

3.3.25 Differentiate  $v = \frac{1+x-4\sqrt{x}}{x} = \frac{1+x-4x^{1/2}}{x}$ .

Solution

Let's use the Quotient Rule (Theorem 3.3.4):

$$\frac{dv}{dx} = v' = \frac{[1-4[\frac{1}{2}x^{-1/2}]](x) - (1+x-4x^{1/2})[1]}{(x)^2}$$

$$= \frac{[1-2x^{-1/2}](x) - (1+x-4x^{1/2})[1]}{(x)^2}$$

OR, we have  $v = \frac{1+x-4x^{1/2}}{x} = \frac{1}{x} + \frac{x}{x} - \frac{4x^{1/2}}{x}$

$$= x^{-1} + 1 + 4x^{-1/2}$$

and then  $\frac{dv}{dx} = v' = -x^{-2} + 0 + 4[\frac{-1}{2}x^{-3/2}]$

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