

Name:

Solutions

MAC 2311 - Analytical Geometry and Calculus I
Quiz # 2, September 7, 2023

Problem 1 Evaluate the following limits,

a) (3 points)

$$\begin{aligned} & \lim_{x \rightarrow 0} \frac{3((x-5)^2 - 25)}{x} \\ &= \lim_{x \rightarrow 0} \frac{3(x^2 - 10x + 25 - 25)}{x} \\ &= \lim_{x \rightarrow 0} \frac{3(x^2 - 10x)}{x} \\ &= \lim_{x \rightarrow 0} \frac{3x(x-10)}{x} \\ &= \lim_{x \rightarrow 0} 3(x-10) \\ &= \boxed{-30} \end{aligned}$$

• 2 points for simplifying expression.

• 1 point for correct solution.

b) (3 points)

$$\begin{aligned} & \lim_{x \rightarrow 0} \frac{\sqrt{2x+3} - \sqrt{3}}{x} \\ &= \lim_{x \rightarrow 0} \frac{(\sqrt{2x+3} - \sqrt{3})(\sqrt{2x+3} + \sqrt{3})}{x(\sqrt{2x+3} + \sqrt{3})} \quad (1 \text{ point}) \\ &= \lim_{x \rightarrow 0} \frac{(2x+3) - 3}{x(\sqrt{2x+3} + \sqrt{3})} \\ &= \lim_{x \rightarrow 0} \frac{2x}{x(\sqrt{2x+3} + \sqrt{3})} \\ &= \lim_{x \rightarrow 0} \frac{2}{\sqrt{2x+3} + \sqrt{3}} \quad (1 \text{ point}) \\ &= \frac{2}{\sqrt{0+3} + \sqrt{3}} \\ &= \frac{2}{2\sqrt{3}} \\ &= \boxed{\frac{1}{\sqrt{3}}} \quad (1 \text{ point}) \end{aligned}$$

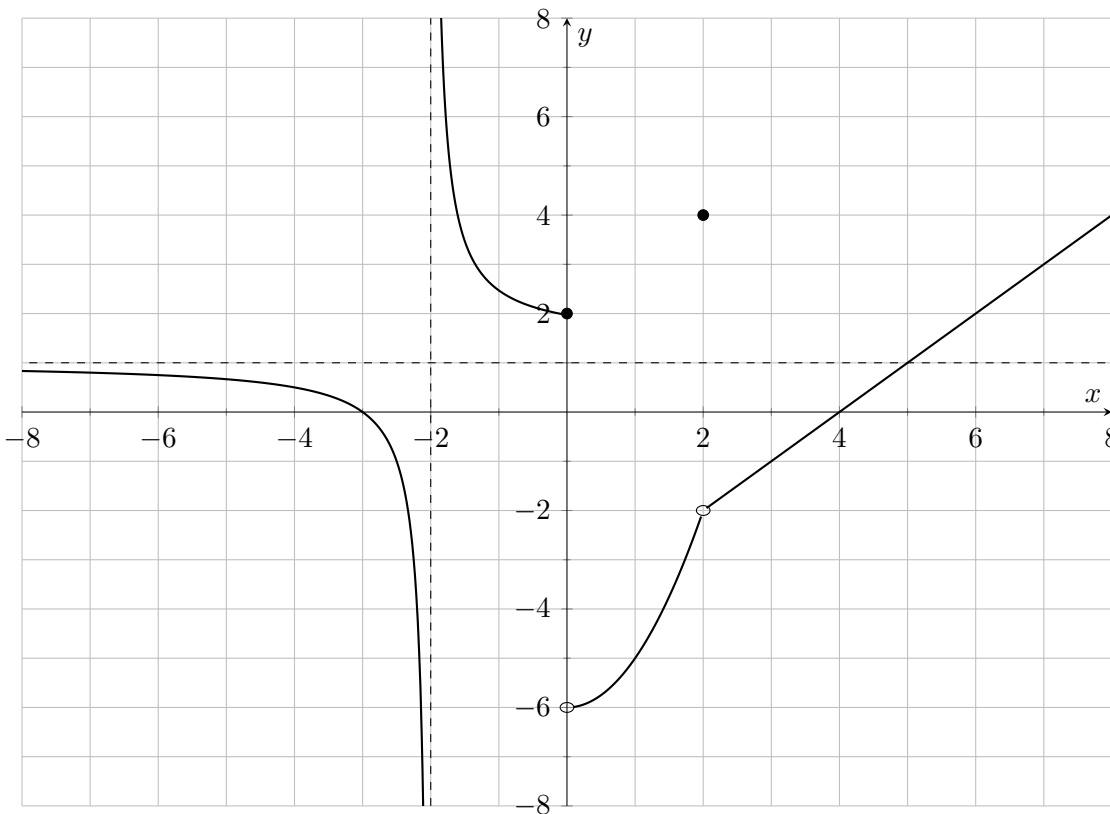
or

$$\boxed{\frac{\sqrt{3}}{3}}$$

(4 points)

Problem 2 :

Consider the graphs of the function f .



A graph of a function f is given above. Use the graph to evaluate the limits, and the function values. Infinite limits should be answer with $-\infty$, ∞ where appropriate, and if the limit does not exist state "DNE".

a) 0.5

$$\lim_{x \rightarrow -2^-} f(x) = -\infty$$

e) 0.5

$$\lim_{x \rightarrow -2^+} f(x) = \infty$$

b) 0.5

$$\lim_{x \rightarrow -\infty} f(x) = 1$$

f) 0.5

$$f(0) = 2$$

c) 0.5

$$f(2) = 4$$

g) 0.5

$$\lim_{x \rightarrow 6} f(x) = 2$$

d) 0.5

$$\lim_{x \rightarrow 0} f(x) = \text{DNE}$$

h) 0.5

$$\lim_{x \rightarrow 0^+} f(x) = -6$$