

1. (1 pt) Evaluate the limit

$$\lim_{b \rightarrow 1} \frac{1-b}{1-\sqrt{b}}$$

2. (1 pt) Evaluate the limit

$$\lim_{a \rightarrow 2} \frac{\frac{1}{a} - \frac{1}{2}}{a-2}$$

3. (1 pt) Let

$$f(x) = \begin{cases} 8 & \text{if } x > 3 \\ 3 & \text{if } x = 3 \\ -x + 8 & \text{if } -8 \leq x < 3 \\ 16 & \text{if } x < -8 \end{cases}$$

Sketch the graph of this function and find following limits if they exist (if not, enter DNE).

- ___1. $\lim_{x \rightarrow 3^-} f(x)$
- ___2. $\lim_{x \rightarrow 3^+} f(x)$
- ___3. $\lim_{x \rightarrow 3} f(x)$
- ___4. $\lim_{x \rightarrow -8^-} f(x)$
- ___5. $\lim_{x \rightarrow -8^+} f(x)$
- ___6. $\lim_{x \rightarrow -8} f(x)$

4. (1 pt) Let $\lim_{x \rightarrow a} f(x) = -8$, $\lim_{x \rightarrow a} g(x) = 0$, $\lim_{x \rightarrow a} h(x) = 2$. Find following limits if they exist. If not, enter DNE ('does not exist') as your answer.

- ___1. $\lim_{x \rightarrow a} f(x) + g(x)$
- ___2. $\lim_{x \rightarrow a} f(x) - g(x)$
- ___3. $\lim_{x \rightarrow a} f(x) * h(x)$
- ___4. $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$
- ___5. $\lim_{x \rightarrow a} \frac{f(x)}{h(x)}$
- ___6. $\lim_{x \rightarrow a} \frac{h(x)}{f(x)}$
- ___7. $\lim_{x \rightarrow a} \sqrt{g(x)}$
- ___8. $\lim_{x \rightarrow a} g(x)^{-1}$
- ___9. $\lim_{x \rightarrow a} \frac{1}{g(x) - h(x)}$

5. (1 pt) Evaluate the limits. If a limit does not exist, enter "DNE".

$$\lim_{x \rightarrow -20^+} \frac{|x+20|}{x+20} = \underline{\hspace{2cm}}$$

$$\lim_{x \rightarrow -20^-} \frac{|x+20|}{x+20} = \underline{\hspace{2cm}}$$

$$\lim_{x \rightarrow -20} \frac{|x+20|}{x+20} = \underline{\hspace{2cm}}$$

6. (1 pt) If

$$12x - 54 \leq f(x) \leq x^2 + 4x - 38$$

determine $\lim_{x \rightarrow 4} f(x) = \underline{\hspace{2cm}}$

What theorem did you use to arrive at your answer?