MAT126.R02: QUIZ 2

SOLUTIONS

1. Let $g(x)$ be a function such that $\int_{-4}^{4} g(x)\,dx = 6$ and $\int_{-4}^{-2} g(x)\,dx = 3$.

Compute $\int_{-2}^{4} g(x)\,dx$

Since $\int_{-4}^{-2} g(x)\,dx + \int_{-2}^{4} g(x)\,dx = \int_{-4}^{4} g(x)\,dx = 6$, *we have* $\int_{-2}^{4} g(x)\,dx =$ $6 - \int_{-4}^{-2} g(x)\,dx = 6 - 3 = 3.$

2. Differentiate the following functions:

(a) $f(x) = \dfrac{x^2}{1-\sqrt{x}}$

$$\left(\frac{x^2}{1-\sqrt{x}}\right)' = \frac{(x^2)'(1-\sqrt{x}) - x^2(1-\sqrt{x})'}{(1-\sqrt{x})^2} = \frac{2x(1-\sqrt{x}) - x^2\left(-\frac{1}{2\sqrt{x}}\right)}{(1-\sqrt{x})^2} = \frac{2x - 2x^{3/2} + \frac{1}{2}x^{3/2}}{(1-\sqrt{x})^2} = \frac{2x - \frac{3}{2}x^{3/2}}{(1-\sqrt{x})^2}$$

(b) $g(t) = e^{\sin t}\ln t$

$(e^{\sin t}\ln t)' = (e^{\sin t})'\ln t + e^{\sin t}(\ln t)' = e^{\sin t}\cos t \ln t + e^{\sin t}\frac{1}{t} = e^{\sin t}\left(\cos t \ln t + \frac{1}{t}\right)$

using the chain rule to differentiate $e^{\sin t}$*:*

$u = \sin t$, $(\sin t)' = \cos t$, $(e^u) = e^u$, *so* $(e^{\sin t})' = e^{\sin t}\cos t$