Here is an idea: write

$$f'(a) = \lim_{x \to a} \frac{f(x) - f(a)}{x - a}$$

$$= \lim_{x \to a} \frac{x^{3/2} - a^{3/2}}{x - a}$$

$$= \lim_{x \to a} \left(\frac{x^{3/2} - a^{3/2}}{x - a} \cdot \frac{x^{3/2} + a^{3/2}}{x^{3/2} + a^{3/2}} \right)$$

$$= \lim_{x \to a} \frac{x^3 - a^3}{(x - a)(x^{3/2} + a^{3/2})} \;,$$

and then use the formula

$$x^n - a^n = (x - a)\left(x^{n-1} + x^{n-2}a + x^{n-3}a^2 + \cdots + x^2 a^{n-3} + x a^{n-2} + a^{n-1} \right) \;.$$

Alternatively, you can use the same formula to write

$$x^{3/2} - a^{3/2} = (\sqrt{x})^3 - (\sqrt{a})^3 = (\sqrt{x} - \sqrt{a})\left[(\sqrt{x})^2 + \sqrt{x}\sqrt{a} + (\sqrt{a})^2 \right]$$

and

$$x - a = (\sqrt{x})^2 - (\sqrt{a})^2 = (\sqrt{x} - \sqrt{a})(\sqrt{x} + \sqrt{a}) \;.$$

Do not forget to state the domain of the function and the domain of its derivative!