

Functions  $f$ ,  $g$  and  $h$  are defined as follows:

$$f : x \mapsto x - 4x^{\frac{1}{2}} + 1 \quad \text{for } x \geq 0,$$

$g : x \mapsto mx^2 + n$  for  $x \geq -2$ , where  $m$  and  $n$  are constants,

$$h : x \mapsto x^{\frac{1}{2}} - 2 \quad \text{for } x \geq 0.$$

- (a) Solve the equation  $f(x) = 0$ , giving your solutions in the form  $x = a + b\sqrt{c}$ , where  $a$ ,  $b$  and  $c$  are integers. [4]

[illegible]

(b) Given that  $f(x) \equiv gh(x)$ , find the values of  $m$  and  $n$ .

[4]

[illegible]