Section 1 – Evaluating Functions (Substituting in) – Non Calculator – Give answers as simplified surds where appropriate.

(1) 3 different functions are given below:

$$f(x) = \sqrt[3]{x+1} \qquad\qquad g(x) = \sin(x) \qquad\qquad h(x) = 2x^{0.5}$$

Evaluate the following:

(a) f(7)　　　(b) f(−1)　　　(c) g(30°)　　　(d) g(90°)　　　(e) g(45°)　　　(f) h(4)　　　(g) h(27)

(2) $t(x) = 2 + x^5$. Given that $t(a) = 34$, find the value of a.

Section 2 – Composite Functions (Combining Functions) – Non Calculator – Give answers as simplified surds where appropriate.

Tip! Always work inwards out. fg(1) means you do g(1) first followed by f(answer to g(1)).

(1) 3 different functions are given below:

$$f(x) = \cos(x) \qquad\qquad g(x) = x^{-1} \qquad\qquad h(x) = 2x$$

Find the following:

(a) hg(1)　　　(b) hf(60°)　　　(c) fh(15°)　　　(d) hgh(2)　　　(e) gf(0°)　　　(f) gg(-2)　　　(g) hhhhhhhhf(90°)

(2) $f(x) = 2x$. Given that $ff(a) = 108$, find the value of a.

Section 3 – Inverse Functions

(1) A function is given as $f(x)$ and its inverse is $f^{-1}(x)$. If $f(2) = 10$ what does $f^{-1}(10)$ equal?

(2) Find the inverse function of each of the following functions using the correct notation in your answer.

(a) $f(x) = 1 - 3x$　　　(b) $g(x) = \dfrac{5}{x^2}$　　　(c) $f(x) = \sqrt[3]{x} + 4$　　　(d) $g(x) = 3x^{0.5}$　　　(e) $f(x) = x^2 - 2x$

(3) $f(x) = x^2$ for positive values of x. Sketch the graph of $f(x)$ and $f^{-1}(x)$ on the same graph. (It may help remembering the input of one is the output of the other!)

(4) $f(x)$ is a linear function. Part of its graph is shown below. Use algebra to show that $f(x) = f^{-1}(x)$