

Unit 1 Review

Monday, August 31, 2015
12:49 PM

Limit Multiple Choice Answers:

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|------|-------|
| 1. B | 9. E |
| 2. A | 10. D |
| 3. C | 11. A |
| 4. A | 12. B |
| 5. B | 13. C |
| 6. D | 14. B |
| 7. B | 15. B |
| 8. B | |

Unit 1 Limits and Continuity Review

I. Name the vertical asymptotes, horizontal asymptotes and holes:

<p>1. $f(x) = \frac{x^3+1}{x-1}$ VA: $x=1$ HA: None Hole: None</p>	<p>2. $g(x) = \frac{x^2-2x}{x^2-4} = \frac{x(x-2)}{(x-2)(x+2)}$ VA: $x=-2$ HA: $y=1$ Hole: $x=2$</p>	<p>3. $h(x) = \frac{3}{x}$ VA: $x=0$ HA: $y=0$ Hole: None</p>
<p>4. $f(x) = \frac{5+x}{x^2-25} = \frac{x+5}{(x+5)(x-5)}$ VA: $x=5$ HA: $y=0$ Hole: $x=-5$</p>	<p>5. $g(x) = \frac{4}{x^2+4x-5} = \frac{4}{(x+5)(x-1)}$ VA: $x=-5$ HA: $y=0$ $x=1$ Hole: None</p>	<p>6. $h(x) = \frac{x}{2x^2+3x} = \frac{x}{x(2x+3)}$ VA: $x=-3/2$ HA: $y=0$ Hole: $x=0$</p>

II. Justify your answers for #1, #2, #3 above:

<p>1. VA: $\lim_{x \rightarrow 1^+} f(x) = \infty$ HA: $\lim_{x \rightarrow \infty} f(x) = \infty$</p>	<p>2. VA: $\lim_{x \rightarrow -2^+} g(x) = -\infty$ HA: $\lim_{x \rightarrow \infty} g(x) = 1$</p>	<p>3. VA: $\lim_{x \rightarrow 0^+} h(x) = \infty$ HA: $\lim_{x \rightarrow \infty} h(x) = 0$</p>
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III. Continuity

1. Name the 4 types of discontinuities:

removable, jump, infinite, oscillating

2. Give the calculus definition of continuity:

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

3. Show that $f(x) = x^4 + 2x - 1$ has a zero on $[0,1]$.

Give an explanation justifying your answer.

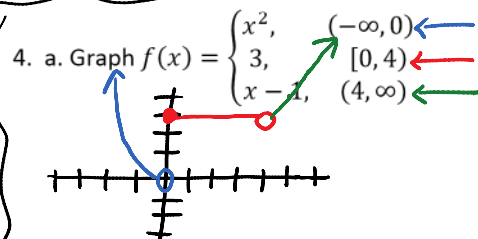
$f(0) = -1$ $f(x)$ is continuous on $[0,1]$ so
 $f(1) = 2$ by the IVT, $f(x)$ must take on every y value b/w -1 and 2 .
 $\therefore f(x)$ must = 0 on $[0,1]$.

IV. Sketch a graph and find an equation given:

- $f(x) = 0$ at $x = 2$ $(2,0)$
- $f(0) = -1$ $(0,-1)$
- $f(x)$ DNE at $x = -1, 4$ hole or asympt.
- $\lim_{x \rightarrow 4^+} f(x) = -\infty$ VA. $x = 4$
- $\lim_{x \rightarrow 4^-} f(x) = \infty$ VA. $x = 4$
- $\lim_{x \rightarrow \infty} f(x) = \lim_{x \rightarrow -\infty} f(x) = -2$ HA $y = -2$

Equation:

$$f(x) = \frac{-2(x-2)(x+1)}{(x-4)(x+1)}$$



b. Name all the discontinuities of $f(x)$ and give the types. Then use limits to justify each type.

$x=0$ Jump $\lim_{x \rightarrow 0^-} f(x) \neq \lim_{x \rightarrow 0^+} f(x)$
 $x=4$ Removable $f(4)$ DNE but $\lim_{x \rightarrow 4} f(x) = 3$

