$$\mathrm{f}(x) = 4x^{\frac{1}{2}} + x - 5$$

Show that $y = \mathrm{f}(x)$ crosses the x-axis at the point (1, 0) and at no other point. (3)

My answer

Let $z = x^{\frac{1}{2}}$, $z^2 = x$

$$\Rightarrow z^2 + 4z - 5 = 0$$

$$(z+2)^2 - 9 = 0$$

$$z = \pm 3 - 2 \ \therefore z = 1 \text{ or } z = -5$$

$$\Rightarrow x = 1 \text{ or } x = 25$$

Since 25 does not satisfy $\mathrm{f}(x) = 0$, $x = 1$ and only 1 when $y = 0$.

Mark scheme answer

$$x + 4x^{\frac{1}{2}} - 5 = 0$$

$$(x^{\frac{1}{2}} + 5)(x^{\frac{1}{2}} - 1) = 0$$

M1

$$x^{\frac{1}{2}} = 5 \text{ (no real solutions), } 1$$

A1

$$x = 1 \ \therefore (1,\ 0) \text{ and no other point}$$

A1