



National
Qualifications
SPECIMEN ONLY

SQ29/N5/01

**Mathematics
Paper 1
(Non-Calculator)**

Marking Instructions

These Marking Instructions have been provided to show how SQA would mark this Specimen Question Paper.

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Part One: General Marking Principles for National 5 Mathematics

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- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question.
- (b) Marking should always be positive, ie marks should be awarded for what is correct and not deducted for errors or omissions.
- (c) Credit must be assigned in accordance with the specific assessment guidelines.
- (d) Candidates may use any mathematically correct method to answer questions except in cases where a particular method is specified or excluded.
- (e) Working subsequent to an error must be followed through, with possible credit for the subsequent working, provided that the level of difficulty involved is approximately similar. Where, subsequent to an error, the working is easier, candidates lose the opportunity to gain credit.
- (f) Where transcription errors occur, candidates would normally lose the opportunity to gain a processing mark.
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 - Working subsequent to a correct answer
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 - Legitimate variations in solutions
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Part Two: Specific Marking Instructions for each question

Question			Marking scheme Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
1			<p>Ans: $7\frac{3}{5}$</p> <ul style="list-style-type: none"> •¹ start simplification and know how to divide fractions •² consistent answer 	2	<ul style="list-style-type: none"> •¹ $\frac{19}{8} \times \frac{16}{5}$ •² $7\frac{3}{5}$ or $\frac{38}{5}$
2			<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 	3	<ul style="list-style-type: none"> •¹ eg $2x^3 - 8x^2 + 2x$ •² eg $3x^2 - 12x + 3$ •³ $2x^3 - 5x^2 - 10x + 3$
3			<p>Ans: $7\sqrt{2}$</p> <ul style="list-style-type: none"> •¹ add vectors correctly •² find magnitude •³ express as surd in simplest form 	3	<ul style="list-style-type: none"> •¹ $\begin{pmatrix} 9 \\ -1 \\ -4 \end{pmatrix}$ •² $\sqrt{98}$ •³ $7\sqrt{2}$
4			<p>Ans: $x = -5, x = 1.5$</p> <ul style="list-style-type: none"> •¹ one correct factor •² correct factorisation •³ solve equation 	3	<ul style="list-style-type: none"> •¹ $x + 5$ or $2x - 3$ •² $(x + 5)(2x - 3)$ •³ $x = -5, x = 1.5$

5			<p>Ans: $\frac{2\sqrt{6}}{3}$</p> <ul style="list-style-type: none"> •¹ know how to rationalise denominator •² consistent answer 	2	<ul style="list-style-type: none"> •¹ $\frac{4}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}}$ •² $\frac{2\sqrt{6}}{3}$
6	a		<p>Ans: $y = 2x + 1$</p> <ul style="list-style-type: none"> •¹ find gradient •² substitute gradient and (11,23) or (17,35) into $y - b = m(x - a)$ or $y = mx + c$ •³ state equation of line in simplest form 	3	<ul style="list-style-type: none"> •¹ $m = 2$ •² eg $y - 23 = 2(x - 11)$ or $23 = 2 \times 11 + c$ •³ $y = 2x + 1$ or $2x - y + 1 = 0$ or equivalent
6	b		<p>Ans: $2 \times 8 + 1 = 17$</p> <ul style="list-style-type: none"> •¹ use equation to calculate sports score 	1	<ul style="list-style-type: none"> •¹ $2 \times 8 + 1 = 17$
7	a		<p>Ans: $x^{-1} + x^0$ or equivalent</p> <ul style="list-style-type: none"> •¹ multiply $x^{1/2} \times x^{-3/2}$ correctly •² multiply $x^{1/2} \times x^{-1/2}$ correctly 	2	<ul style="list-style-type: none"> •¹ x^{-1} •² x^0 or 1
7	b		<p>Ans: $1\frac{1}{6}$</p> <ul style="list-style-type: none"> •¹ find exact value of expression 	1	<ul style="list-style-type: none"> •¹ $1\frac{1}{6}$ or $\frac{7}{6}$
8			<p>Ans: $v = \sqrt{\frac{2p}{m}}$</p> <ul style="list-style-type: none"> •¹ multiply by 2 •² divide by m •³ square root 	3	<ul style="list-style-type: none"> •¹ $mv^2 = 2p$ •² $v^2 = \frac{2p}{m}$ •³ $v = \sqrt{\frac{2p}{m}}$

9	a	<p>Ans: $y = (x - 4)^2 + 3$</p> <ul style="list-style-type: none"> •¹ p correct •² q correct 	2	<ul style="list-style-type: none"> •¹ $y = (x - 4)^2$ •² $y = (x - 4)^2 + 3$
9	b	<p>Ans: insert correct diagram</p> <ul style="list-style-type: none"> •¹ correct shape and position •² coordinates of y-intercept shown •³ coordinates of turning point shown 	3	<ul style="list-style-type: none"> •¹ parabola with minimum turning point in first quadrant •² (0,19) •³ (4,3)
10	a	<p>Ans: $3f + 4r = 185$</p> <ul style="list-style-type: none"> •¹ construct equation 	1	<ul style="list-style-type: none"> •¹ $3f + 4r = 185$
10	b	<p>Ans: $2f + 3r = 130$</p> <ul style="list-style-type: none"> •¹ construct equation 	1	<ul style="list-style-type: none"> •¹ $2f + 3r = 130$
10	c	<p>Ans: restricted pass costs £20 full pass costs £35</p> <ul style="list-style-type: none"> •¹ evidence of scaling •² calculate r or f •³ communicate answer 	3	<ul style="list-style-type: none"> •¹ $6f + 8r = 370$ $6f + 9r = 390$ •² $r = 20$ or $f = 35$ •³ restricted pass costs £20 full pass costs £35
11		<p>Ans: $\frac{x - 22}{(x + 2)(x - 4)}$</p> <ul style="list-style-type: none"> •¹ correct common denominator •² correct numerator •³ simplify 	3	<ul style="list-style-type: none"> •¹ $(x + 2)(x - 4)$ •² $4(x - 4) - 3(x + 2)$ •³ $\frac{x - 22}{(x + 2)(x - 4)}$

12	a		Ans: $r - 5$ • ¹ state expression	1	• ¹ $r - 5$
12	b		Ans: 10·6 cm • ¹ correct use of Pythagoras' theorem • ² expand bracket • ³ solve equation	3	• ¹ $r^2 = (r - 5)^2 + 9^2$ • ² $r^2 = r^2 - 10r + 25 + 81$ • ³ $r = 10·6$

Total Marks for Paper 1 – 40

[END OF SPECIMEN MARKING INSTRUCTIONS]



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Mathematics
Paper 2

Marking Instructions

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1			Ans: 85·169 miles • ¹ multiplying factor • ² power of 3 • ³ answer	3	• ¹ 1·15 • ² 1·15 ³ • ³ 85·169 or 85·17 or 85·2 or 85
2			Ans: $1·65 \times 10^9$ • ¹ correct method • ² answer	2	• ¹ $3 \times 10^5 \times 5·5 \times 1000$ • ² $1·65 \times 10^9$
3	a		Ans: $b - a$ • ¹ answer	1	• ¹ $b - a$
3	b		Ans: $2(b - a)$ • ¹ answer	1	• ¹ $2(b - a)$
4			Ans: -4 • ¹ correct substitution into equation • ² state value of k	2	• ¹ $-16 = k \times 2^2$ • ² -4
5			Ans: 9·8 cm • ¹ correct application of cosine rule for PR ² • ² correct value for PR ² • ³ answer	3	• ¹ $8^2 + 3^2 - 2 \times 8 \times 3 \times \cos 120^\circ$ • ² 97 • ³ 9·8(488.....)

6		<p>Ans: 870 cm³</p> <ul style="list-style-type: none"> •¹ know how to calculate volume of toy •² substitute correctly into formula for volume of hemisphere •³ substitute correctly into formula for volume of cone •⁴ calculate volume correctly •⁵ round to 2 significant figures 	5	<ul style="list-style-type: none"> •¹ add volume of cone and volume of hemisphere •² $\frac{1}{2} \times \frac{4}{3} \times \pi \times 6^3$ (= 452.389...) •³ $\frac{1}{3} \times \pi \times 6^2 \times 11$ (= 414.690....) •⁴ 867.079... •⁵ 870
7		<p>Ans: £387.50</p> <ul style="list-style-type: none"> •¹ know that 120% = 465 •² know to divide 465 by 1.2 •³ answer 	3	<ul style="list-style-type: none"> •¹ 120% = 465 •² 100% = 465 ÷ 1.2 •³ 387.50
8	a	<p>Ans: mean = 21 standard deviation = 2.1</p> <ul style="list-style-type: none"> •¹ calculate mean •² start to calculate standard deviation •³ answer 	3	<ul style="list-style-type: none"> •¹ 21 •² as far as $\Sigma(x - \bar{x})^2 = 22$ or $\Sigma x^2 = 2668$ •³ 2.0976
8	b	<p>Ans: two valid statements</p> <ul style="list-style-type: none"> •¹ compare means •² compare standard deviations 	2	<ul style="list-style-type: none"> •¹ Machine A, on average, packs more sprouts into a bag •² The number of sprouts packed in a bag by Machine A is more consistent

9		<p>Ans: 4·1472 litres</p> <ul style="list-style-type: none"> •¹ find linear scale factor •² find volume scale factor •³ calculate volume 	3	<ul style="list-style-type: none"> •¹ $\frac{36}{15}$ (= 2·4) •² $\left(\frac{36}{15}\right)^3$ (= 2·4³ = 13·824) •³ 4·1 or 4·15 or 4·147 or 4·1472
10	a	<p>Ans: half of [2 – (–4)] graph moved down 1</p> <ul style="list-style-type: none"> •¹ correct explanation of 3 •² correct explanation of –1 	2	<ul style="list-style-type: none"> •¹ half of [2 – (–4)] , or equivalent •² graph of $y = \cos x^\circ$ moved down 1, or equivalent
10	b	<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 	4	<ul style="list-style-type: none"> •¹ $3\cos x^\circ - 1 = 0$ •² as far as $\cos x^\circ = \frac{1}{3}$ •³ 70·5 •⁴ 289·5
11	a	<p>Ans: 1536 cm²</p> <ul style="list-style-type: none"> •¹ correct fraction of area •² correct formula •³ all calculations correct 	3	<ul style="list-style-type: none"> •¹ $\frac{110}{360}$ •² $\frac{110}{360} \times \pi \times 40^2$ •³ 1535·8...
11	b	<p>Ans: 175 cm</p> <ul style="list-style-type: none"> •¹ correct fraction of circumference •² correct formula •³ all calculations correct 	3	<ul style="list-style-type: none"> •¹ $\frac{250}{360}$ •² $\frac{250}{360} \times \pi \times 80$ •³ 174·5...

12			Ans: $p > \frac{1}{3}$ <ul style="list-style-type: none"> •¹ know to use discriminant •² correct values of a, b and c •³ form correct inequation •⁴ solve inequation 	4	<ul style="list-style-type: none"> •¹ $b^2 - 4ac$ •² $a = p, b = -2, c = 3$ •³ $4 - 12p < 0$ •⁴ $p > \frac{1}{3}$
13	a		Ans: 29° <ul style="list-style-type: none"> •¹ calculate angle CDH •² correct use of sine rule •³ rearrange equation •⁴ find angle CDH 	4	<ul style="list-style-type: none"> •¹ 130° •² $\frac{50}{\sin CDH} = \frac{79}{\sin 130^\circ}$ •³ $\sin CDH = \frac{50 \sin 130^\circ}{79}$ •⁴ 29°
13	b		Ans: 249° <ul style="list-style-type: none"> •¹ use alternate angle •² find correct bearing 	2	<ul style="list-style-type: none"> •¹ angle alternate to given bearing = 40° •² 249°

Total Marks for Paper 2 – 50

[END OF SPECIMEN MARKING INSTRUCTIONS]