MATH 110 Problem Set 2.9

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Not part of the course

The following problems based on Section 2.9 of the textbook will help you study. *You do not need to hand in solutions to these problems.*

1. (Based on 2.9.1–4) Find the linearization $L(x)$ of the function at a.

   (a) $f(x) = 1/\sqrt{2+x}$, $a = 0$ (b) $f(x) = x^{3/4}$, $a = 16$

2. (Based on 2.9.11–14) Find the differential of each function.

   (a) $y = s/(1+2s)$ (b) $y = u\cos u$ (c) $y = (t + \tan t)^5$ (d) $y = \sqrt{z + 1/z}$

3. (Based on 2.9.19–22) Let $y = \sqrt{x}$. Compute Δy and dy for $x = 1$ and $\Delta x = dx = 1$. Then sketch a diagram like Figure 5 in Section 2.9 of the textbook showing dx, dy, and Δy.

4. (Based on 2.9.36) One side of a right triangle is known to be 20 cm long and the opposite angle is measured as $30°$, with a possible error of $\pm 1°$.

   (a) Use differentials to estimate the error in computing the length of the hypoteneuse.

   (b) What is the percentage error?

You may find the following additional exercises from Section 2.9 helpful.

2.9 C-level: 1–30;
      B-level: 31–34;
      A-level: 35–42