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DR

$$y = x^2 - 4x^{\frac{1}{2}} \Rightarrow \frac{dy}{dx} = 2x - 4 \times \frac{1}{2} x^{-\frac{1}{2}}$$

$$\frac{dy}{dx} = 0 \text{ gives } x^{\frac{3}{2}} = 1 \Rightarrow x = 1$$

There is only one solution to this so there is only one stationary point on the graph

$$\text{When } x = 1, y = 1 - 4 = -3$$

$$\frac{d^2y}{dx^2} = 2 - 2\left(-\frac{1}{2}\right)x^{-\frac{3}{2}}$$

$$\text{When } x = 1, \frac{d^2y}{dx^2} = 3 > 0$$

So the stationary point is a minimum point

M1**2.1**

Uses fractional power in an attempt to differentiate

M1**3.1a**

Attempt to solve their $\frac{dy}{dx} = 0$

A1**2.2a**

Must obtain $x = 1$ from correct working and indicate that this is the only stationary point

B1**2.1**

From correct working seen (AG)

M1**1.1a**

Attempt to find second derivative

M1**1.1a**

Substituting into their expression

A1**2.2a**

Conclusion from correct working (AG)

Allow SC1 for verifying that $x = 1$ gives $\frac{dy}{dx} = 0$

Alternative for final three marks

Attempt to evaluate $\frac{dy}{dx}$ at a point $x \neq 1$

M1

Attempt to evaluate $\frac{dy}{dx}$ at a point the other side of

M1

$x = 1$

A1

Correct conclusion from correct values

As there is only one stationary point, allow for similarly evaluating y and comparing with -3