Higher Maths question bank :: Paper 1

13. Composing functions and domains

The questions below refer to the following function definitions:

$f(x) = \sqrt{x-1}$, $g(x) = \frac{5}{x}$, $h(x) = \frac{4x+1}{2x-1}$,

$j(x) = x^2 + 2$, $k(x) = \sqrt[3]{x+1}$, $m(x) = 3x + 1$.

1. a) Find an expression for $g\big(m(x)\big)$.
   b) Find an expression for $m\big(j(x)\big)$.

2. a) State the greatest possible domain in $\mathbb{R}$ of function $j(x)$.
   b) State the range of values of x, if any, for which $f(x)$ is undefined.

3. a) Find an expression for $j\big(g(x)\big)$.
   b) Find an expression for $f\big(j(x)\big)$.

4. a) State the greatest possible domain in $\mathbb{R}$ of function $g(x)$.
   b) State the range of values of x, if any, for which $k(x)$ is undefined.

5. a) Find an expression for $h\big(m(x)\big)$.
   b) Find an expression for $j\big(f(x)\big)$.

6. a) State the greatest possible domain in $\mathbb{R}$ of function $h(x)$.
   b) State the range of values of x, if any, for which $m(x)$ is undefined.

7. a) Find an expression for $g\big(k(x)\big)$.
   b) Find an expression for $k\big(m(x)\big)$.