Chapter 3.4: More Practicing the Chain Rule
Calculus I
College of the Atlantic. October 24, 2024

1. Take the derivative of the following functions:

   (a) $f(x) = \sqrt{4 + x}$

   (b) $f(x) = e^4 e^x$

   (c) $f(x) = e^{4+x}$

   (d) $f(x) = e^{4+4x}$

2. A spherical balloon is inflated so that its radius is increasing at a constant rate of 1 cm/s.

   (a) At what rate is air being blown into the balloon[1] when its radius is 5 cm? Be sure to give your answer with proper units.

   (b) At what rate is air being blown into the balloon when its radius is 7 cm?

   (c) Which of your answers is larger? Does this make sense?

3. Find the derivative of the following functions

   (a) $f(x) = \frac{4x^2}{\sqrt{4+x}}$

   (b) $f(x) = (1 + \sqrt{x^2 - 4})^{\frac{4}{3}}$

   (c) $f(x) = \frac{7x}{4}$

   (d) $f(x) = \frac{x}{e^x + 7}$

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[1]Note that this is the same as the rate of change of the volume of the balloon.