



**Education**  
**KwaZulu-Natal Department of Education**  
**REPUBLIC OF SOUTH AFRICA**

**MATHEMATICS P1**  
**MARKING GUIDELINE**  
**COMMON TEST**  
**JUNE 2017**

**NATIONAL**  
**SENIOR CERTIFICATE**

**GRADE 11**

**MARKS: 100**

**N.B. This marking guideline consists of 8 pages.**

**QUESTION 1**

1.1.1	$(x+3)(x-5)=9$ $x^2 - 2x - 15 = 9$ $x^2 - 2x - 24 = 0$ $(x+4)(x-6) = 0$ $x = -4$ or $x = 6$	1A for multiplying out 1CA for factors 1CA for answers	(3)
1.1.2	$x - \sqrt{2x-1} = 2$ $\sqrt{2x-1} = x-2$ $2x-1 = (x-2)^2$ $2x-1 = x^2 - 4x + 4$ $x^2 - 6x + 5 = 0$ $(x-5)(x-1) = 0$ $x = 5$ or $x = 1$ N/A	1A for isolating surd 1CA for squaring both sides 1CA for factors 1CA for $x = 5$	(4)
1.1.3	$1 < (2x-3)^2$ $1 < 4x^2 - 12x + 9$ $-4x^2 + 12x - 8 < 0$ $4x^2 - 12x + 8 > 0$ $x^2 - 3x + 2 > 0$ $(x-2)(x-1) > 0$ CVs: 1; 2 	1A for $-4x^2 + 12x + 8 < 0$ 1CA for $4x^2 - 12x + 8 > 0$ 1CA for factorisation	(5)
1.2.1	$x < 1$ or $x > 2$ OR $(-\infty; 1) \cup (2; \infty)$ $3x^2 = 3x + 5$ $3x^2 - 3x - 5 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(3)(-5)}}{2(3)}$ $= 1,88$ or $-0,88$	2CA for answer 1A for formula 1A for substitution 2CA for answers	(4)

1.2.2	$y + 1 = 1,88$ OR $y + 1 = -0,88$ $y = 0,88$ or $y = -1,88$	2CA for answers (2)
1.3	$x = \frac{3 \pm \sqrt{69}}{6}$ The roots are real, irrational and unequal.	1CA for irrational 1CA for unequal (2)
1.4	$y = -2x + 1$ equation 1 $2x^2 - xy + y^2 = 4$ equation 2 Substitute equation 1 into equation 2: $2x^2 - x(-2x + 1) + (-2x + 1)^2 = 4$ $2x^2 + 2x^2 - x + 4x^2 - 4x + 1 = 4$ $8x^2 - 5x - 3 = 0$ $(8x + 3)(x - 1) = 0$ $x = -\frac{3}{8}$ or $x = 1$ $y = \frac{7}{4}$ or $y = -1$	1A for making $y$ the subject of the formula 1CA for substitution 1CA for standard form 1CA for factorization 1CA for both $x$ -values 1CA for both $y$ -values (6) 1261

QUESTION 2

2.1.1	$\frac{\sqrt{75} - \sqrt{12}}{x} = \sqrt{48}$ $\frac{5\sqrt{3} - 2\sqrt{3}}{x} = 4\sqrt{3}$ $\frac{3\sqrt{3}}{x} = 4\sqrt{3}$ $x = \frac{3\sqrt{3}}{4\sqrt{3}}$ $= \frac{3}{4}$	1A for $5\sqrt{3} - 2\sqrt{3}$ 1A for $4\sqrt{3}$ 1CA for simplification 1CA for answer (4)
2.1.2	$5x^2 - 256 = x^{\frac{2}{3}}$ $4x^2 = 256$ $x^2 = 64$ $x = 64^{\frac{1}{2}}$ $= (2^6)^{\frac{1}{2}}$ $= 2^3$ $= 16$	1A for $x^{\frac{2}{3}}$ 1A for $4x^2$ 1A for $(64)^{\frac{1}{2}}$ 1CA for answer (4)
2.2.1	$\left(\frac{1}{\sqrt{2}} + \sqrt{2}\right)^2$ $= \frac{1}{2} + 2 + 2$ $= 4\frac{1}{2}$	1A for $\frac{1}{2}$ 1A for answer (2)
2.2.2	$\sqrt[3]{\frac{6^m + 5(3^m)}{10^m + 5^{m+1}}}$ $= \sqrt[3]{\frac{2^m \cdot 3^m + 5 \cdot 3^m}{5^m \cdot 2^m + 5 \cdot 5^m}}$ $= \sqrt[3]{\frac{3^m(2^m + 5)}{5^m(2^m + 5)}}$ $= \sqrt[3]{\frac{3^m}{5^m}}$ $= \sqrt[3]{\left(\frac{3}{5}\right)^m}$ $= \frac{3}{5}$	1A for expanding 1CA for factorisation 1CA for simplification 1CA for answer (4) 141

QUESTION 3

3.1.1	40	1A for answer	(1)
3.1.2	<p> <math>2a = 2</math>    <math>3a + b = 1</math>    <math>a + b + c = 4</math>  <math>a = 1</math>    <math>b = 3</math>    <math>c = 0</math>  <math>T_n = n^2 + 3n</math> </p>	1A for $a = 1$ ICA for $b = 3$ ICA for $c = 0$ ICA for $T_n$	(4)
3.1.3	$n^2 + 3n = 460$ $n^2 + 3n - 460 = 0$ $(n - 20)(n + 23) = 0$ $n = 20$ $T_{21} = 21^2 + 3(21)$ $= 504$	ICA for equating $T_n$ to 460 ICA for factorisation ICA for value of $n$ ICA for value of the next term	(4)
3.1.4	First differences: 6; 8; 10; ... $T_n = 2n + 4$	1A for $2n$ 1A for +4	(2)
3.1.5	$2n + 4 = 64$ $n = 30$ Between $T_{30}$ and $T_{31}$	1A for $n = 30$ 1A for $T_{30}$ 1A for $T_{31}$	(3)
3.2	<p> <math>-2x + 42 = 2x - 34</math>  <math>4x = 76</math>  <math>x = 19</math> </p>	1A for $x - 13$ 1A for $29 - x$ and $x - 5$ ICA for 2 <sup>nd</sup> differences ICA for equating second differences ICA for answer	(5)

QUESTION 4

4.1	$h(0) = 2^0 + 1$ $= 2$	1A for substitution 1A for answer	(2)
4.2	$y = 1$	1A for answer	(1)
4.3		1A for shape ICA for y-intercept ICA for asymptote	(3)
4.4	Average gradient $= \frac{f(0) - f(-2)}{0 - (-2)}$ $= \frac{2 - 5}{2}$ $= -\frac{3}{2}$	1A for formula 1A for $f(-2) = 5$ ICA for answer	(3)
4.5	$x < -2$	2A for answer	(2)
			[11]

5.1	$p = 3$ $q = -2$ $y = \frac{a}{x+3} - 2$ Substitute $(-5; 0)$ : $0 = \frac{a}{-5+3} - 2$ $2 = \frac{a}{-2}$ $a = -4$	OR Substitute $(5; -3)$ : $-3 = \frac{a}{1+3} - 2$ $-1 = \frac{a}{4}$ $a = -4$	1A for $p = 3$ 1A for $q = -2$ 1CA for substitution 1CA for answer	(4)
5.2	$x \in \mathbb{R}$ , but $x \neq -3$ OR $(-\infty; -3)$ or $(-3; \infty)$		2A for answer	(2)
5.3	Substitute $(-3; -2)$ in $y = x + k$ : $-2 = -3 + k$ $k = 1$		1A for substitution 1A for answer	(2)
5.4	$-5 \leq x < -3$ or $x \geq 1$ OR $[-5; -3) \cup [1; \infty)$		2A for $-5 \leq x < -3$ 1A for $x \geq 1$	(3)
5.5	Gradient $= \frac{-3-0}{1+5}$ $= -\frac{1}{2}$ $y = \frac{1}{2}x - \frac{5}{2}$		1A for gradient 1CA for answer	(2) (13)

6.1.1	$x = \frac{-b}{2a}$ $= \frac{-(-1)}{2(-\frac{1}{2})}$ $= -1$ $f(-1) = -\frac{1}{2}(-1)^2 - (-1) + 4 = 4\frac{1}{2}$ B $(-1; 4\frac{1}{2})$	1A for substitution 1A for answer (x-coordinate) 1CA for y-coordinate	(3)
6.1.2	C(0; 4)	1A for answer	(1)
6.2	$-\frac{1}{2}x^2 - x + 4 = 0$ $x^2 + 2x - 8 = 0$ $(x+4)(x-2) = 0$ $x = -4$ or $x = 2$ D(-4; 0) E(2; 0)	1A for $-\frac{1}{2}x^2 - x + 4 = 0$ 1A for factors 2CA for answers	(3)
6.3	$y = a(x+4)^2$ $4 = a(-2+4)^2$ $4 = a(2)^2$ $a = 1$ $y = (x+4)^2$	1A for $y = a(x+4)^2$ 1A for substituting $(-2; 4)$ 1CA for answer	(3)
6.4	$y = (x-4)^2$ $= x^2 - 8x + 16$	(x-4) <sup>2</sup> OR $x^2 - 8x + 16$ 2A for answer	(2)
6.5	$k > 4\frac{1}{2}$	2A for answer	(2)
6.6	$f(x) - g(x)$ $= -\frac{1}{2}x^2 - x + 4 - (x+4)^2$ $= -\frac{1}{2}x^2 - x + 4 - x^2 - 8x - 16$ $= -\frac{3}{2}x^2 - 9x - 12$ $f(-3) - g(-3)$ $= -\frac{3}{2}(-3)^2 - 9(-3) - 12$ $= \frac{3}{2}$	1A: $-\frac{1}{2}x^2 - x + 4 - (x+4)^2$ 1A: simplification 1CA: answer	(3) (17)

TOTAL: 100