

MATH 110 Problem Set 2.3

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The following problems based on Section 2.3 of the textbook will help you study. *You do not need to hand in solutions to these problems.*

1. (Based on 2.3.1–22) Differentiate the following functions using any of the differentiation formulas you know.

(a) $f(t) = \frac{2t}{4+t^2}$ (b) $y = \frac{x+1}{x^3+x-3}$ (c) $y = \frac{t}{(t-1)^2}$ (d) $g(t) = \frac{t-\sqrt{t}}{t^{1/3}}$

2. (Based on 2.3.55–58) Find equations of the tangent line and normal line to the curve at the given point.

(a) $y = (1+2x)^2$, $(1, 9)$ (b) $y = \frac{\sqrt{x}}{x+1}$, $(4, 0.4)$

3. (Based on 2.3.69–72) If $f(1) = 3$, $f'(1) = -2$, $g(1) = -1$ and $g'(1) = 2$, find $h'(1)$ for the following functions.

(a) $h(x) = 3f(x) - 5g(x)$ (c) $h(x) = f(x)/g(x)$
(b) $h(x) = f(x)g(x)$ (d) $h(x) = (2f(x) - 1)/(g(x) + 3)$

4. (Based on 2.3.80–82) Find equations of the tangent lines to the curve $y = \frac{x-1}{x+1}$ that are parallel to the line $x - 2y = 2$.

5. (Based on 2.3.87, 102) Find an expression for $(fgh)''$ (the second derivative of the product of three functions).

You may find the following additional exercises from Section 2.3 helpful.

2.3 C-level: 1–22, 25–44, 51–52, 53–54, 55–58, 59–62, 63–66

B-level: 23–24, 45, 46–48, 49–50, 67, 68, 69–72, 73–74, 75–76, 77–82, 83–86, 93–96,

A-level: 87, 88–92, 97–100, 101–110