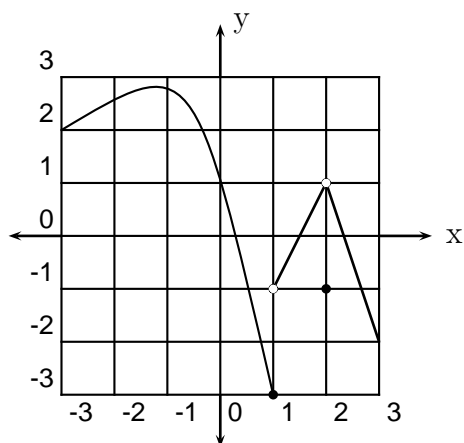


## 231 Gateway 1 Practice Test - Limits

No uses of Calculators; No Partial Credit. 30 minutes to finish test. More space will be provided on the actual test.

1. (24 pts) Find the Limits (or write DNE for "does not exist") for the function  $y = f(x)$  given by the graph:



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

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

(c)  $\lim_{x \rightarrow 1^+} f(x) =$

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

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

(f) State the numbers at which the function is discontinuous.

2. (8 pts) State the intervals on which the following functions are continuous.

(a)  $f(x) = 16x^4 - 3x^3 + 2x + 1$

(b)  $g(y) = \frac{67}{y^2 - 9}$

3. (42 pts) Find the limits. In each case, your answer should be a number, or  $\infty$ , or  $-\infty$  (or DNE if none of these apply.)

(a)  $\lim_{x \rightarrow 3} x^2 - x + 1$

(b)  $\lim_{x \rightarrow -2} \frac{(x+2)(x+3)}{(x+2)}$

(c)  $\lim_{t \rightarrow 2^-} \frac{3}{t-2}$

(d)  $\lim_{t \rightarrow 2^+} \frac{3}{t-2}$

(e)  $\lim_{s \rightarrow 5} \frac{5}{(s-5)^2}$

(f)  $\lim_{t \rightarrow 0} \frac{5t}{\sin(2t)}$

4. (7 pts) Find the limit:  $\lim_{t \rightarrow -\infty} \frac{1}{(t+1)^2} - 2$ .

5. (7 pts) Find the limit:  $\lim_{u \rightarrow \infty} \frac{3u^2 + 1}{u^2 + 3}$ .

6. (12 pts) Give equations for the horizontal and vertical asymptotes of  $y = \frac{3x+1}{2-x}$

Horizontal Asymptote:

Vertical Asymptote: