

Last Name: SOLUTIONS

First Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

## Quiz 1

**Question 1.** Use the graph of  $f(x)$  below to find the following:

(a) (0.5 marks)  $\lim_{x \rightarrow 2} f(x) = 2$

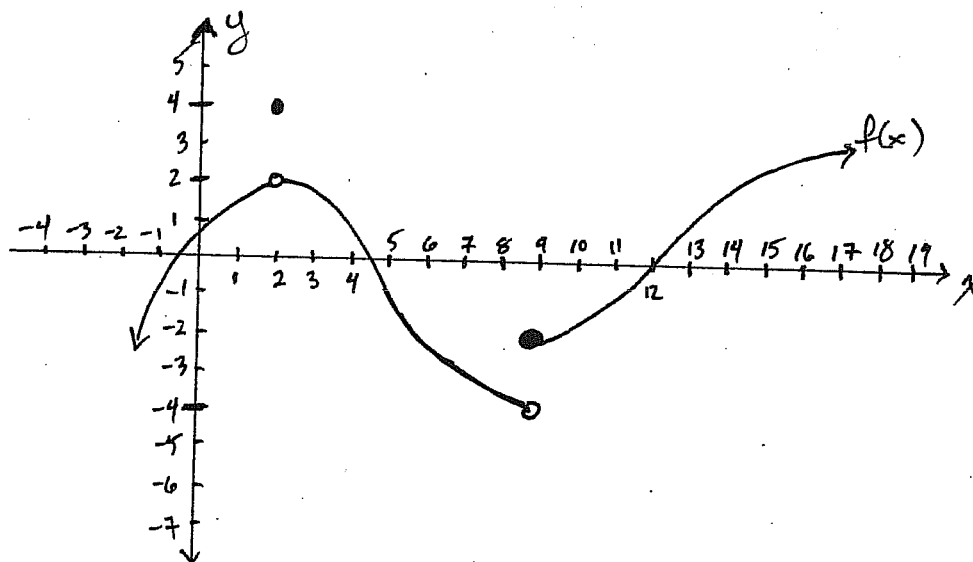
(b) (0.5 marks)  $f(2) = 4$

(c) (0.5 marks)  $\lim_{x \rightarrow 9^-} f(x) = -4$

(d) (0.5 marks)  $\lim_{x \rightarrow 9^+} f(x) = -2$

(e) (0.5 marks)  $\lim_{x \rightarrow 9} f(x)$  D.N.E.

(f) (0.5 marks)  $\lim_{x \rightarrow 12} f(x) = 0$



**Question 2.** (7 marks) Find the following limits:

$$(a) \lim_{t \rightarrow -3} \frac{t^2 - 9}{2t^2 + 7t + 3} = \text{I.F. } \frac{0}{0}$$

$$= \lim_{t \rightarrow -3} \frac{(t+3)(t-3)}{(t+3)(2t+1)}$$

$$= \lim_{t \rightarrow -3} \frac{t-3}{2t+1} = \frac{(-3)-3}{2(-3)+1} = \frac{-6}{-5} = \frac{6}{5}$$

$$\begin{aligned} & 2t^2 + 7t + 3 \\ &= 2t^2 + 6t + t + 3 \\ &= 2t(t+3) + (t+3) \\ &= (t+3)(2t+1) \end{aligned}$$

$$(b) \lim_{x \rightarrow -4} \frac{\sqrt{x^2+9}-5}{x+4} = \lim_{x \rightarrow -4} \frac{\sqrt{x^2+9}-5}{x+4} \cdot \frac{\sqrt{x^2+9}+5}{\sqrt{x^2+9}+5}$$

$$= \lim_{x \rightarrow -4} \frac{(x^2+9)-25}{(x+4)(\sqrt{x^2+9}+5)} = \lim_{x \rightarrow -4} \frac{x^2-16}{(x+4)(\sqrt{x^2+9}+5)}$$

$$= \lim_{x \rightarrow -4} \frac{(x+4)(x-4)}{(x+4)(\sqrt{x^2+9}+5)} = \lim_{x \rightarrow -4} \frac{x-4}{\sqrt{x^2+9}+5}$$

$$= \frac{-4-4}{\sqrt{(-4)^2+9}+5} = -\frac{8}{10} = -\frac{4}{5}$$