

1	(a)	3.5 to 4.5	M1	substitution into formula $\frac{1}{3}\pi r^2 h$ of chosen values for r and V (accept $r = 5.13$ and $V = 98$) and starts rearrangement e.g. multiplies by 3, divides by π or divides by r^2 (both sides)
			M1	uses estimates in calculation e.g. $\frac{3 \times 100}{3 \times 25}$ (or in rearranged formula) or $\frac{12}{\pi}$
			A1	arrives at a single value from estimate in the range 3.5 to 4.5
	(b)	more	C1	ft e.g. more since number in numerator goes up; numbers in denominator go down.

2	(a)	No (supported)	P1	for 265 or 275 or 274.999... or 107.5 or 112.5 or 112.4999...
			P1	process to find $\frac{d}{t}$ where $270 < d \leq 275$ and $107.5 \leq t < 110$ oe for process to work in consistent units of time eg $\frac{d}{t} \times 60$ or $t \div 60$ where $265 \leq d \leq 275$ and $107.5 \leq t < 110$ oe or $160 \div 60 (= 2.666...)$
			C1	Conclusion supported with correct figure(s) given eg No and 153(.488..) or No and 2.66 to 2.7 and 2.5(581..) from correct working
	(b)	Statement	C1	e.g. Less distance in the same time so (max) speed would drop

3	(a)	Estimated value	P1	for using a rounded value in a correct process eg $3000 \div 15$ or 15×8 or 20×8	Their rounded value must be used in a calculation Rounding may appear after a correct process eg $15.12 \times 8 = 120.96 \approx 100$ followed by $eg 3069.25 \div 100$ Accept $3069.25 \div 15.12 \div 8$ oe
			P1	for a full process to find the number of days eg "3000" \div "15" \div "10" (= 20) or "3000" \div "15" \div 8 (= 25)	
			A1	for a correct answer following through their rounded values	
	(b)	Explanation	C1	eg less days required or it doesn't affect the answer because I would still round 16.27 down to 15 (or up to 20)	Refers to time taken

4	(a)	16 to 20	P1	for using time = $\frac{\text{distance}}{\text{speed}}$, eg $\frac{1}{200}$ or $\frac{1}{213}$ or for 1 hour = $60 \times 60 (= 3600)$ seconds	Calculation could be done in stages.
			P1	complete process, eg $\frac{1}{200} \times 60 \times 60$ oe or $\frac{1}{213} \times 60 \times 60$ oe	
			A1	for answer in range 16 to 20	
	(b)	decision with reason	C1	(dep on correct use of time = $\frac{\text{distance}}{\text{speed}}$) for reason related to their response to part(a). eg overestimate as speed rounded down	

5	(a)	75 to 81	B2	for answer in the range 75 to 81	Can use standard form
			(B1	for 60 or 100 or 6000 or 6400 or $\sqrt{64 \times 100}$)	
			B1	for 0.000148 oe	
	(b)	0.000148	B1	for 0.000148 oe	
	(c)	$\frac{1}{25}$	B1	for $\frac{1}{25}$ or 0.04	

6	(a)	30	<p>P1 for a start to the process, eg $5406 \div 6 (= 901)$ or $5400 \div 6 (= 900)$ or $5000 \div 6 (= 833.33..)$ or $5410 \div 6 (= 901.66..)$</p> <p>P1 for a process to find the length of one side, eg $\sqrt{901}$" or $\sqrt{900}$" or $\sqrt{833.33..}$" or $\sqrt{901.66..}$"</p> <p>A1 for 30</p>	
	(b)	Explanation	<p>C1 for a correct explanation based on their working in (a). eg underestimate because I rounded the total area down</p>	<p>Must be based on the use of a rounded value in a calculation</p>