

7.4: Addition and Subtraction of Rational Expressions

Note Title

6/29/2017

Example: Multiplication: $\frac{3}{5} \cdot \frac{4}{5} = \boxed{\frac{12}{25}}$

Addition: $\frac{3}{5} + \frac{4}{5} = \frac{3+4}{5} = \boxed{\frac{7}{5}}$
(with like denominators)

(with different denominators): $\frac{3}{5} + \frac{4}{7}$
Addition
LCD: 35

$$= \frac{3}{5} \left(\frac{7}{7} \right) + \frac{4}{7} \left(\frac{5}{5} \right)$$
$$= \frac{21}{35} + \frac{20}{35} = \boxed{\frac{41}{35}}$$

Simplify

Ex: $\frac{1}{6x} + \frac{7}{6x}$

$$= \frac{1+7}{6x} = \frac{\cancel{8}}{\cancel{6}x} = \boxed{\frac{4}{3x}}$$

Ex: $\frac{3}{x+5} - \frac{10}{x+5}$

$$= \frac{3-10}{x+5} = \boxed{\frac{-7}{x+5}} = \boxed{-\frac{7}{x+5}}$$

Note: $-\frac{7}{x+5} = \frac{-7}{x+5} = \frac{7}{-(x+5)}$

Ex: $\frac{2}{x-4} + \frac{8}{4-x}$

$$\frac{2}{x-4} + \frac{8}{-1(x-4)}$$

$$\frac{2}{x-4} - \frac{8}{x-4} = \frac{2-8}{x-4} = \boxed{\frac{-6}{x-4}}$$

$$= \boxed{-\frac{6}{x-4}}$$

Note:
 $a-b = -(b-a)$
 $-(b-a)$
 $= -b+a$
 $= a-b$

Ex: $\frac{4x}{x+1} + \frac{x+3}{x+1}$

$$= \frac{4x + x+3}{x+1} = \boxed{\frac{5x+3}{x+1}}$$

Ex: $\frac{3y-5}{y+4} - \frac{5y-7}{y+4}$

$$= \frac{3y-5-(5y-7)}{y+4} = \frac{3y-5-5y+7}{y+4}$$

$$= \boxed{\frac{-2y+2}{y+4}} = \boxed{\frac{-2(y-1)}{y+4}} = \boxed{-\frac{2(y-1)}{y+4}}$$

(all these are correct)

$$= \boxed{-\frac{2y-2}{y+4}}$$

Ex.: $\frac{2x+1}{x^2-1} + \frac{x+2}{x^2-1}$

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

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

Ex.: $\frac{3}{3x^2+2x-8} - \frac{3x-1}{3x^2+2x-8}$

$$= \frac{3 - 1(3x-1)}{3x^2+2x-8} = \frac{3-3x+1}{3x^2+2x-8} = \frac{-3x+4}{3x^2+2x-8}$$

Scratchwork

$3x^2+2x-8$ (-) opp. signs went a diff. of 2

$(3x-4)(x+2)$

check

$3x^2$	8
$\wedge$	$\wedge$
$3x \cdot x$	$1 \cdot 8$
	$2 \cdot 4$

$3x^2+6x-4x-8$

$3x^2+2x-8$ ✓

$6x$ $2x$

$$= \frac{-3x+4}{(3x-4)(x+2)}$$

$$= \frac{-1(3x-4)}{(3x-4)(x+2)}$$

$$= \boxed{\frac{-1}{x+2}} = \boxed{-\frac{1}{x+2}}$$

Test 2 #39 Divide.

$$\frac{12x^7y^2z^4 + 9xy^5z - 2xyz^6}{3x^3y^2z}$$

$$= \frac{12x^7y^2z^4}{3x^3y^2z} + \frac{9xy^5z}{3x^3y^2z} + \frac{-2xyz^6}{3x^3y^2z}$$

Then reduce these fractions.

3.1: The Rectangular Coordinate System

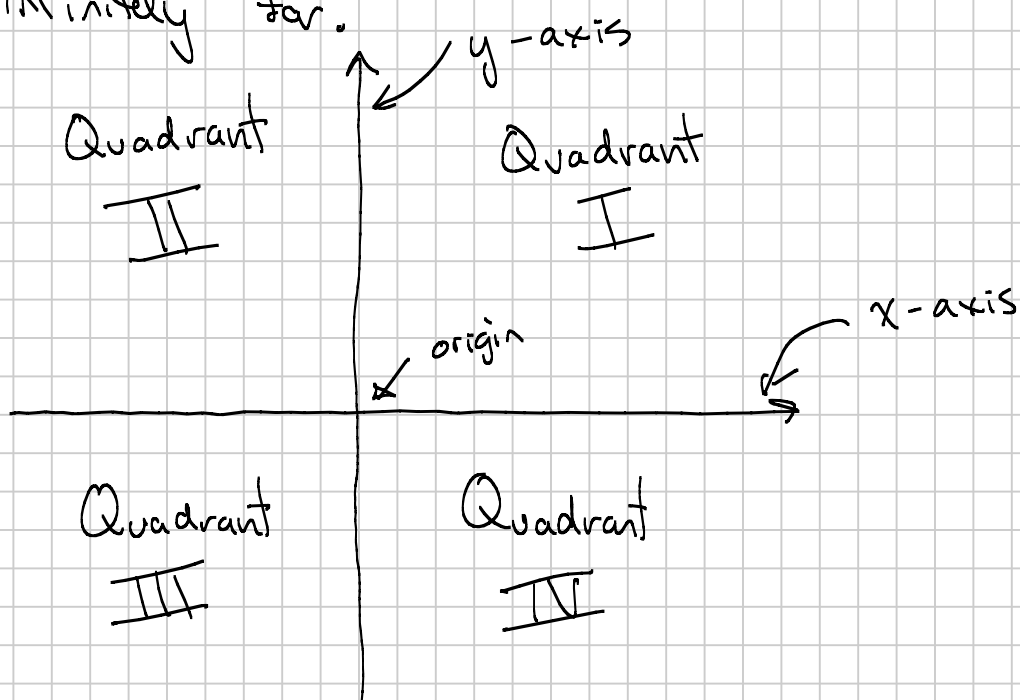
Note Title

2/5/2015

(also called the Cartesian coordinate system,
Cartesian plane, xy -plane)

(after René Descartes)

Think of a plane (flat sheet) that
extends infinitely far.



A Point on the plane is written as
an ordered pair (x, y)

The first coordinate is the x -coordinate.
The second coordinate is the y -coordinate.

Ex: Plot these points

$$(2, 4) \quad (0, 0)$$

$$(-3, 1) \quad (0, 4)$$

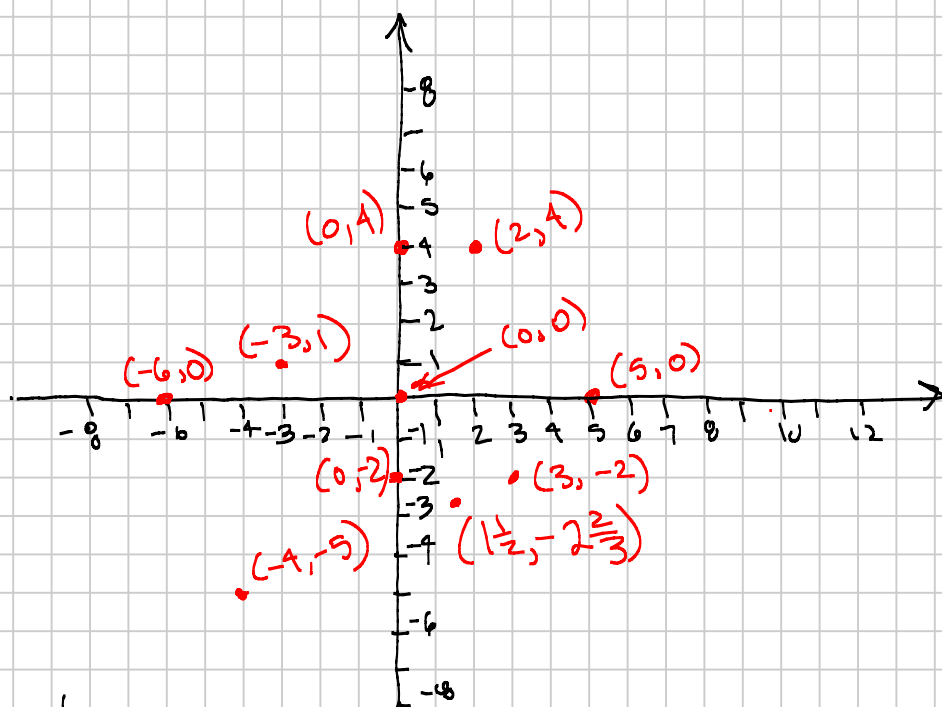
$$(-4, -5) \quad (5, 0)$$

$$(3, -2) \quad (-6, 0)$$

$$\left(\frac{3}{2}, -\frac{8}{3}\right) \quad (0, -2)$$

To plot $\left(\frac{3}{2}, -\frac{8}{3}\right)$, rewrite as
 $\left(1\frac{1}{2}, -2\frac{2}{3}\right)$

(or use calculator to get
a decimal approximation)



3.2: Linear Equations in Two Variables

A linear equation in 2 variables can be written as $Ax + By = C$, where A, B, C are real numbers.

A solution to a linear equation is an ordered pair that makes the equation true.

Ex: Is $(4, 6)$ a solution to $3x - 2y = 1$?
Substitute $x=4, y=6$:

$$3(4) - 2(6) = 1$$

$$12 - 12 = 1$$

$$0 = 1 \text{ False}$$

No $(4, 6)$ is not a solution.

Ex: Is $(5, 7)$ a solution to $3x - 2y = 1$?
 $x=5, y=7 \Rightarrow$

$$3(5) - 2(7) = 1$$

$$15 - 14 = 1$$

$$1 = 1 \text{ True!}$$

Yes, $(5, 7)$ is a solution.

Ex: Graph the line $-3x + 2y = -4$.

We find solutions by choosing a value of x or y , then solve for the other.

$$-3x + 2y = -4$$

$$\begin{aligned} \underline{x=2} \quad & -3x + 2y = -4 \\ & -3(2) + 2y = -4 \\ & -6 + 2y = -4 \\ & \quad +6 \quad \quad +6 \\ & 2y = 2 \\ & \frac{2y}{2} = \frac{2}{2} \\ & y = 1 \end{aligned}$$

$$(2, 1)$$

$$\begin{aligned} \underline{y=-2} \quad & -3x + 2(-2) = -4 \\ & -3x - 4 = -4 \\ & \quad +4 \quad \quad +4 \\ & -3x = 0 \\ & \frac{-3x}{-3} = \frac{0}{-3} \\ & x = 0 \end{aligned}$$

$$(0, -2)$$

$$\begin{aligned} \underline{x=4} \quad & -3x + 2y = -4 \\ & -3(4) + 2y = -4 \\ & -12 + 2y = -4 \\ & \quad +12 \quad \quad +12 \\ & 2y = 8 \\ & \frac{2y}{2} = \frac{8}{2} \\ & y = 4 \end{aligned}$$

$$\begin{aligned} \underline{x=-2} \quad & -3x + 2y = -4 \\ & -3(-2) + 2y = -4 \\ & 6 + 2y = -4 \\ & \quad -6 \quad \quad -6 \\ & 2y = -10 \\ & \frac{2y}{2} = \frac{-10}{2} \\ & y = -5 \end{aligned}$$

$$(4, 4)$$

$$(-2, -5)$$

$$(2, 1)$$

$$(0, -2)$$

