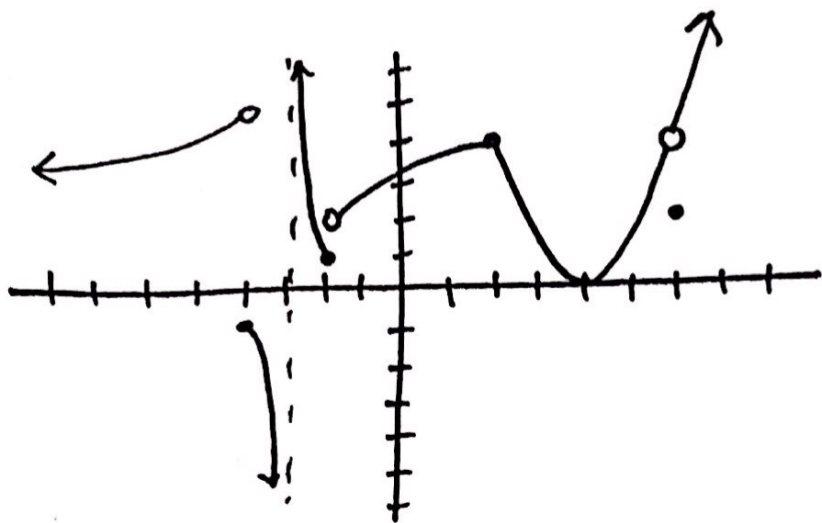


AP Calculus AB
Unit 1 Quiz 1 Review

Name: Key

1) State the limit or value.



a) $f(-2) = \underline{1}$

b) $\lim_{x \rightarrow -2} f(x) = \underline{\text{DNE}}$

c) $f(-4) = \underline{-1}$

d) $\lim_{x \rightarrow -4} f(x) = \underline{\text{DNE}}$

e) $\lim_{x \rightarrow -3} f(x) = \underline{\text{DNE}}$

f) $\lim_{x \rightarrow 6} f(x) = \underline{4}$

g) $f(6) = \underline{2}$

2) Evaluate the limit.

a) $\lim_{x \rightarrow 4} \frac{x^2 - 2x - 8}{x - 4}$

$\frac{(x-4)(x+2)}{x-4} = x+2$
 $4+2 = \underline{6}$

b) $\lim_{x \rightarrow 9} \frac{x-9 \cdot \sqrt{x+3}}{\sqrt{x-3} \sqrt{x+3}}$

$= \frac{(x-9)(\sqrt{x+3})}{x+3 \sqrt{x-3} \sqrt{x+3}} = \frac{(x-9)(\sqrt{x+3})}{x+3 \sqrt{x-3}}$
 $= \sqrt{x+3} = \sqrt{9+3} = \underline{6}$

c) $\lim_{x \rightarrow 2} \frac{(2x+1)^2 - 25}{x-2}$

$\frac{(2x+1)(2x+1) - 25}{x-2} = \frac{4x^2 + 4x + 1 - 25}{x-2} = \frac{4x^2 + 4x - 24}{x-2}$
 $= \frac{4(x^2 + x - 6)}{x-2} = \frac{4(x+3)(x-2)}{x-2} = 4(x+3)$
 $4(2+3) = \underline{20}$

d) $\lim_{x \rightarrow 1} \frac{\frac{2x}{x+1} - 1}{x-1}$

$= \frac{\frac{2x}{x+1} - \frac{x+1}{x+1}}{x-1} = \frac{\frac{2x-x-1}{x+1}}{x-1} = \frac{\frac{x-1}{x+1}}{x-1} = \frac{1}{x+1} = \underline{\frac{1}{2}}$

e) $\lim_{\theta \rightarrow 0} \frac{6 - 6\cos\theta}{\theta}$

$= \frac{6(1 - \cos\theta)}{\theta}$
 $= 6 \cdot 0 = \underline{0}$

f) $\lim_{x \rightarrow 0} \frac{3\sin x}{x} + 1$

$= 3 \cdot \frac{\sin x}{x} + 1$
 $= 3 \cdot 1 + 1 = \underline{4}$

3) Name the discontinuity on the graph from #1 at...

f(-4) Jump discontinuity

f(-3) Asymptote

f(6) Removable discontinuity

4) State the discontinuities and the interval of continuity for...

$f(x) = \begin{cases} \frac{1}{x+1}, & x \leq 1 \\ \frac{1}{3-x}, & x > 1 \end{cases}$
Asymptotes at $x = -1$ and $x = 3$, possible disc at $x = 1$
 $\frac{1}{1+1} = \frac{1}{2}$
 $\frac{1}{3-1} = \frac{1}{2} \rightarrow$ continuous at $x = 1$
 $(-\infty, -1) \cup (-1, 1] \cup (3, \infty)$