2.1-2.3 AP PRACTICE QUESTIONS (With Work Space)

Multiple Choice Practice

1. $\lim_{x \to 0} \frac{4x-3}{7x+1} =$

A. ∞ B. $-\infty$ C. 0 D. $\frac{4}{7}$ E. -3

2. $\lim_{x \to \frac{1}{3}} \frac{9x^2-1}{3x-1} =$

A. ∞ B. $-\infty$ C. 0 D. 2 E. 3

3. $\lim_{x \to 2} \frac{x^3-8}{x^2-4} =$

A. 4 B. 0 C. 1 D. 3 E. 2

4. The function $G(x) = \begin{cases} x-3, & x<2 \\ -5, & x=2 \\ 3x-7, & x>2 \end{cases}$ is not continuous at $x=2$ because…

A. $G(2)$ is not defined
B. $\lim_{x \to 2} G(x)$ does not exist
C. $\lim_{x \to 2} G(x) \neq G(2)$
D. Only reasons B and C
E. All of the above reasons.

5. $\lim_{x \to \infty} \frac{-3x^2+7x^3+2}{2x^3-3x^2+5} =$

A. ∞ B. $-\infty$ C. 1 D. $\frac{7}{2}$ E. $-\frac{3}{2}$

6. $\lim_{x \to -2} \frac{\sqrt{2x+5}-1}{x+2} =$

A. 1 B. 0 C. ∞ D. $-\infty$ E. Does Not Exist

7. If $f(x)=3x^2-5x$, then find $\lim\limits_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$.

A. $3x-5$
B. $6x-5$
C. $6x$
D. 0
E. Does not exist

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8. $\lim\limits_{x\to -\infty}\dfrac{2-5x}{\sqrt{x^2+2}}=$

A. 5 B. –5 C. 0 D. $-\infty$ E. ∞

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9. The function $f(x)=\dfrac{2x^2+x-3}{x^2+4x-5}$ has a vertical asymptote at $x=-5$ because…

A. $\lim\limits_{x\to -5^+} f(x)=\infty$

B. $\lim\limits_{x\to -5^-} f(x)=-\infty$

C. $\lim\limits_{x\to -5^-} f(x)=\infty$

D. $\lim\limits_{x\to \infty} f(x)=-5$

E. $f(x)$ does not have a vertical asymptote at $x=-5$

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10. Consider the function $H(x)=\begin{cases}3x-5, & x<3\\ x^2-2x, & x\geq 3\end{cases}$. Which of the following statements is/are true?

I. $\lim\limits_{x\to 3^-} H(x)=4$.

II. $\lim\limits_{x\to 3} H(x)$ exists.

III. $H(x)$ is continuous at $x=3$.

A. I only B. II only C. I and II only

D. I, II and III E. None of these statements is true

Free Response Practice #1
Calculator Permitted

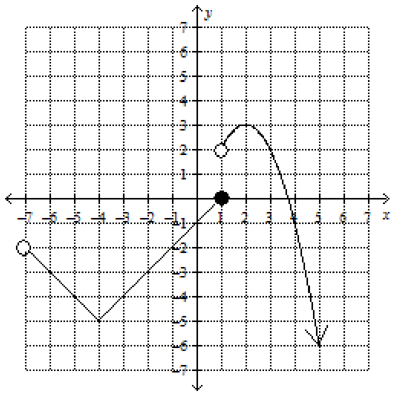
Consider the function $h(x) = \dfrac{-2x - \sin x}{x-1}$ to answer the following questions.

a. Find $\lim\limits_{x \to 1^+} h(x)$. Show your numerical analysis that leads to your answer and explain what this result implies graphically about $h(x)$ at $x = 1$.

b. Find $\lim\limits_{x \to \frac{\pi}{2}} \left[h(x) \cdot (2x-2)\right]$. Show your analysis.

c. Explain why the Intermediate Value Theorem guarantees a value of c on the interval [1.5, 2.5] such that $h(c) = -4$. Then, find c.

Free Response Practice #2
Calculator NOT Permitted



Graph of $g(x)$

$$f(x)=\begin{cases} ax+3, & x<-3 \\ x^2-3x, & -3\le x<2 \\ bx-5, & x\ge 2 \end{cases}$$

Equation of $f(x)$

Pictured above is the graph of a function $g(x)$ and the equation of a piece-wise defined function $f(x)$. Answer the following questions.

a. Find $\lim_{x\to 1^+}\left[2g(x)-f(x)\cdot\cos \pi x\right]$. Show your work applying the properties of limits.

b. On its domain, what is one value of x at which $g(x)$ is discontinuous? Use the three part definition of continuity to explain why $g(x)$ is discontinuous at this value.

c. For what value(s) of a and b, if they exist, would the function $f(x)$ be continuous everywhere? Justify your answer using limits.