

7	$M = kh^3$ oe or $4 = k \times 0.5^3$ oe		4	M1 $k \neq 1$ and where k could be any letter	M2 for $\frac{500}{4} = \frac{h^3}{0.5^3}$ oe or $125 \times 0.5^3 (= 15.625)$ oe
	$k = \frac{4}{0.5^3}$ or $k = \frac{4}{0.125}$ or $k = 32$			M1 Allow this for M2 if $M = kh^3$ is not written	
	$h = \sqrt[3]{\frac{500}{32}}$ or $\sqrt[3]{\frac{500 \times 0.5^3}{4}}$ or $\sqrt[3]{15.625}$ or $h = 5 \times 0.5$			M1 for a correct expression for h using correct values or a value of k from a completely correct method	
		2.5		A1 oe	
Total 4 marks					

8	$(a =) \frac{14}{3 \times \frac{7}{4y-3} - 7}$		3	M1	For a correct substitution
	$(a =) \frac{14(4y-3)}{21-7(4y-3)}$ oe eg $\frac{56y-42}{21-28y+21}$			M1	or for a correct but unsimplified answer in the form $\frac{m}{n}$ ie the denominator should be simplified to remove the fraction
		$\frac{4y-3}{3-2y}$		A1	oe but must be simplified
				Total 3 marks	
8 alt	$x = \frac{14+7a}{3a}$ and $\frac{14+7a}{3a} = \frac{7}{4y-3}$		3	M1	For rearranging 'x' to be in terms of a and equating two expressions for a
	$a(42-28y) = 56y-42$ oe eg $(a =) \frac{56y-42}{21-28y+21}$			M1	or for a correct but unsimplified answer in the form $\frac{m}{n}$
		$\frac{4y-3}{3-2y}$		A1	oe but must be simplified
				Total 3 marks	

9	$y = \frac{k}{\sqrt{x}}$ or $ky = \frac{1}{\sqrt{x}}$ or $x = pT^3$ or $y = \frac{k}{\sqrt{pT^3}}$ or $y = \frac{c}{\sqrt{T^3}}$ oe	Alternative $y^2T^3 = n$ oe		4	M1 Constant of proportionality must be a symbol such as k or p or c or n $k \neq 1, p \neq 1$ and $c \neq 1$ and $n \neq 1$
	$c = 8 \times \sqrt{25^3} (=1000)$ oe	$n = 8^2 \times 25^3 (=1000000)$ oe			M1 dep M1 for rearranging for c or n with ($y =$) 8 and ($T =$) 25 substituted correctly into their equation
	$27 = \frac{'1000'}{\sqrt{T^3}}$ and $T^3 = \left(\frac{'1000'}{27}\right)^2$ oe $27 = \frac{'1000'}{\sqrt{T^3}}$ and $T^{\frac{1}{2}} = \left(\frac{'1000'}{27}\right)^{\frac{1}{3}}$ oe	$T^3 = \frac{'1000000'}{27^2}$ oe			M1 for substitution of y and a correct rearrangement for T^3 or $T^{\frac{1}{2}}$ or T .
			$\frac{100}{9}$		A1 oe eg 11 $\frac{1}{9}$ or 11.1 or 11.111(...)
					Total 4 marks

10	eg $40 = \frac{k}{1.5^2}$ or $k = 90$ or $\frac{C^2}{1.5^2} = \frac{40}{1000}$ (= 0.04) or $(C^2 =) 1.5^2 \times \frac{40}{1000}$ (= 0.09) or $\frac{1.5^2}{C^2} = \frac{1000}{40}$ (= 25) or $(C^2 =) 1.5^2 \div \frac{1000}{40}$ (= 0.09)		3	M1
	eg $(C =) \sqrt{\frac{90}{1000}}$ oe or $(C =) \sqrt{1.5^2 \times 0.04}$ or $(C =) \sqrt{1.5^2 \div 25}$ or $(C =) \sqrt{0.09}$			M1
		0.3	A1 oe, allow ± 0.3 oe or -0.3 oe	
	Total 3 marks			

11	(a)		-0.5	1	B1 oe eg $-\frac{1}{2}, -\frac{1}{2}, \frac{1}{-2}, -1/2$
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12 (a)	$P = \frac{k}{y^2}$		3	M1	oe (the constant term, k , can be any other letter apart from a or P or y)
	eg $a = \frac{k}{4^2}$ or $k = 16a$			M1	oe
	Correct answer scores full marks (unless from obvious incorrect working)	$P = \frac{16a}{y^2}$		A1	oe eg $P = 16ay^{-2}$ or $P = \frac{4^2 a}{y^2}$
(b)	$\sqrt{\frac{16a}{4a}} = c\sqrt{a}$ oe eg $\frac{16a}{4a} = c^2 a$ or $4a = \frac{16a}{c^2 a}$ or $4a \times c^2 a = 16a$ oe or (when $P = 4a$) $y^2 = \frac{16a}{4a}$ or $y^2 = 4$ or $y = \sqrt{\frac{16a}{4a}} (= 2)$ oe		3	M1	fit a correct formula involving the constant term (c used here) and a or fit for an expression or value of y^2 or y given for when $P = 4a$
	$c = \sqrt{\frac{4}{a}}$ or $c = \frac{\pm 2}{\sqrt{a}}$ or $c = \frac{\pm 2\sqrt{a}}{a}$ oe allow the constant term squared eg $c^2 = \frac{16a}{4a^2} (= \frac{4}{a})$			M1	(implies previous M1) a correct value, in terms of a , for the constant term or the constant term squared – need not be simplified
	Correct answer scores full marks (unless from obvious incorrect working)	$P = \frac{4a^2}{x}$		A1	oe eg $P = \frac{16a}{\frac{4x}{a}}$ or $P = \frac{16a^2}{4x}$
					Total 6 marks

13 (b)		0.25	1	A1ft oe dep on M1 in part (a) and for their value of k if $F = \frac{k}{r^2}$
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14 (a)	$25 \pm \dots\dots$ or $\dots\dots - 12$ or $(-5)^2 - 4 \times 3$ or $(-5)^2 - 4(3)$ or $-5 \times -5 - 4 \times 3$ or $-5 \times -5 - 4(3)$		2	M1 for either 25 or -12 in the correct place or the correct substitution shown with brackets around -5
	Correct answer scores full marks (unless from obvious incorrect working)	13		A1 (M0A0 for -37 without any working)