



National
Qualifications
SPECIMEN ONLY

S847/75/02

**Mathematics
Paper 2**

Marking Instructions

These marking instructions have been provided to show how SQA would mark this specimen question paper.

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Marking instructions for each question

Question		Generic scheme	Illustrative scheme	Max mark
1		Ans: 97 miles <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		Ans: 1.65×10^9 <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		Ans: $2x^3 - 5x^2 - 10x + 3$ <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		Ans: B(8,4,10), C(4,0,10) <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		Ans: 9.8 cm <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)	Ans: 29° • ¹ calculate angle HCD • ² correct substitution into sine rule • ³ rearrange equation • ⁴ find angle CDH	• ¹ 130° • ² $\frac{50}{\sin CDH} = \frac{79}{\sin 130}$ • ³ $\sin CDH = \frac{50 \sin 130}{79}$ • ⁴ 29	4
15	(b)	Ans: 249° • ¹ use angle alternate to given bearing • ² find correct bearing	• ¹ 40 • ² 249 [180 + 40 + 29]	2
16	(a) (i)	Ans: 2x + 13 • ¹ correct expression	• ¹ 2x + 13	1
16	(a) (ii)	Ans: $4x^2 + 44x + 117 = 270$ $\Rightarrow 4x^2 + 44x - 153 = 0$ • ¹ find expression for area of card and expand pair of brackets • ² construct equation and rearrange into required form	• ¹ $(2x + 13)(2x + 9) = 4x^2 + 44x + 117$ • ² $4x^2 + 44x + 117 = 270$ $\Rightarrow 4x^2 + 44x - 153 = 0$	2
16	(b)	Ans: 2.8 cm • 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	• 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]