GRADE 10 · FUNCTIONS AND GRAPHS

# What a Function Really Is: Words, Tables, Formulae & Graphs (Grade 10)

## MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 22

*Answer all questions. Show all your working — marks are awarded for method as well as the final answer.* **Teacher copy: accept any correct equivalent method.**

**1** Explain, in your own words, what makes a relationship a FUNCTION. (2)

> Every input has exactly ONE output ✓; no input may give two different answers ✓ (2)

**2** Write the rule "multiply by 3, then subtract 4" as a formula in function notation. (2)

> $f(x) = 3x - 4$ ✓✓ (2)

**3** Determine the rule for the table $x$: 1, 2, 3, 4 $\rightarrow$ $y$: 5, 8, 11, 14. (3)

> Constant difference of 3, so $y = 3x + c$ ✓; $5 = 3(1) + c$ so $c = 2$ ✓; $y = 3x + 2$ ✓ (3)

**4** If $f(x) = 4x - 7$, determine $f(3)$. (2)

> $f(3) = 4(3) - 7$ ✓ $= 5$ ✓ (2)

**5** If $f(x) = x^2 + 2x$, determine $f(-3)$. (2)

> $(-3)^2 + 2(-3) = 9 - 6$ ✓ $= 3$ ✓ (2)

**6** If $f(x) = 5x + 1$, determine the value of $x$ for which $f(x) = 26$. (2)

> $5x + 1 = 26$ ✓; $x = 5$ ✓ (2)

**7** Write down the domain and the range of $f(x) = x^2$. (2)

> Domain: $x \in \mathbb{R}$ (all real numbers) ✓; Range: $y \geq 0$ ✓ (2)

**8** Explain why $f(x) = x^2$ is still a function even though $f(-4)$ and $f(4)$ are both 16. (2)

> Two different inputs are allowed to give the same output ✓; the rule is only broken if ONE input gives two different outputs ✓ (2)

**9** State the vertical line test and say what it tells you. (2)

> Slide a vertical line across the graph ✓; if it ever cuts the graph more than once the graph is not a function, because that $x$-value has more than one $y$-value ✓ (2)

**10** A taxi charges R$12$ to get in plus R$7$ per kilometre. Write a formula for the cost C of a journey of $k$ kilometres, and calculate the cost of a $15$ km trip. (3)

> $C = 7k + 12$ ✓✓; $C = 7(15) + 12 = R117$ ✓ (3)

**TOTAL: 22 marks**

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