

Brief answer to selected problems in HW03

1. Section 3.2: Problem 48.

- a. $\{x \mid -3 \leq x \leq 3, \text{ and } x \neq 2, \neq -2\}$
- b. $\{2, -2\}$
- c. $\phi(\text{empty set})$

2. Section 3.2: Problem 54.

Assume tangent line intersect with the curve at (x_0, y_0) . Then solve the equations for $x_0 \geq 0$

$$\begin{cases} y_0 = \frac{1}{2\sqrt{x_0}}(x_0 + 1) \\ y_0 = \sqrt{x_0} \end{cases}$$

3. Section 3.2: Problem 57.

Observing following limits for $\lim_{t \rightarrow 0} \frac{g(t)}{h(t)}$

$$(1) \begin{cases} g(t) = t^2 \\ h(t) = t \end{cases} \quad (2) \begin{cases} g(t) = t \\ h(t) = 2t \end{cases} \quad (3) \begin{cases} g(t) = t \\ h(t) = t^2 \end{cases}$$

4. Section 3.3: Problem 70.

$$\begin{array}{ll} \text{continuity:} & -a + b = b - 3 \\ \text{differentiable:} & a = -2b \end{array}$$

5.

$$\frac{d^n}{dx^n}(f(x)g(x)) = \sum_{k=0}^n C_k^n \left(\frac{d^k}{dx^k} f\right) \left(\frac{d^{n-k}}{dx^{n-k}} g\right)$$