

Marking instructions for each question

Question	Generic scheme	Illustrative scheme	Max mark
1	<p>Ans: 97 miles</p> <ul style="list-style-type: none"> •¹ know how to increase by 15% •² know how to calculate the distance after 3 weeks •³ evaluate 	<ul style="list-style-type: none"> •¹ $\times 1.15$ •² 64×1.15^3 •³ 97 	3
2	<p>Ans: 1.65×10^9</p> <ul style="list-style-type: none"> •¹ correct method •² answer 	<ul style="list-style-type: none"> •¹ $3 \times 10^5 \times 5.5 \times 1000$ •² 1.65×10^9 	2
3	<p>Ans: $2x^3 - 5x^2 - 10x + 3$</p> <ul style="list-style-type: none"> •¹ three terms correct •² remaining terms correct •³ collect like terms 	<ul style="list-style-type: none"> •¹ e.g. $2x^3 - 8x^2 + 2x \dots$ •² e.g. $\dots 3x^2 - 12x + 3$ •³ $2x^3 - 5x^2 - 10x + 3$ 	3
4	<p>Ans: B(8,4,10), C(4,0,10)</p> <ul style="list-style-type: none"> •¹ state coordinates of B •² state coordinates of C 	<ul style="list-style-type: none"> •¹ (8,4,10) •² (4,0,10) 	2
5	<p>Ans: 9.8 cm</p> <ul style="list-style-type: none"> •¹ correct substitution into cosine rule •² calculate PR^2 •³ calculate PR 	<ul style="list-style-type: none"> •¹ $(PR^2 =) 8^2 + 3^2 - 2 \times 8 \times 3 \times \cos 120^\circ$ •² 97 •³ 9.8 (488...) 	3

Question	Generic scheme	Illustrative scheme	Max mark
6	<p>Ans: 870 cm³</p> <ul style="list-style-type: none"> •¹ substitute correctly into formula for volume of cone •² substitute correctly into formula for volume of sphere or hemisphere •³ know to add volume of hemisphere to volume of cone •⁴ carry out all calculations correctly (must involve sum of two volume calculations) •⁵ round final answer to two significant figures 	<ul style="list-style-type: none"> •¹ $\frac{1}{3} \times \pi \times 6^2 \times 11 (= 414.690\dots)$ •² $\frac{4}{3} \times \pi \times 6^3 (= 904.778\dots)$ or $\frac{1}{2} \times \frac{4}{3} \times \pi \times 6^3 (= 452.389\dots)$ •³ evidence •⁴ 867.079... •⁵ 870 	5
7	<p>Ans: 3456 millilitres</p> <ul style="list-style-type: none"> •¹ find linear scale factor •² know to multiply volume by cube of linear scale factor •³ calculate volume (calculation must involve a power of linear scale factor) 	<ul style="list-style-type: none"> •¹ $\frac{36}{15} (= 2.4)$ •² $\left(\frac{36}{15}\right)^3 \times 250 (= 2.4^3 \times 250)$ •³ 3456 	3
8	<p>Ans: $5n^4$</p> <ul style="list-style-type: none"> •¹ simplify powers in numerator •² cancel constants •³ eliminate n from denominator 	<ul style="list-style-type: none"> •¹ $10n^6$ •² $\frac{5n^6}{n^2}$ •³ $5n^4$ 	3

Question		Generic scheme	Illustrative scheme	Max mark
9	(a)	<p>Ans: gradient = $-\frac{4}{3}$</p> <ul style="list-style-type: none"> •¹ start to rearrange •² state gradient 	<ul style="list-style-type: none"> •¹ $3y = -4x + 12$ •² $-\frac{4}{3}$ 	2
9	(b)	<p>Ans: (0,4)</p> <ul style="list-style-type: none"> •¹ state coordinates (must use brackets) 	<ul style="list-style-type: none"> •¹ (0,4) 	1
10		<p>Ans: 1039.2 cm²</p> <ul style="list-style-type: none"> •¹ correct angle •² know how to find area of triangle •³ know how to find area of hexagon •⁴ correct calculation with correct units 	<ul style="list-style-type: none"> •¹ 60 •² $\frac{1}{2} \times 20 \times 20 \times \sin 60$ •³ $\left(\frac{1}{2} \times 20 \times 20 \times \sin 60\right) \times 6$ •⁴ 1039.2 cm² 	4
11	(a)	<p>Ans: 864 cm²</p> <ul style="list-style-type: none"> •¹ appropriate fraction •² correct substitution into area of sector formula •³ all calculations correct 	<ul style="list-style-type: none"> •¹ $\frac{110}{360}$ •² $\frac{110}{360} \times \pi \times 30^2$ •³ 863.9... 	3
11	(b)	<p>Ans: 131 cm</p> <ul style="list-style-type: none"> •¹ appropriate fraction •² correct substitution into length of arc formula •³ all calculations correct 	<ul style="list-style-type: none"> •¹ $\frac{250}{360}$ •² $\frac{250}{360} \times \pi \times 60$ •³ 130.8... 	3

Question	Generic scheme	Illustrative scheme	Max mark
12	<p>Ans: 70.5, 289.5</p> <ul style="list-style-type: none"> •¹ form equation •² rearrange equation •³ find one value •⁴ find second value 	<ul style="list-style-type: none"> •¹ $3 \cos x - 1 = 0$ •² $\cos x = \frac{1}{3}$ •³ 70.5 •⁴ 289.5 	4
13	<p>Ans: $\frac{x}{x+5}$</p> <ul style="list-style-type: none"> •¹ factorise numerator •² factorise denominator •³ cancel brackets correctly 	<ul style="list-style-type: none"> •¹ $x(x-4)$ •² $(x-4)(x+5)$ •³ $\frac{x}{x+5}$ 	3
14	<p>Ans: $a = \frac{2(s-ut)}{t^2}$</p> <ul style="list-style-type: none"> •¹ subtract ut •² multiply by 2 •³ divide by t^2 	<ul style="list-style-type: none"> •¹ $s - ut = \frac{1}{2}at^2$ •² $2(s - ut) = at^2$ •³ $a = \frac{2(s-ut)}{t^2}$ 	3

Question		Generic scheme	Illustrative scheme	Max mark
15	(a)	<p>Ans: 29°</p> <ul style="list-style-type: none"> •¹ calculate angle HCD •² correct substitution into sine rule •³ rearrange equation •⁴ find angle CDH 	<ul style="list-style-type: none"> •¹ 130° •² $\frac{50}{\sin CDH} = \frac{79}{\sin 130}$ •³ $\sin CDH = \frac{50 \sin 130}{79}$ •⁴ 29 	4
15	(b)	<p>Ans: 249°</p> <ul style="list-style-type: none"> •¹ use angle alternate to given bearing •² find correct bearing 	<ul style="list-style-type: none"> •¹ 40 •² 249 [180 + 40 + 29] 	2
16	(a) (i)	<p>Ans: $2x + 13$</p> <ul style="list-style-type: none"> •¹ correct expression 	<ul style="list-style-type: none"> •¹ $2x + 13$ 	1
16	(a) (ii)	<p>Ans: $4x^2 + 44x + 117 = 270$ $\Rightarrow 4x^2 + 44x - 153 = 0$</p> <ul style="list-style-type: none"> •¹ find expression for area of card and expand pair of brackets •² construct equation and rearrange into required form 	<ul style="list-style-type: none"> •¹ $(2x + 13)(2x + 9) = 4x^2 + 44x + 117$ •² $4x^2 + 44x + 117 = 270$ $\Rightarrow 4x^2 + 44x - 153 = 0$ 	2
16	(b)	<p>Ans: 2.8 cm</p> <ul style="list-style-type: none"> •¹ correct substitution into quadratic formula •² evaluate discriminant •³ solve for x •⁴ select positive value of x, correctly stated to one decimal place 	<ul style="list-style-type: none"> •¹ $\frac{-44 \pm \sqrt{44^2 - 4 \times 4 \times (-153)}}{2 \times 4}$ •² $\frac{-44 \pm \sqrt{4384}}{2 \times 4}$ (stated or implied by •³) •³ 2.77... and -13.77... •⁴ 2.8 	4

[END OF SPECIMEN MARKING INSTRUCTIONS]