March 06, 2017

Clavis

Test Review

1. Are the following symmetric to the y-axis, origin or neither? How do you know?

a. $y = 3x^{10} - 5x^{4} + 2x^{2}$

Symmetric with y-axis
All even exponents

b. $y = -7x^{7} + 4x^{4} - 3x^{1}$

Neither, exponents are different.

c. $y = -5x^{11} + 2x^{7} + 4x^{3}$

odd exponents
Symmetric w/ origin

2. Is $y = \dfrac{x}{x^2 - 1}$ even, odd, both or neither?

Even: $(-x, y)$

$y = \dfrac{-x}{(-x)^2 - 1}$

$y = \dfrac{-x}{x^2 - 1}$

No

Odd: $(-x, -y)$

$-y = \dfrac{-x}{(-x)^2 - 1}$

$-1(-y) = \left(\dfrac{-x}{x^2 - 1}\right) - 1$

$y = \dfrac{x}{x^2 - 1}$ ✓ Same odd

∴ Symmetric with origin

3. Describe the end behavior of the following:

a. $f(x) = -3x^5 + 2x^4 - 2x^2$

As $x \to +\infty$, $f(x) \to -\infty$

As $x \to -\infty$, $f(x) \to +\infty$

b. $f(x) = 4x^4 - 3x^3 + 2$

As $x \to +\infty$, $f(x) \to +\infty$

As $x \to -\infty$, $f(x) \to +\infty$

4. Find the inverse of $y = 2x^2 + 5$ and determine if the inverse is a function.

$y = 2x^2 + 5$

$x = 2y^2 + 5$

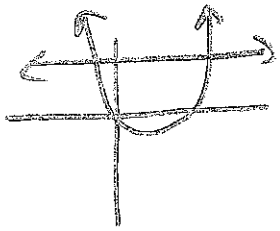
$-5 \quad -5$

$\frac{x-5}{2} = \frac{2y^2}{2}$

$\sqrt{y^2} = \sqrt{\frac{x-5}{2}}$

$y = \pm\sqrt{\frac{x-5}{2}}$

$f^{-1}(x) = \pm\sqrt{\frac{x-5}{2}}$



Not a function since $f(x)$ does not pass the HLT

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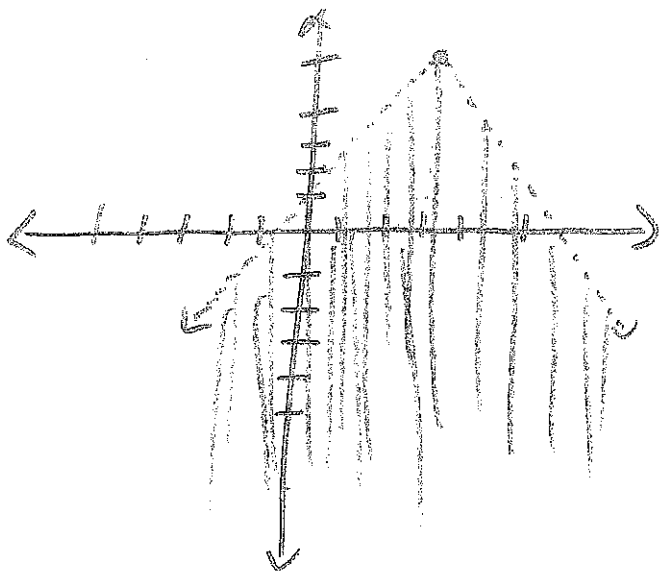
5. Given: $y < -|x - 3| + 5$

a. Identify the parent graph. $y < |x|$

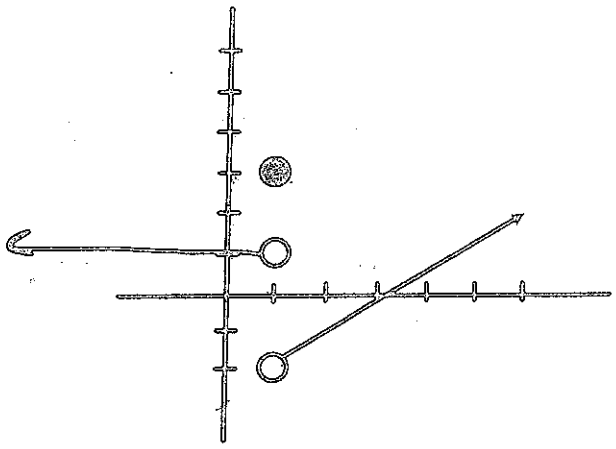
b. Describe the transformations that take place.

- Right 3
- Reflect over x
- Up 5

c. Graph.



6. Evaluate the following limits:



Left a. $\lim_{x \to 1^-} f(x) = 1$

Right b. $\lim_{x \to 1^+} f(x) = -2$

c. $\lim_{x \to 1} f(x) =$ DNE

d. $f(1) = 3$

e. $\lim_{x \to -\infty} f(x) = +1$

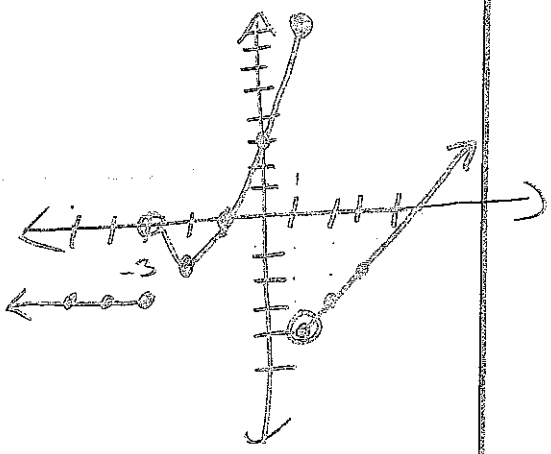
f. $\lim_{x \to +\infty} f(x) = +\infty$

7. Sketch: $f(x)=\begin{cases}-2, & x\le -3\\ (x+2)^2-1, & -3<x\le 1\\ x-5, & x>1\end{cases}$

x	-2
-5	-2
-4	-2
closed -3	-2

x	$(x+2)^2-1$
open -3	0
-2	-1
-1	0
0	3
closed 1	8

x	$x-5$
open 1	-4
2	-3
3	-2



Evaluate:

a) $\lim_{x\to -3^+} f(x) = 0$ (Right)

b) $\lim_{x\to -3^-} f(x) = -2$

c) $\lim_{x\to -3} f(x) =$ DNE

d.) $f(-3) = -2$

e) $\lim_{x\to 1^+} f(x) = -4$

f) $\lim_{x\to 1^-} f(x) = 8$

g) $\lim_{x\to 1} f(x) =$ DNE

h) $f(1) = 8$

8. $\lim_{x \to 3} \frac{x^2-4}{x+2} = \frac{3^2-4}{3+2} = \frac{5}{5} = 1$

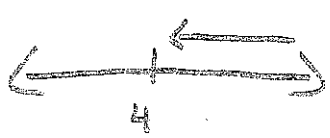
9. $\lim_{x \to \infty} \frac{3x^3+2x}{3x^2+5x^3}$ $\frac{3}{5}$ $\frac{3(1+\frac{2}{3})}{3(\frac{1}{3}+5)}$ $\frac{1}{+0}$ $+\infty$

10. $\lim_{x \to 5} \frac{x^2-25}{x-5} = \frac{5^2-25}{5-5} = \frac{0}{0}$ $\frac{(x+5)(x-5)}{x-5}$ $= x+5$ $= 5+5 = 10$

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

12. $\lim_{x \to \infty} \frac{x}{3x^3} = 0$ ∞

13. $\lim_{x \to 4^+} \frac{x}{x-4}$ 4^+ $\frac{4}{4-4} = \frac{4}{0}$



$\frac{4.000001}{4.000001-4} = \frac{+}{+} = +\infty$