5. $f(x) = \dfrac{2x-3}{\sqrt{x}}$

$= \dfrac{2x-3}{x^{\frac{1}{2}}}$

$= \dfrac{2x^1}{x^{\frac{1}{2}}} - \dfrac{3}{x^{\frac{1}{2}}}$

$= 2x^{\frac{1}{2}} - 3x^{-\frac{1}{2}}$

$f'(x) = 2 \cdot \frac{1}{2} x^{-\frac{1}{2}} - 3\left(-\frac{1}{2}\right) x^{-\frac{1}{2}-1}$

$= x^{-\frac{1}{2}} + \frac{3}{2} x^{-\frac{3}{2}}$

$= \dfrac{1}{x^{\frac{1}{2}}} + \dfrac{3}{2x^{\frac{3}{2}}}$

RECALL $x^{-\frac{1}{2}} \cdot x^{\frac{3}{2}} = x^{\frac{2}{2}}$

$= \dfrac{1 \cdot 2x^{\frac{2}{2}}}{2x^{\frac{3}{2}}} + \dfrac{3}{2x^{\frac{3}{2}}}$

$= \dfrac{2x}{2x^{3/2}} + \dfrac{3}{2x^{3/2}}$

$= \boxed{\dfrac{2x+3}{2x^{\frac{3}{2}}}}$