## Chapter 1.X.X

**The purpose of this lesson is to:**
**Understand how to simplify complicated expressions**

WARM UP

Solve for the variable:

1.  $2x - 12 = 4 - 6x$

2.  $a^2 - 2 = 14$

3.  $v^2 + 2 = -4v - 1$

4.  $2x^2 - x = x^2 - 4x$

NOTES

To find the points of _____ of two functions, set them _____ and then solve for the variable.

Example: find the points of intersection of $f(x) = x^2 + 2$ and $g(x) = -4x - 1$

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Task Card

Write these polynomials as a fraction, and then divide.

**1.** Divide $3x^4 - 5x^2 + 3$ by $x + 2$

**2.** Divide $x^3 + 2x^2 - 3x + 4$ by $x - 7$

Find the end behavior equation for each of the following functions:

1. $$y = \frac{2x^3 + 5x^2 - x - 6}{x^2 - x - 20}$$

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2. $y = \dfrac{x^2 + x - 2}{x^2 + 3x - 10}$

For each function below list all holes, vertical asymptotes and x-intercepts

1. $f(x) = \dfrac{(x-3)(x+2)}{(x-3)(2x+1)}$

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

Sketch the following functions:

1. A function that has:
   a. a vertical asymptote at x =2
   b. a horizontal asymptote at y = 3
   c. a hole at x = 1

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2. A function that has:
   a. vertical asymptotes at x = 3 and x = -3
   b. A hole at x = -1
   c. A horizontal asymptote at y = 2

## Homework

For each function below list all holes, vertical asymptotes and x-intercepts

1. $f(x) = \dfrac{(x-3)(x+2)}{(x-3)(2x+1)}$

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

3. $f(x) = \dfrac{x^3 - 12x^2 + 32x}{x^2 - 2x - 8}$

4. $g(x) = \dfrac{x^2 - 9x + 14}{x^2 + 3x + 2}$

Find the end behavior of the following function:

$$y = \frac{x^3 - 3x + 2}{x^2 + 3x - 10}$$

**Problem 2:** Write a rational function g with vertical asymptotes at x = 3 and x = -3, a horizontal asymptote at y = -4 and with no x intercept.

For each function below list all holes, vertical asymptotes and x-intercepts

3. $f(x) = \dfrac{x^3 - 12x^2 + 32x}{x^2 - 2x - 8}$

4. $g(x) = \dfrac{x^2 - 9x + 14}{x^2 + 3x + 2}$