SQA Past paper questions

2019 – Paper 1 – Question 12

Functions f and g are defined by

- $f(x)=\frac{1}{\sqrt{x}}$, where $x>0$
- $g(x)=5-x$, where $x\in\mathbb{R}$.

(a) Determine an expression for $f(g(x))$. **2**

(b) State the range of values of x for which $f(g(x))$ is undefined. **1**

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2017 – Paper 1 – Question 1

Functions f and g are defined on suitable domains by $f(x)=5x$ and $g(x)=2\cos x$.

(a) Evaluate $f(g(0))$. **1**

(b) Find an expression for $g(f(x))$. **2**

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2016 – Paper 1 – Question 12

The functions f and g are defined on $\mathbb{R}$, the set of real numbers by $f(x)=2x^2-4x+5$ and $g(x)=3-x$.

(a) Given $h(x)=f(g(x))$, show that $h(x)=2x^2-8x+11$. **2**

(b) Express $h(x)$ in the form $p(x+q)^2+r$. **3**

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Exemplar – Paper 1 – Question 11

Functions f and g are defined on suitable domains by $f(x)=x^3-1$ and $g(x)=3x+1$.

(a) Find an expression for $k(x)$, where $k(x)=g(f(x))$. 2

(b) If $h(k(x))=x$, find an expression for $h(x)$. 3

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2014 – Paper 2 – Question 3

Functions f and g are defined on suitable domains by

$$f(x)=x(x-1)+q \text{ and } g(x)=x+3.$$

(a) Find an expression for $f(g(x))$. 2

(b) Hence, find the value of q such that the equation $f(g(x))=0$ has equal roots. 4

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2012 – Paper 2 – Question 1

Functions f and g are defined on the set of real numbers by

- $f(x)=x^2+3$
- $g(x)=x+4$.

(a) Find expressions for:

(i) $f(g(x))$;

(ii) $g(f(x))$. 3

(b) Show that $f(g(x))+g(f(x))=0$ has no real roots. 3

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2009 – Paper 2 – Question 2

Functions f and g are given by $f(x) = 3x + 1$ and $g(x) = x^2 - 2$.

(a) (i) Find $p(x)$ where $p(x) = f(g(x))$. 3

(ii) Find $q(x)$ where $q(x) = g(f(x))$. 3

(b) Solve $p'(x) = q'(x)$.

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2007 – Paper 1 – Question 3

Functions f and g, defined on suitable domains, are given by $f(x) = x^2 + 1$ and $g(x) = 1 - 2x$.

Find:

(a) $g(f(x))$; 2

(b) $g(g(x))$. 2

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2006 – Paper 1 – Question 3

Two functions f and g are defined by $f(x) = 2x + 3$ and $g(x) = 2x - 3$, where x is a real number.

(a) Find expressions for:

(i) $f(g(x))$;

(ii) $g(f(x))$. 3

(b) Determine the least possible value of the product $f(g(x)) \times g(f(x))$. 2

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