

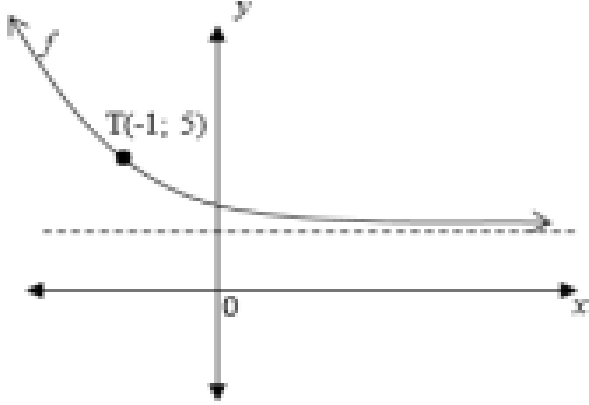


GRADE 11
TECHNICAL MATHEMATICS
MEMORANDUM
PAST PAPER QUESTIONS
FUNCTIONS AND GRAPHS



QUESTION 4		
4.1	$f(0) = (0)^2 - 2(0) - 3$ $= -3$ $A(0; -3)$	(2)
		$f(0) = (0)^2 - 2(0) - 3\checkmark$ $-3\checkmark$ $A(0; -3), \text{Answer only, full marks}$
4.2	$x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $x = 3 \text{ or } x = -1$ $x^2 - 2x - 3 = 0$ $B(-1; 0)$ $C(3; 0)$	(4)
		$(x - 3)(x + 1) \checkmark$ $= 0\checkmark$ $B(-1; 0)\checkmark$ $C(3; 0)\checkmark$
4.3	$m = \frac{0+3}{3+0} = 1$ $A(0; -3)$ $\therefore g(x) = x - 3$	(3)
		$m = 1\checkmark$ $\therefore g(x) = x - 3\checkmark\checkmark$
4.4	$x = \frac{-(-2)}{2(1)} = 1$ $y = (1)^2 - 2(1) - 3 = -4$ $D(1; -4)$	(3)
		$x = 1, \checkmark$ $y = (1)^2 - 2(1) - 3\checkmark$ $(1)^2 - 2(1) - 3\checkmark$ $D(1; -4), \text{answer only, full marks}$
4.5	$x - \text{value at point} = 1$ $\therefore g(1) = (1) - 3 = -2$ $ED = Y_E - Y_D$ $= \text{Max} - \text{Min}$ $ED = 2$	(3)
		$g(1) = (1) - 3\checkmark, \text{correct substitution}$ $y = -2\checkmark$ $ED = 2\checkmark$
4.6	$y \geq -4, y \in \mathbb{R}$ OR $y: y \in [-4; \infty)$	(1)
		$y \geq -4, y \in \mathbb{R}\checkmark$ OR $y: y \in [-4; \infty)\checkmark$

QUESTION 5		
	Given: $f(x) = \frac{3}{x} - 2$ and a circle $x^2 + y^2 = 16$	
5.1	$x = 0$ $y = -2$	$x = 0$ ✓ $y = -2$ ✓ (2)
5.2	For x-intercept, $y = 0$ $0 = \frac{3}{x} - 2$ $\frac{3}{x} = 2$ $x = \frac{3}{2}$ $(\frac{3}{2}; 0)$ There is no y – intercept	$0 = \frac{3}{x} - 2$, equating to zero✓ $x = \frac{3}{2}$ ✓ $(\frac{3}{2}; 0)$ ✓ There is no y – intercept✓ (4)
5.3	$r^2 = 16$ $r = 4$	$r^2 = 16$ ✓ $r = 4$ ✓ Answer only, full marks (2)
5.4		✓, circle ✓both x and y intercepts of the circle ✓shape of the hyperbola ✓x – intercept of the hyperbola ✓, asymptote(s) (5)
5.5	Write down the domain of the circle $-4 \leq x \leq 4$ $x: x \in [-4; 4]$	$-4 \leq x \leq 4$ ✓ or $x: x \in [-4; 4]$ ✓ (1)

QUESTION 6		
	<p>On the sketch below, $f(x) = b^x + 2$, and $T(-1; 5)$ is a point on f</p> 	
6.1	<p>Calculate the value of b.</p> $f(x) = b^x + 2$ $5 = b^{-1} + 2$ $3 = b^{-1}$ $b = 3^{-1} = \frac{1}{3}$	<p>(3)</p> $5 = b^{-1} + 2 \checkmark, \text{correct substitution}$ $3 = b^{-1} \checkmark, \text{simplification}$ $b = 3^{-1} = \frac{1}{3} \checkmark$
6.2	$f(0) = \left(\frac{1}{3}\right)^0 + 2$ $f(0) = 3$ <p>$(0; 3)$</p>	<p>(2)</p> $f(0) = \left(\frac{1}{3}\right)^0 + 2 \checkmark$ $f(0) = 3 \checkmark$
6.3	$f(x) = 3^x + 2$	<p>(2)</p> $f(x) = 3^x + 2 \checkmark \checkmark$
6.4	<p>If $(x; 8)$ is a point on the graph f, calculate the of x.</p> $8 = \left(\frac{1}{3}\right)^x + 2$ $6 = \left(\frac{1}{3}\right)^x$ $x = \log_{\frac{1}{3}} 6$ $x = -1,63$	<p>(3)</p> $6 = \left(\frac{1}{3}\right)^x \checkmark$ $x = \log_{\frac{1}{3}} 6 \checkmark$ $x = -1,63 \checkmark$