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 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			**Ans:** $7\frac{3}{5}$ •[1] start simplification **and** know how to divide fractions •[2] consistent answer	**2**	•[1] $\frac{19}{8}\times\frac{16}{5}$ •[2] $7\frac{3}{5}$ or $\frac{38}{5}$
2			**Ans:** $2x^3 - 5x^2 - 10x + 3$ •[1] three terms correct •[2] remaining terms correct •[3] collect like terms	**3**	•[1] eg $2x^3 - 8x^2 + 2x$ •[2] eg $3x^2 - 12x + 3$ •[3] $2x^3 - 5x^2 - 10x + 3$
3			**Ans:** $7\sqrt{2}$ •[1] add vectors correctly •[2] find magnitude •[3] express as surd in simplest form	**3**	•[1] $\begin{pmatrix} 9 \\ -1 \\ -4 \end{pmatrix}$ •[2] $\sqrt{98}$ •[3] $7\sqrt{2}$
4			**Ans:** $x = -5$, $x = 1{\cdot}5$ •[1] one correct factor •[2] correct factorisation •[3] solve equation	**3**	•[1] $x + 5$ or $2x - 3$ •[2] $(x + 5)(2x - 3)$ •[3] $x = -5$, $x = 1{\cdot}5$

5			**Ans:** $\frac{2\sqrt{6}}{3}$ •[1] know how to rationalise denominator •[2] consistent answer	**2**	 •[1] $\frac{4}{\sqrt{6}}\times\frac{\sqrt{6}}{\sqrt{6}}$ •[2] $\frac{2\sqrt{6}}{3}$
6	a		**Ans:** $y = 2x + 1$ •[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**	 •[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		**Ans:** **2 × 8 + 1 = 17** •[1] **use equation** to calculate sports score	**1**	 •[1] 2 × 8 + 1 = 17
7	a		**Ans:** $x^{-1} + x^0$ **or equivalent** •[1] multiply $x^{1/2} \times x^{-3/2}$ correctly •[2] multiply $x^{1/2} \times x^{-1/2}$ correctly	**2**	 •[1] x^{-1} •[2] x^0 or 1
7	b		**Ans:** $1\frac{1}{6}$ •[1] find exact value of expression	**1**	 •[1] $1\frac{1}{6}$ or $\frac{7}{6}$
8			**Ans:** $v = \sqrt{\frac{2p}{m}}$ •[1] multiply by 2 •[2] divide by m •[3] square root	**3**	 •[1] $mv^2 = 2p$ •[2] $v^2 = \frac{2p}{m}$ •[3] $v = \sqrt{\frac{2p}{m}}$

9	a		**Ans:** $y = (x-4)^2 + 3$ •^{1} p correct •^{2} q correct	**2**	•^{1} $y = (x-4)^2$ •^{2} $y = (x-4)^2 + 3$
9	b		**Ans:** **insert correct diagram** •^{1} correct shape and position •^{2} coordinates of y-intercept shown •^{3} coordinates of turning point shown	**3**	•^{1} parabola with minimum turning point in first quadrant •^{2} (0,19) •^{3} (4,3)
10	a		**Ans:** $3f + 4r = 185$ •^{1} construct equation	**1**	•^{1} $3f + 4r = 185$
10	b		**Ans:** $2f + 3r = 130$ •^{1} construct equation	**1**	•^{1} $2f + 3r = 130$
10	c		**Ans:** **restricted pass costs £20** **full pass costs £35** •^{1} evidence of scaling •^{2} calculate r or f •^{3} communicate answer	**3**	•^{1} $6f + 8r = 370$ $6f + 9r = 390$ •^{2} $r = 20$ or $f = 35$ •^{3} restricted pass costs £20 full pass costs £35
11			**Ans:** $\frac{x-22}{(x+2)(x-4)}$ •^{1} correct common denominator •^{2} correct numerator •^{3} simplify	**3**	•^{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] $r = 10{\cdot}6$

Total Marks for Paper 1 — 40

[END OF SPECIMEN MARKING INSTRUCTIONS]

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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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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			**Ans: 85·169 miles** •[1] multiplying factor •[2] power of 3 •[3] answer	**3**	•[1] 1·15 •[2] $1{\cdot}15^3$ •[3] 85·169 or 85·17 or 85·2 or 85
2			**Ans: $1{\cdot}65 \times 10^9$** •[1] correct method •[2] answer	**2**	•[1] $3 \times 10^5 \times 5{\cdot}5 \times 1000$ •[2] $1{\cdot}65 \times 10^9$
3	a		**Ans: $\mathbf{b - a}$** •[1] answer	**1**	•[1] $\mathbf{b - a}$
3	b		**Ans: $\mathbf{2(b - a)}$** •[1] answer	**1**	•[1] $2(\mathbf{b - a})$
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] $8^2 + 3^2 - 2 \times 8 \times 3 \times \cos 120°$ •[2] 97 •[3] 9·8(488…..)

6			**Ans: 870 cm^3** •^{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**	•^{1} add volume of cone and volume of hemisphere •^{2} $\frac{1}{2}\times\frac{4}{3}\times\pi\times6^3$ (= 452·389…) •^{3} $\frac{1}{3}\times\pi\times6^2\times11$ (= 414·690….) •^{4} 867·079… •^{5} 870
7			**Ans: £387·50** •^{1} know that 120% = 465 •^{2} know to divide 465 by 1·2 •^{3} answer	**3**	•^{1} 120% = 465 •^{2} 100% = 465 ÷ 1·2 •^{3} 387·50
8	a		**Ans: mean = 21** **standard deviation = 2.1** •^{1} calculate mean •^{2} start to calculate standard deviation •^{3} answer	**3**	•^{1} 21 •^{2} as far as $\Sigma(x-\bar{x})^2 = 22$ or $\Sigma x^2 = 2668$ •^{3} 2·0976
8	b		**Ans: two valid statements** •^{1} compare means •^{2} compare standard deviations	**2**	•^{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			**Ans: 4·1472 litres** •^{1} find linear scale factor •^{2} find volume scale factor •^{3} calculate volume	**3**	•^{1} $\frac{36}{15}$ (= 2·4) •^{2} $\left(\frac{36}{15}\right)^3$ (= $2{\cdot}4^3$ = 13·824) •^{3} 4·1 or 4·15 or 4·147 or 4·1472
10	a		**Ans: half of [2 – (–4)]** **graph moved down 1** •^{1} correct explanation of 3 •^{2} correct explanation of –1	**2**	•^{1} half of [2 – (–4)] , or equivalent •^{2} graph of $y = \cos x°$ moved down 1, or equivalent
10	b		**Ans: 70·5°, 289·5°** •^{1} form equation •^{2} rearrange equation •^{3} find one value •^{4} find second value	**4**	•^{1} $3\cos x° - 1 = 0$ •^{2} as far as $\cos x° = \frac{1}{3}$ •^{3} 70·5 •^{4} 289·5
11	a		**Ans: 1536 cm^2** •^{1} correct fraction of area •^{2} correct formula •^{3} all calculations correct	**3**	•^{1} $\frac{110}{360}$ •^{2} $\frac{110}{360} \times \pi \times 40^2$ •^{3} 1535·8...
11	b		**Ans: 175 cm** •^{1} correct fraction of circumference •^{2} correct formula •^{3} all calculations correct	**3**	•^{1} $\frac{250}{360}$ •^{2} $\frac{250}{360} \times \pi \times 80$ •^{3} 174·5...

12			**Ans:** $p > \frac{1}{3}$ •[1] know to use discriminant •[2] correct values of a, b and c •[3] form correct inequation •[4] solve inequation	**4**	•[1] $b^2 - 4ac$ •[2] $a = p$, $b = -2$, $c = 3$ •[3] $4 - 12p < 0$ •[4] $p > \frac{1}{3}$
13	a		**Ans: 29°** •[1] calculate angle CDH •[2] correct use of sine rule •[3] rearrange equation •[4] find angle CDH	**4**	•[1] 130° •[2] $\frac{50}{\sin \text{CDH}} = \frac{79}{\sin 130°}$ •[3] $\sin \text{CDH} = \frac{50 \sin 130°}{79}$ •[4] 29°
13	b		**Ans: 249°** •[1] use alternate angle •[2] find correct bearing	**2**	•[1] angle alternate to given bearing = 40° •[2] 249°

Total Marks for Paper 2 — 50

[END OF SPECIMEN MARKING INSTRUCTIONS]