

Quiz 6

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. pg.117#20 (4 marks) Find $(f \circ g)(x)$, $(g \circ f)(x)$: $f(x) = x^2 - 3$, $g(x) = \frac{1}{x+2}$.

$$(f \circ g)(x) = f(g(x))$$

$$= f\left(\frac{1}{x+2}\right)$$

$$= \left(\frac{1}{x+2}\right)^2 - 3$$

$$(g \circ f)(x) = g(f(x))$$

$$= g(x^2 - 3)$$

$$= \frac{1}{x^2 - 3 + 2}$$

$$= \frac{1}{x^2 - 1}$$

Question 2. pg.110#12 (6 marks) Sketch the graph of the piece-wise function:

$$f(x) = \begin{cases} -x-1 & \text{if } x < -1 \\ -1 & \text{if } -1 \leq x \leq 1 \\ x^2-1 & \text{if } x > 1 \end{cases}$$

$$\begin{matrix} (-\infty, -1) \\ [-1, 1] \\ (1, \infty) \end{matrix}$$

$$\text{Domain} = (-\infty, -1) \cup [-1, 1] \cup (1, \infty) \\ = \mathbb{R}$$

$$\text{Range} = \{-1\} \cup (0, \infty)$$

