Look over 4.2 HW # 10-15 & 4.3 HW #15-24

4.2 pg.12

Topic: Solve each inequality. (Hint: It might be helpful to sketch the graph and/or to create a sign line).

10. $(x+5)(x-2)(x-7) \geq 0$

$-5 \leq x \leq 2$, or $x \geq 7$

11. $x^2 + 7x + 6 < 0$

$(x+6)(x+1) < 0$

$-6 < x < -1$

12. $3x - 5 > 2$

$3x > 7$

$x > \frac{7}{3}$

13. $\frac{-x+2}{(x+1)(x+5)} \geq 0$

$2, -1, -5$

$x < -5$, $-1 < x \leq 2$

14. $(x+1)(x-1)(x-5) < 0$

15. $x^2 - 2x - 24 > 0$

4.3 HW pgs.17-18

Find ALL solutions to the following equations and inequalities. Watch out for extraneous solutions!

sol'n that don't work

15. $\sqrt{x+5} = 4$

16. $\sqrt{x+5} \leq 4$

$x+5 \geq 0$

$x \geq -5$

$x + 5 \leq 16$

$x \leq 11$

$-5 \leq x \leq 11$ or $[-5, 11]$

17. $2\sqrt{x-1} = 2$

18. $\sqrt{x-4} \geq 1$

$x - 4 \geq 0$

$x \geq 4$

$x - 4 \geq 1$

$x \geq 5$

$x \geq 5$

19. $\frac{4}{x+2} + \frac{2x}{x-1} = \frac{2x+1}{x+2}$

LCD: $(x+2)(x-1)$

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

$\frac{4x-4+2x^2+4x}{(x-1)(x+2)} - \frac{(2x^2-x-1)}{(x+2)(x-1)} = 0$

$\frac{\cancel{2x^2}+8x-4-\cancel{2x^2}+x+1}{(x+2)(x-1)} = 0$

$\frac{9x-3}{(x+2)(x-1)} = 0$

$9x - 3 = 0$

$9x = 3$

$x = \frac{1}{3}$

20. $\frac{x^2+9x+18}{x+3} = 2$

21. ~~$\frac{x^3-5x+2}{x-10} = 4$~~

22. $\frac{x^2+9x+14}{x+2} = 4$

23. $\frac{3}{x+1} + \frac{4}{x+2} = 5$

24. Which problems have extraneous solutions? What causes extraneous solutions when solving radical equations? What causes extraneous solutions when solving rational equations?

Feb 08-09:43 AM

4.4 Rewriting Rational Expressions

A Solidify Understanding Task

Part I: Comparing proper fractions and proper rational expressions (as well as improper).

1. What is the difference between a proper and an improper fraction?

impr: $n > d$ pr: $n < d$

A rational expression is similar, except that instead of comparing the numeric value of the numerator and denominator, the comparison is based on the *degree* of each polynomial. Therefore, *a rational expression is proper if the degree of the numerator is less than the degree of the denominator, and improper otherwise.* In other words, improper rational expressions can be written as $\frac{a(x)}{b(x)}$, where $a(x)$ and $b(x)$ are polynomials and the degree of $a(x)$ is greater than or equal to the degree of $b(x)$.

P I

2. Label each rational expression as proper or improper.

$\frac{(x+1)}{(x-2)(x+2)}$ $\frac{x^3-3x^2+5x-1}{x^2-4x+4}$ $\frac{(x+3)(x+2)}{x^4-4}$ $\frac{x+3}{x+5}$ $\frac{x^3-5x+2}{x-10}$

$\frac{d1}{d2}$ P proper $\frac{d3}{d2}$ I $\frac{d2}{d4}$ P $\frac{d1}{d1}$ I improper $\frac{d3}{d1}$ I

As we may remember, improper fractions can be rewritten in an equivalent form we call a mixed number. If $a > b, then\ the\ fraction\ of\ \frac{a}{b}\ can\ be\ rewriten\ as\ \frac{a}{b} = q + \frac{r}{b}$, where q represents the quotient and r represents the remainder.

Rewrite each improper fraction as an equivalent mixed number.

3. $\frac{35}{5} =$ $7 + \frac{0}{5}$

4. $\frac{37}{5} =$

5. $\frac{247}{12} =$

Determine if each rational expression is proper or improper. If improper, use long division to rewrite the rational expressions such that $\frac{a(x)}{b(x)} = q(x) + \frac{r(x)}{b(x)}$ where $q(x)$ represents the quotient and $r(x)$ represents the remainder.

6. $\frac{x^2+5x+6}{x+2}$ I $= x+3+\frac{0}{x+2}$

7. $\frac{3x-4}{x^3-1}$ P

8. $\frac{2x^3-7x^2+6}{x-1}$ I

$2x^2-5x-5+\frac{1}{x-1}$

9. $\frac{-5x+10}{x^3+6x^2+3x-1}$ P

10. $\frac{x^2+2x+5}{x+3}$ I

$x-1+\frac{8}{x+3}$

11. $\frac{3x+8}{x-1}$ I

$3+\frac{11}{x-1}$

12. $\frac{x^3+6x^2-15x+10}{x-1}$ I

$x^2+7x-8+\frac{2}{x-1}$

13. $\frac{3x-20}{x^2+2x+3}$ P

14. $\frac{x^3+12x^2+23x+8}{x+3}$ I

$x^2+9x-4+\frac{20}{x+3}$

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4.5 Watch Your "Behavior"

A Develop Understanding Task

In this task, you will develop your understanding of the end behavior of rational functions as well as discover the behavior of even and odd functions.

Part I: End behavior of rational functions

After completing the task *The* Gift, Marcus and Hannah were talking about the discussion regarding the end behavior of the parent function $f(x) = \frac{1}{x}$. Marcus said "I thought the end behavior of all functions was that you either ended up going to positive or negative infinity." Hannah agreed, adding "Now we have a function that approaches zero. I wonder if all rational functions will always approach zero as x approaches $\pm\infty$." Marcus replied "I am sure they do. Just like all polynomial functions end behavior approaches either $\pm\infty$, I think the end behavior for all rational functions must approach zero".

1. Could Marcus be right? Make a conjecture about the end behavior of rational functions and test it. (Hint: this should take awhile- be sure to think about the various rational expressions we have studied). As you analyze the end behavior of different rational functions, try to generalize the patterns you notice regarding end behavior.

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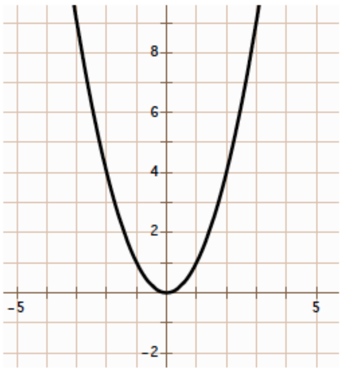
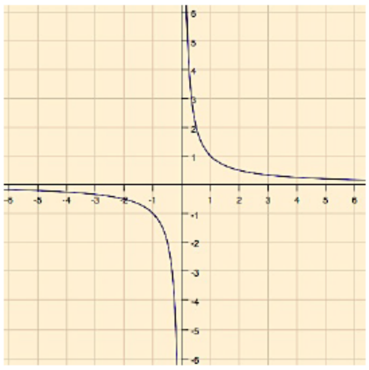
Part II: Even and Odd Functions

Below are three graphs: one represents an even function, one represents an odd function, and one is neither even nor odd.

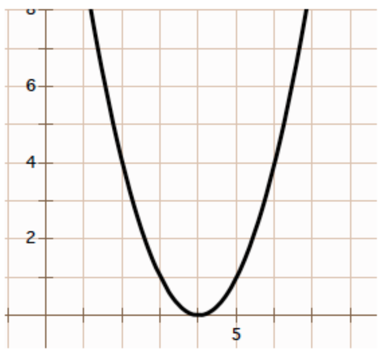
even function: $f(x) = x^2$



odd function: $f(x) = \frac{1}{x}$



neither: $f(x) = (x-4)^2$



2. Use the graphs and their corresponding functions to write a definition for an even function and an odd function.

- A function is an even function if...

- A function is an odd function if ...

3. Below are more functions. Based on your definition, classify as either even, odd, or neither.

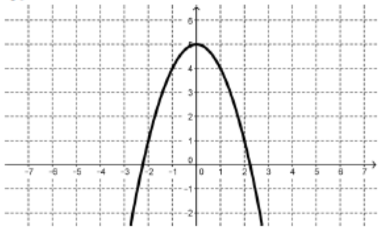
a.

x	y
-2	10
-1	5
0	-4
1	5
2	10

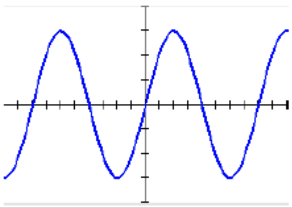
b.

$f(x) = x^4 - 3x + 6$

c.



d.



e.

$f(x) = x^4 - 3$

f.

$f(x) = x^3$

g.

x	y
-2	-10
-1	-5
0	0
1	5
2	10

h.

$f(x) = \sqrt{x+2}$

i.

$f(x) = x(x-2)(x+2)$

4. The answers to question three are at the bottom of this page. Check your solutions and adjust your definitions of even and odd functions, as needed.

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Homework/Classwork

Finish the "Ready, Set, Go" problems