Mathematics September Memorandum 2019 **Marks:** 100

	Question 1	
1.1	**A** ✓	
1.2	**C** ✓	
1.3	**A** ✓	
1.4	**D** ✓	
1.5	**B** ✓	
1.6	**A** ✓	
1.7	**C** ✓	
1.8	**D** ✓	
1.9	**C** ✓	
1.10	**B** ✓	
	Question 2	
2.1.1	$2x^2 - 162$ $= 2(x^2 - 81)$✓ $= 2(x - 9)(x + 9)$✓✓	3
2.1.2	$x^2 - 16x + 64$ $= (x - 8)(x - 8)$✓✓	2
2.2.1	$4x(3x^2 - 9x + 15)$ $= 12x^3 - 36x^2 + 60x$✓✓✓	3
2.2.2	$\frac{6x^3 - 8x^2 + 2x + 10}{2x}$ $= \frac{6x^3}{2x} - \frac{8x^2}{2x} + \frac{2x}{2x} + \frac{10}{2x}$✓ $= 3x^2 - 4x + 1 + \frac{5}{x}$✓✓✓	4
2.2.3	$2(x + 3)^2 + 4(x - 3)(x + 5)$ $= (x^2 + 6x + 9) + 4(x^2 + 2x - 15)$✓✓✓ $= 2x^2 + 12x + 18 + 4x^2 + 8x - 60$ $= 6x^2 + 20x - 42$✓✓✓	6
2.2.4	$\frac{4x^2 - 1}{4x^2 + 4x + 1}$ $= \frac{(2x+1)(2x-1)}{(2x+1)(2x+1)}$ ✓✓✓✓ $= \frac{2x-1}{2x+1}$ ✓	5
2.3	**Calculate the value of:** $abc - a^3 + b^2 - c \; if \; a = -2; b = 3 \; and \; c = 2$ $= (-2)(3)(2) - (-2)^3 - (3)^2 - 2$✓✓	4

	$= -12 + 8 - 9 - 2$ $= -15$✓✓	

	Question 3	
3.1	$x^2 - 3x = 0$ $x(x-3) = 0$✓ $x = 0 \; or \; x - 3 = 0$✓ $x = 0 \; or \; x = 3$✓✓	4
3.2	$(x-1)^2 = x + 5$ $x^2 - x - x + 1 = x + 5$ ✓ $x^2 - 2x + 1 - x - 5 = 0$ $x^2 - 3x - 4 = 0$ ✓ $(x-4)(x+1) = 0$ ✓ $x - 4 = 0 \; or \; x + 1 = 0$ ✓ $x = 4 \; or \quad x = -1$ ✓	5
3.3	$\frac{2}{x} + 3 = -1; x \neq 0$ $\frac{2}{x} \times x + 3 \times x = 0 \times x$ ✓ $2 + 3x = 0$ ✓ $3x = -2$ $\frac{3x}{3} = \frac{-2}{3}$ ✓ $x = \frac{-2}{3}$ ✓	4
3.4	The length of a rectangle is 6cm more than its width. The area of a rectangle is $216cm^2$.What are the dimensions of this rectangle $let \; the \; width \; be \; x$ $\therefore \; the \; length \; will \; be \; x + 6cm$✓ $\therefore A = l \times b$ $216cm^2 = (x + 6cm)x$✓ $216cm^2 = x^2 + 6x \; cm$ $x^2 + 6x \; cm = 216cm^2$ $(x + 18)(x - 12) = 0$ $x = -18 \; or \; x = 12$✓ *Therefore, the width is 12cm and the length is 18cm*✓	4
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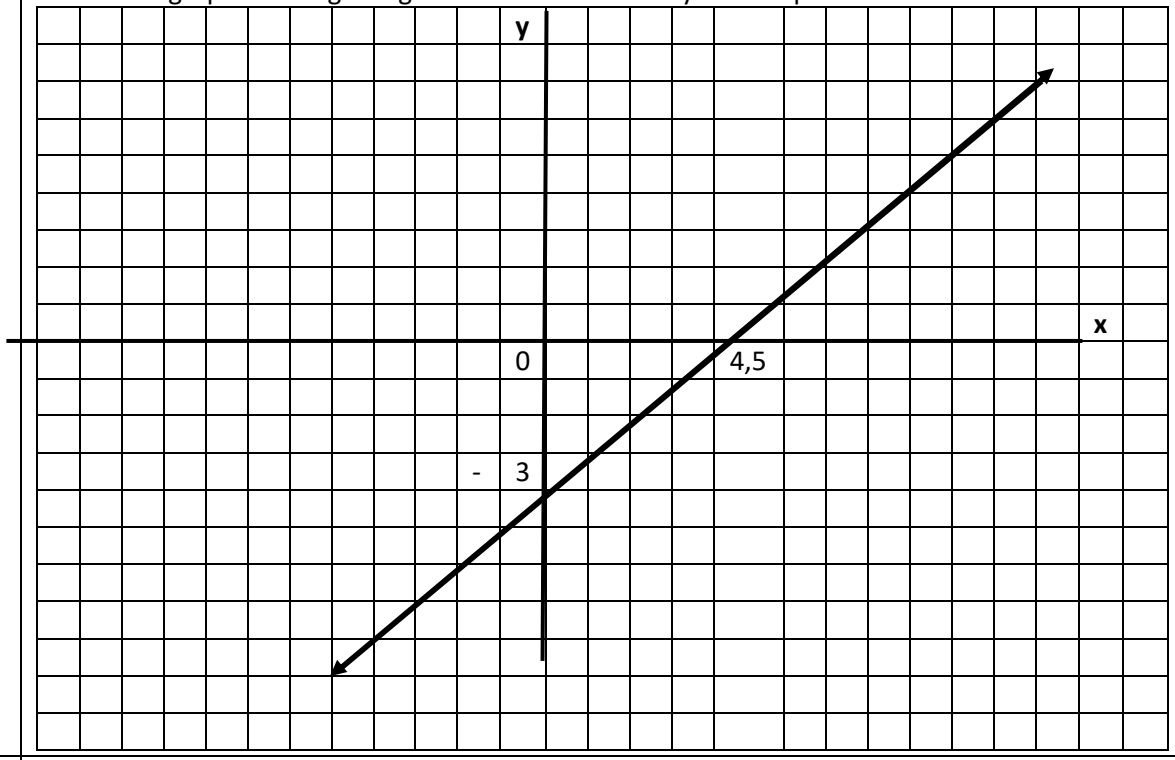
Question 4	

4.1	**Complete the following table for x- and y- values for the equation:** $y = x^2 - 1$ x: -3 | -1 | 0 | **1✓** | **3✓** y: **8✓** | **0✓** | **-1✓** | 0 | 8	3
4.2.1	The gradient of the equation, $-3y = -2x + 9$ $y = \frac{2}{3}x - \frac{9}{3}$ $y = \frac{2}{3}x - 3$✓ $the\ gradient\ is\ \frac{2}{3}$✓	2
4.2.2	The x- intercept of the equation, $\frac{2}{3}x - 3 = 0$✓ $2x - 9 = 0$ $x = \frac{9}{2}$=4,5✓	2
4.2.3	The y- intercept of the equation and $y = -3$✓✓	2
4.2.4	Sketch the graph on the given grid. Indicate the x-and y- intercepts on the sketch.  	5 Y int. ✓ X int. ✓ Line ✓ Y axis ✓ X axis ✓
		14

	Question 5	
5.1.1	Calculate its volume . $V = \pi r^2 h$✓ $V = \pi(1{,}8)(2{,}5)$✓ $V = 4{,}5\pi cm^2$✓	3

5.1.2	Calculate its surface area. $SA = 2\pi r^2$ ✓ $SA = 2\pi(1.8)^2$ ✓ $SA = 6{,}48\pi cm^2$ ✓	3

5.2.1	Triangular prism	1
5.2.2	Volume $= \frac{1}{2} \times 6 \times 6 \times 15cm^3$ ✓✓ $= 270cm^3$ ✓✓	4
5.2.3	TSA $= 2(\frac{1}{2} \times 6 \times 6)cm^2 + 2(15 \times 6)cm^2$ ✓✓ $= 216cm^2$ ✓	3
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	Question 6	
6.1	Volume $= 6 \times 6 \times 13{,}9cm^3$ ✓ $= 500{,}4cm^3$ ✓ $= 500{,}4ml$ ✓	3
6.2	Volume $= 8 \times 8 \times height\ cm^3$ $height \times 8 \times 8 = 500cm^3$ ✓ $height = \frac{500cm^3}{8 \times 8}$ $height = 7{,}8125\text{cm}$ ✓ The height should be 7,9 since 7,8 will give a volume of less than 500ml. ✓	3
	Question 7	
7.1	Open circle means not included. In terms of the context – at zero seconds there is no cost charged.	
7.2	Company A: Charges the same rate for a minute, and then the charge increases as the time increases. For 4 minutes the charge went from R2,50 to a total of R5 four minutes after the first minute. ✓ So then the rate per minute will be: $\frac{5{,}00-2{,}50}{4} = \frac{2{,}50}{4} = 0{,}625 = 62{,}5c = 63c$ per minute starting from R2,50. ✓ Company B: The charges increases as the time increases, as soon as you reach 6 minutes you then pay a flat rate for your call. For 6 minutes the charge went from R5 to a total of R7,50. ✓ So then the rate per minute will be: $\frac{7{,}50-5}{6} = \frac{2{,}50}{6} = 41{,}6 = 42$ cents a minute, starting from R5. ✓	4
7.3	A: Cost = R2,50 + 8(R0,625) ✓ = R7,50 ✓ B: Cost = R7,50 ✓	3
7.4	Cost A = $\begin{cases} R2{,}50\ if\ m < 1 \\ R2{,}50 + 0{,}63m\ if\ m \geq 1 \end{cases}$ ✓✓	4

	Cost B = $\begin{cases} R5 + 0{,}42m \; if \; m < 6 \\ R7{,}50 \; if \; m \geq 6 \end{cases}$ ✓✓ Where m is the number of minutes spoken on the phone	
7.5	For 15 minutes: Cost A = R2,50 + 14(0,63) ✓ = R11,32 ✓ Cost B = R7,50 ✓	3
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