Answer	Marks	Guidance
3	Attempt to resolve either direction	**M1**	Correct number of terms. Allow sin/cos mix. Allow sign errors. Allow g missing.
	$0.3g + T\cos\alpha° - 4\sin 60° = 0$ $(T\cos\alpha° = 0.464\ldots)$	**A1**	OE
	$T\sin\alpha° - 4\cos 60° = 0$ $(T\sin\alpha° = 2)$	**A1**	OE If the two Ts are different, award maximum A1A0 unless subsequently stated that the two Ts are the same.
	$\alpha = \tan^{-1}\left(\dfrac{4\cos 60°}{4\sin 60° - 0.3g}\right) = \tan^{-1}\left(\dfrac{2}{0.464\ldots}\right)$	**M1**	Attempt to solve for α. No missing/extra terms. Allow g missing. Must get to '$\alpha =$'.
	$T = \dfrac{4\cos 60}{\sin(their\alpha)} = \sqrt{(4\cos 60°)^2 + (4\sin 60° - 0.3g)^2} = \sqrt{2^2 + (0.464\ldots)^2}$	**M1**	OE Attempt to solve for T. No missing/extra terms. Allow g missing. Must get to '$T =$'.
	Tension = 2.05 N $\alpha = 76.9$	**A1**	For both AWRT 2.05, 76.9 (Tension = 2.05314… N $\alpha = 76.9356\ldots$)
	Alternative method for Q3 using triangle of forces		
	Attempt at cosine rule from triangle of forces	**M1**	Must use lengths 4 and $0.3g$ with a suitable angle. Allow g missing.
	$T^2 = 4^2 + (0.3g)^2 - 2\times 4\times(0.3g)\times\cos 30$	**A1**	
	Tension = 2.05	**A1**	Tension = 2.05314… AWRT 2.05
	Attempt at sin rule	**M1**	Must have angle 30° and another angle in terms of α with correct numerators, but allow g missing.
	$\dfrac{Their\,T}{\sin 30} = \dfrac{4}{\sin(180-\alpha)}$ or $\dfrac{Their\,T}{\sin 30} = \dfrac{0.3g}{\sin(\alpha - 30)}$	**A1**	Correct. Allow $\sin\alpha$ instead of $\sin(180-\alpha)$.
	$\alpha = 76.9$	**A1**	$\alpha = 76.9356\ldots$ AWRT 76.9

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Question	Answer	Marks	Guidance
3	**Alternative method for Q3 using Lami's theorem**		
	Attempt at Lami's theorem	**M1**	Must have numerators correct and at least one angle correct. Allow *g* missing.
	$\frac{4}{\sin\alpha}=\frac{0.3g}{\sin(210-\alpha)}=\frac{T}{\sin(150)}$	**A1 A1**	A1 for two parts second A1 for all three.
	$\alpha=\tan^{-1}\left(\frac{4\sin 210}{0.3g+4\cos 210}\right)$	**M1**	For solving for α using compound angle formula. Must be correct for their angles. Allow *g* missing.
	$T=\frac{4\sin(150)}{\sin\alpha}$ or $T=\frac{0.3g\sin(150)}{\sin(210-\alpha)}$	**M1**	For solving for *T* using their α. Allow *g* missing.
	Tension = 2.05 N $\alpha = 76.9$	**A1**	For both AWRT 2.05, 76.9
		6	
	SC: Tension and the 4N force considered in the wrong directions		
	Attempt to resolve either direction	**M1**	Correct number of terms. Allow sin/cos mix. Allow sign errors. Allow *g* missing.
	$T\cos 60° - 4\sin\alpha° = 0$ And: $T\sin 60° - 4\cos\alpha° - 0.3g = 0$	**A1**	For both OE If the two *T*s are different, they get **SC A0** unless they subsequently state that the two *T*s are the same.
	$\left(\frac{T\cos 60°}{4}\right)^2+\left(\frac{T\sin 60°-0.3g}{4}\right)^2=1\Rightarrow\frac{1}{4}T^2+\frac{3}{4}T^2-3\sqrt{3}T+9=16$ $\Rightarrow T^2-3\sqrt{3}T-7=0\Rightarrow T=6.31(\text{or}-1.11)$ OR: $4\sqrt{3}\sin\alpha-4\cos\alpha=3\Rightarrow 8\sin(\alpha-30)=3\Rightarrow\alpha=\sin^{-1}\frac{3}{8}+30$	**M1**	OE Attempt to solve for *T or* α. No missing/extra terms. Allow *g* missing. Must get to '*T* =' or 'α='.

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Question	Answer	Marks	Guidance
3	$T = 6.31\text{N}$ $\alpha = 52.0$	**A1**	(T = 6.30617…, α=52.0243…)
		6	

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Question	Answer	Marks	Guidance
4(a)	$P = D \times 15$	**B1**	For any D. OE including $\frac{P}{15}$.
	$D - 500 = 1200 \times 0.8$ $(\Rightarrow D = 1460)$	**M1**	Attempt at Newton's second law with three terms. Allow sign errors.
	Power = 21900 W	**A1**	Allow 21900 without units or 21.9 kW, but not simply 21.9 without units or with wrong units.
		3	
4(b)	[Change in KE =] $\frac{1}{2}\times 1200\times 32^2 - \frac{1}{2}\times 1200\times 15^2$ $\left[= 614400 - 135000 = \ 479400\right]$	**B1**	Sight of both KEs.
	Work done by engine = 21900 × 53 (= 1160700)	**B1ft**	OE e.g. $21900 = \frac{WD}{53}$ FT *their* 21900.
	Distance AB = 1362.6 m	**B1**	AG Must come from 1160700 – 500d = 479400 OE e.g. $500d = 681300$.
		3	

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Question	Answer	Marks	Guidance
5(a)	$T - 40g\sin 20 - 50 = 40a \quad [T - 136.8\ldots - 50 = 40a]$ $500\cos 15 - 80g\sin 20 - T = 80a \quad [482.96\ldots - 273.61\ldots - T = 80a]$ $500\cos 15 - 80g\sin 20 - 40g\sin 20 - 50 = (80+40)a$ $[482.96\ldots - 273.61\ldots - 136.8\ldots - 50 = 120a]$	**M1**	Attempt at Newton's second law for at least one case. Allow sign errors. Do not allow g missing. Correct number of terms. Allow sin/cos mix.
		A1	Any 2 equations.
	For attempt to solve for T or a	**M1**	From equation(s) with no missing/extra terms. Allow g missing. Must get to '$T =$' or '$a =$'.
	Acceleration = 0.188 ms^{-2}	**A1**	Allow AWRT 0.19.
	Tension = 194 N	**A1**	
		5	
5(b)	[1.2 = 0 + 0.188t]	**M1**	For use of constant acceleration formula(e) and solving for t with *their* positive a, leading to a positive value of t $a \neq \pm 10, a \neq \pm g$ Allow if a is negative in part **(a)** and use $\lvert a \rvert$ here.
	Time = 6.39 s	**A1**	Allow 6.38 Allow 6.32 from a = 0.19
		2	

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Question	Answer	Marks	Guidance
6(a)	$0.3\times 2[+0]=0.3\times 0.6+0.4\times v$	**M1**	For use of conservation of momentum. Must be 3 terms. Allow sign errors.
	Speed of B = 1.05 ms^{-1}	**A1**	AG Allow M1 A0 if g included with the masses.
		2	
6(b)	$0.4\times 1.05[+0]=(0.4+m)\times 0.5$	**M1**	For use of conservation of momentum. Must be 3 terms. Allow sign errors.
	m = 0.44 or $\frac{11}{25}$	**A1**	Allow M1 A0 if g included with the masses.
		2	

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Question	Answer	Marks	Guidance
6(c)	1.2 [m] or 0.9 [m]	**B1**	Must be a distance as some candidates get 1.2 from $\frac{0.6}{0.5}$.
	$0.5t$	**B1**	Seen but not $+\frac{1}{2}at^2$ unless later state that $a = 0$. B0 if only $0.5t = 2.1$ (may see solving to find $t = 3.5$).
	$0.6t$	**B1**	Seen but not $+\frac{1}{2}at^2$ unless later state that $a = 0$. Allow B2 in place of second and third B1 marks for 'difference in speeds is 0.1 [ms^{-1}]'.
	Distances equal so $0.6t - 0.9 = 0.5t$ and solve for t Or $t = \frac{0.9}{0.6 - 0.5}$	**M1**	OE Must get to '$t =$'. Allow ± *their* 0.9 but not ±1.2 or ± 2.1 or ±1.5. Do not allow $0.6t + 0.5t = \pm 0.9$. Do not allow M1 if either or both terms include $+\frac{1}{2}at^2$ unless they state $a = 0$.
	Time = 9 s	**A1**	CWO

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Question	Answer	Marks	Guidance
6(c)	**Alternative method for question 6(c) using time from start of motion**		
	1 [m] or 1.1[m]	**B1**	
	$0.6T$	**B1**	Seen but not $+\frac{1}{2}aT^2$ unless later state that $a = 0$.
	$0.5T$	**B1**	Seen but not $+\frac{1}{2}aT^2$ unless later state that $a = 0$. Allow **B2** in place of second and third B1 marks for 'difference in speeds is 0.1 [ms^{-1}]'.
	Distances equal so $0.6T - 1.1 = 0.5T$ and solve for T Or $T = \frac{1.1}{0.6 - 0.5}$	**M1**	OE Must get to '$T =$'. Allow ± *their* 1.1 but not ±1.0 or ± 2.1. Do not allow $0.6T + 0.5T = \pm 1.1$. Do not allow M1 if either or both terms include $+\frac{1}{2}aT^2$ unless they state $a = 0$
	⇒ Time from *BC* collision = $11 - 2 = 9$ s	**A1**	CWO

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Question	Answer	Marks	Guidance
6(c)	**Alternative method for question 6(c) using distance travelled from time when *B* and *C* collide**		
	1.2 [m] or 0.9 [m]	**B1**	
	Time taken for A is $\frac{d+0.9}{0.6}$ Or $d+0.9=0.6t$	**B1 FT**	Allow ± *their* 0.9 but not ±1.2 or ± 2.1 or ±1.5.
	Time taken for BC is $\frac{d}{0.5}$ Or $d=0.5t$	**B1**	
	$\frac{d+0.9}{0.6}=\frac{d}{0.5}\Rightarrow d=4.5\Rightarrow \text{Time}=\frac{4.5}{0.5}$	**M1**	Must get to '$t=$'. Allow ± *their* 0.9 but not ±1.2 or ± 2.1.
	Time = 9 s	**A1**	CWO
		5	

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Question	Answer	Marks	Guidance
7(a)	$v = \frac{0.3}{1.5}t^{\frac{3}{2}}(+c)\left[= 0.2t^{\frac{3}{2}}(+c)\right]$	**M1**	For integration (do not penalise missing c) The power of t must increase by 1 with a change of coefficient. Use of $v = at$ scores M0.
	Velocity = 1.6 $\left[= \frac{8}{5}\right]$ ms^{-1}	**A1**	ISW any extra work using the second equation for a.
		2	

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Question	Answer	Marks	Guidance
7(b)	$v = \frac{-k}{-0.5}t^{-\frac{1}{2}}[+d]\left[= 2kt^{-\frac{1}{2}}[+d]\right]$	***M1**	For integration. No need for constant. Allow use of given value of $k = 2.6$. The power of t must increase by 1 with a change of coefficient. Use of $v = at$ scores M0.
	$Their\,1.6 = \frac{-k}{-0.5} \times 4^{-\frac{1}{2}} + d \left[= 2k \times 4^{-\frac{1}{2}} + d\right] \quad [Their\,1.6 = k + d]$ $0.3 = \frac{-k}{-0.5} \times 16^{-\frac{1}{2}} + d \left[= 2k \times 16^{-\frac{1}{2}} + d\right] \quad \left[0.3 = \frac{k}{2} + d\right]$	**A1 FT**	For both equations in k and d (Allow unsimplified).
	Attempt to solve for k or d	**DM1**	Or substitute $k = 2.6$ into both equations and solve both for d (with $d \neq 0$). Must get to '$k =$' or '$d =$'.
	$k = 2.6[v =]5.2t^{-\frac{1}{2}} - 1$ or $[v =]\frac{-2.6}{-0.5}t^{-\frac{1}{2}} - 1$	**A1**	AG (AG for k, not for the expression). Allow unsimplified expression for v and/or in terms of k. If k is substituted then both equations must be shown to give a value of $d = -1$ and getting $v = 5.2t^{-\frac{1}{2}} - 1$ **SC B1** for solving the correct equations simultaneously with no working seen and getting correct expression for v. **SC A1** for correct expression for v if only the first M1 is scored.

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Question	Answer	Marks	Guidance
7(b)	**Alternative method for question 7(b) from using limits**		
	$v = \frac{-k}{-0.5}t^{-\frac{1}{2}}[+d]\left[= 2kt^{-\frac{1}{2}}[+d]\right]$	***M1**	For integration No need for constant. Allow use of given value of $k = 2.6$. The power of t must increase by 1 with a change of coefficient. Use of $v = at$ scores M0.
	$\frac{-k}{-0.5}\times 4^{-\frac{1}{2}} - \frac{-k}{-0.5}\times 16^{-\frac{1}{2}} = 1.6 - 0.3$ or $2k\times 4^{-\frac{1}{2}} - 2k\times 16^{-\frac{1}{2}} = 1.6 - 0.3$	**A1 FT**	OE For correct unsimplified equation in k from using limits for v as their 1.6 and 0.3 and limits for t as 4 and 16.
	Attempt to solve for k	**DM1**	Must be an equation using 0.3 and their k, and 16 and 4, Must be subtracting the limits to form the equation in k, but may have sign errors in their $1.6 - 0.3$.
	$k = 2.6,\ \ v = 5.2t^{-\frac{1}{2}} - 1$ or $v = \frac{-2.6}{-0.5}t^{-\frac{1}{2}} - 1$	**A1**	**AG** (AG for k, not for the expression). Allow unsimplified expression for v and/or in terms of k.
		4	
7(c)	$\pm 5.2T^{-\frac{1}{2}} - their\,1 = 0$	**M1**	For solving for T. Must get to '$T =$'. Must come from integration, with *their* 1 from part **(b)** or found here not equal to zero. Do not allow made up value of d.
	$T = \frac{676}{25}$ or 27.04	**A1**	OE Must be exact. Allow both marks as long as expression for v is correct, however obtained in **Q7(b)**.
		2	

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Question	Answer	Marks	Guidance
7(d)	$\int_0^4 0.2t^{\frac{3}{2}}\,dt = \frac{0.2}{2.5}t^{\frac{5}{2}}$ or $\int_4^{27.04}\left(5.2t^{-\frac{1}{2}} - their1\right)dt = \frac{5.2}{0.5}t^{\frac{1}{2}} - their1\times t$	**M1**	For integration of $0.2t^{\frac{3}{2}}$ oe or $5.2t^{-\frac{1}{2}} - their\ 1$. May be in terms of *k*. Not from any other expression. *Their* 1 may be zero (or replaced by zero). *Their* 1 may came from either part **(b)** or part **(c)** The power of *t* must increase by 1 with a change of coefficient in at least one term.
	$= \left[\frac{0.2}{2.5}t^{\frac{5}{2}}\right]_0^4 + \left[\frac{5.2}{0.5}t^{\frac{1}{2}} - t\right]_4^{27.04}\left[= \left[0.08t^{\frac{5}{2}}\right]_0^4 + \left[10.4t^{\frac{1}{2}} - t\right]_4^{27.04}\right]$	**A1ft**	For both integrals (unsimplified) No need for limits FT non-zero value of *d*. May be in terms of *k*. *Their* 1 may came from either part **(b)** or part **(c)**.
	$= 0.08\times 32 + (10.4\times 5.2 - 27.04) - (10.4\times 2 - 4)\ \left[= 2.56 + 10.24\right]$	**M1**	For correct use of limits (0 and 4 then 4 and *their* 27.04) in both of their integrals, which have come from integration of $0.2t^{\frac{3}{2}}$ and $5.2t^{-\frac{1}{2}} - their1$. Not from any other expression. *Their* 1 may be zero (or replaced by zero). *Their* 1 may came from either part **(b)** or part **(c)**. Allow M1 for $d = 0$ (the final answer is 35.8).
	$= \frac{64}{5}$ or 12.8	**A1**	oe Awrt 12.8 Allow if using 27(.0) rather than 27.04 Allow all 4 marks as long as expression for v is correct, however obtained in **Q7(b)**.

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Question	Answer	Marks	Guidance
7(d)	**SC for using a calculator to integrate.**		
	Either $\int_0^4 0.2t^{\frac{3}{2}}\,dt = 2.56$ Or $\int_4^{27.04}\left(5.2t^{-\frac{1}{2}} - 1\right)dt = 10.24$	**B1**	AWRT 2.56 Allow 10.2 Must use 27.04 or 27(.0) if latter integral.
	Total distance = 12.8 m	**B1**	AWRT 12.8. Allow if using 27(.0) rather than 27.04 Allow both B marks as long as expression for v is correct, however obtained in **Q7(b)**.
		4	

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