

1	Alternative method 1		
	$110 \div 2$ or 55 or $2 \div 110$ or 0.018(1...) or 0.0182 or $44 \div 110$ or 0.4 or $110 \div 44$ or 2.5	M1	oe
	$44 \div (110 \div 2)$ or 0.8 or $\frac{4}{5}$	M1dep	oe eg 2880 or calculation that would evaluate to 0.8 eg $2 \div 110 \times 44$ or $44 \div 110 \times 2$ or $2 \div (110 \div 44)$ or $\frac{110 + 44}{110 \div 2} - 2$ or $2.8 - 2$
	48	A1	
	Alternative method 2		
	$110 \div 2 \div 60$ or 0.916... or 0.917 or 0.92 or $2 \times 60 \div 110$ or 1.09(0...) or 1.091	M1	oe
	$44 \div (110 \div 2 \div 60)$	M1dep	oe calculation that would evaluate to 48 eg $44 \times 2 \times 60 \div 110$
	48	A1	

1 cont	Additional Guidance	
	Ignore units for M marks eg 55 miles	M1
	Do not award A1 if premature approximation for 48 seen eg (Alt 1) $0.018 \times 44 = 0.8$ Answer 48 (Alt 1) $0.018 \times 44 = 0.792$ and $0.792 \times 60 = 47.52$ Answer 48 (Alt 2) $44 \div 0.917 = 48$ (Alt 2) $44 \div 0.917 = 47.9$ Answer 48 (Alt 2) $44 \times 1.09 = 48$ (Alt 2) $44 \times 1.09 = 47.96$ Answer 48	M2A1 M2A0 M2A1 M2A0 M2A1 M2A0
	48 followed by answer 2 h 48 min	M2A0
	48 followed by answer 168 min	M2A0
	Allow M1 even if not subsequently used	
	Alt 1 Working in seconds leading to 2880	M2

Question	Answer	Mark	Comments
2	$62 \div 2$ or 62×0.5 or 31	M1	oe eg $62 \div 60 \times 30$
	their $31 - 25$ or 6	M1	their 31 must be > 25
	their 6×3 or 18 or their 6×4 or 24	M1dep	dep on 2nd M1
	49	A1	
	Additional Guidance		
	49 from correct working, but a different answer given		M3A0

Q	Answer	Mark	Comments
3	Alternative method 1 – compares speeds in m/s		
	$200 \div 24$ or $8.3(3\dots)$	M1	oe eg $\frac{200}{24}$ or $8\frac{1}{3}$
	$28.8 \times 1000 \div 60 \div 60$ or 8	M1	oe eg $28\,800 \div 3600$ or $28.8 \div 3.6$
	8 and $8.3(3\dots)$ and Tom	A1	oe eg 8 and $8\frac{1}{3}$ and Tom
	Alternative method 2 – compares speeds in km/h		
	$200 \div 24$ or $8.3(3\dots)$	M1	oe eg $\frac{200}{24}$ or $8\frac{1}{3}$
	their $8.3(3\dots) \div 1000 \times 60 \times 60$ or 30	M1dep	oe eg $0.0083(3\dots) \times 3600$
	30 and Tom	A1	
	Alternative method 3 – time for Adil starting with m/s		
	$28.8 \times 1000 \div 60 \div 60$ or 8	M1	oe eg $28\,800 \div 3600$
	$200 \div$ their 8 or 25	M1dep	oe eg $\frac{200}{8}$
	25 and Tom	A1	oe eg Tom by 1s
	Alternative method 4 – time for Adil starting with km/h		
	$\frac{200 \div 1000}{28.8}$ or [0.0069, 0.007] or $\frac{200}{28.8}$ or [6.9, 7]	M1	oe eg $\frac{0.2}{28.8}$ eg $\frac{125}{18}$
	their [0.0069, 0.007] $\times 60 \times 60$ or their [6.9, 7] $\div 1000 \times 60 \times 60$ or 25	M1dep	oe eg $\frac{0.2}{28.8} \times 3600$
	25 and Tom	A1	oe eg Tom by 1s

Q	Answer	Mark	Comments
3 cont	Alternative method 5 – distance for Adil in 24s		
	28800 × 24 or 691200 or 28.8 ÷ 60 ÷ 60 or 0.008 or 28.8 × 24 or 691.2	M1	oe eg $\frac{3456}{5}$
	their 691200 ÷ 60 ÷ 60 or their 0.008 × 1000 × 24 or their 691.2 × 1000 ÷ 60 ÷ 60 or 192	M1dep	oe eg 28800 × 24 ÷ 3600
	192 and Tom	A1	
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		
	Ignore all units		
	Allow other correct comparisons eg 500 and 480 (this is metres per minute) eg 500 and 480 and Tom		M1M1 M1M1A1
	200 m = 0.2 km, 24 s = 24 ÷ 60 ÷ 60 = $\frac{1}{150}$ hour, 0.2 ÷ $\frac{1}{150}$ = 30 and Tom		M1M1A1
	$\frac{200 \div 1000}{24} = \frac{1}{120}$ (or 0.0083...)		M1

Q	Answer	Mark	Comments
4	(Total time $\Rightarrow$) $\frac{30}{a} + \frac{30}{b}$	M1	oe eg $\frac{30b}{ab} + \frac{30a}{ab}$ or $\frac{30(b+a)}{ab}$
	correct expression for total distance $\div$ total time	M1dep	eg $(30 + 30) \div \left(\frac{30}{a} + \frac{30}{b}\right)$ or $60 \div \frac{30(b+a)}{ab}$ or $60 \times \frac{ab}{30(b+a)}$
	$60 \times \frac{ab}{30(a+b)} = \frac{2ab}{a+b}$	A1	condone $b + a$ for $a + b$ condone $30a + 30b$ for $30(a + b)$
	Additional Guidance		
	Students can gain M1M1 if they incorrectly simplify a correct expression for total time before forming the division eg $\frac{30}{a} + \frac{30}{b} = \frac{60}{a+b}$ followed by $60 \div \frac{60}{a+b}$		M1M1A0
	Allow correct cancellation of 60 and 30 at any stage of the working		

Q	Answer	Mark	Comments
5	$176 \div 48$ or $3.66\dots$ or 3.67 or $\frac{11}{3}$ or 3 h 40 mins	M1	oe eg 220 mins implied by 12 40 pm
	$(293 - 176) \div 65$ or $117 \div 65$ or 1.8 or $\frac{9}{5}$ or 1 h 48 mins	M1	oe eg 108 mins
	their $3.66\dots$ + their 1.8 or $\frac{82}{15}$ or [5.46, 5.47] or 5 h 28 mins or [2 27 (pm), 2 28.2 (pm)]	M1dep	oe eg 328 mins dep on M2 implied by adding times eg $9 + 3\ 40 + 1\ 48$
	5.5 and [5.46, 5.47] and Yes or 5 h 30 mins and 5 h 28 mins and Yes or 330 mins and 328 mins and Yes or [2 27 (pm), 2 28.2 (pm)] and Yes	A1	oe arrival time must be in a comparable time format
	Additional Guidance		
	Up to M3 may be awarded for correct work seen in multiple attempts even if not subsequently used		
	Accept use of 24 hour clock throughout		
	Do not accept 2 28 am as a correct arrival time		
	$\frac{176}{48} = 3.6$, $\frac{117}{65} = 1.8$, $3.6 + 1.8 = 5.4$, 2 24 pm and Yes		M1M1M1A0
	$\frac{176}{48} = 3.7$, $\frac{117}{65} = 1.8$, $3.7 + 1.8 = 5.5$, 2 30 pm and Arrives on time		M1M1M1A0
	$3.6 + 1.8 = 5.4$, 2 24 pm and Yes		M0M1M0A0
	$3.7 + 1.8 = 5.5$, 2 30 pm and Arrives on time		M0M1M0A0

Q	Answer	Mark	Comment
6	$6 \times 10 \div 2$ or 30 or 6×90 or 540 or 570	M1	oe eg $\frac{1}{2} \times \frac{6}{10} \times 10^2$ or $\frac{1}{2} \times (100 + 90) \times 6$ may be on diagram
	$800 - 6 \times 10 \div 2 - 6 \times 90$ or $800 - \text{their } 30 - \text{their } 540$ or $800 - \text{their } 570$ or 230	M1dep	oe full method for remaining distance may be on diagram may be embedded eg $230 \div 40$
	$\frac{1}{2} \times (v + 6) \times 40 = \text{their } 230$ $2 \times \text{their } 230 \div 40 - 6$	M1dep	oe eg $20v + 120 = \text{their } 230$ any letter
	5.5	A1	oe value
	Additional Guidance		
	Up to M2 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comments
7	$0.5 \times \pi \times 45$ or $0.5 \times [141, 141.4]$ or $[70.5, 70.7]$ or $0.5 \times \pi \times 45 + 75$ or $[145.5, 145.7]$	M1	oe eg 22.5π
	$(0.5 \times \pi \times 45 + 75) \div 18$ or their $[145.5, 145.7] \div 18$	M1	oe their $[145.5, 145.7]$ can be any value
	8.08(...) or 8.09(...)	A1	may be implied by 8.1
	8.1	B1ft	ft any answer seen with greater than 2 sf SC2 3.9
	Additional Guidance		
	Up to M2 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts, B1ft may also be awarded		
	$\frac{120}{18} = 6.67$ answer 6.7		M0M1A0B1ft
	$\frac{120}{18} = 6.7$		M0M1A0B0ft
	$0.5 \times \pi \times 45$ and $70.7 \div 18 = 3.93$ answer 3.9		M1M1A0B1ft
	SC2 for an answer of 3.9 without working is when 75 is not used		

Q	Answer	Mark	Comments
8	A change in distance for an integer time interval or a change in distance for a non-integer time interval with the corresponding time interval	M1	integer time intervals are [88, 92] [70, 74] [52, 56] [34, 38] [16, 20] may be seen on graph
	$\frac{\text{their change in distance}}{\text{corresponding time interval}}$	M1dep	oe eg $\frac{[88, 92]}{5}$ must see their change in distance and the corresponding time interval division by 1 may be implied
	18	A1	SC1 24
	Additional Guidance		
	M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	90×5		M1M0
	(1 second) Answer [16, 20] is awarded at least M2		
	18 from incorrect working cannot score A1		
	18 followed by further work eg $18 \div 5 = 3.6$		M1M0

Q	Answer	Mark	Comments
9(a)	Alternative method 1: working in metres per second or kilometres per second		
	1500 (metres) or 0.05 (km)	B1	implied by 30 or 1200
	their $1500 \div 50 \times 40$ or their $1.5 \div 0.05 \times 40$ or 1200	M2	oe M1 their $1500 \div 50$ or 30 oe or $50 \div 40$ or 1.25 oe or $1.5 \div 0.05$ oe their 1500 must be using digits 15 (and zeros) their 0.05 must be using single digit 5 (and zeros)
	their $1200 \div 60$	M1dep	oe dep on M2
	20	A1ft	ft their 1500 or their 0.05
	Alternative method 2: working in metres per minute or kilometres per minute		
	1500 (metres) or 0.05 (km)	B1	implied by 0.075
	$40 \div 60$ or $\frac{2}{3}$	M1	oe accept [0.66, 0.67]
	$50 \div (40 \div 60)$ or 75 or $\frac{\text{their } 0.05}{(40 \div 60)}$ or 0.075 or their $1500 \times (40 \div 60)$	M1dep	oe calculation their 1500 must be using digits 15 (and zeros) their 0.05 must be using single digit 5 (and zeros)
	their $1500 \div 75$ or $1.5 \div 0.075$ or their $1500 \times (40 \div 60) \div 50$	M1dep	oe
	20	A1ft	ft their 1500 or their 0.05

9(a) cont	Additional Guidance		
	1500 ÷ 1.25		B1M2
	1.5 ÷ 50 × 40 their 1500 must be using digits 15 (and zeros)		B0M2
	1.5 ÷ 0.5 × 40 their 0.05 must be using single digit 5 (and zeros)		B0M2
	150 ÷ 50 their 1500 must be using digits 15 (and zeros)		B0M1
	150 ÷ 1.25 = 120, 120 ÷ 60 = 2		B0M2M1A1ft
Q	Answer	Mark	Comments
9(b)	It is greater than the answer to part (a)	B1	