Algebra 2
Operations with Rational Expressions – Day 2

Name: KEY
Date: _____ Period: _____

Perform the indicated operation.

1.) $\frac{m-3n}{6m^3n} - \frac{m+3n}{6m^3n}$

- $\frac{M-3N-(M+3N)}{6M^3N}$
- $\frac{-6N}{6M^3N}$
- $\frac{-1}{M^3}$

2.) $\frac{4}{4}\cdot\frac{6}{x-1} - \frac{5x}{4}\cdot\frac{(x-1)}{(x-1)}$

- $\frac{24}{4(x-1)} - \frac{5x(x-1)}{4(x-1)}$
- $\frac{24-5x^2+5x}{4(x-1)}$
- $\frac{-5x^2+5x+24}{4(x-1)}$

3.) $\frac{(x-8)}{(x-8)}\cdot\frac{3}{x+7} + \frac{4}{x-8}\cdot\frac{(x+7)}{(x+7)}$

- $\frac{3x-24}{(x-8)(x+7)} + \frac{4x+28}{(x+7)(x-8)}$
- $\frac{7x+4}{(x-8)(x+7)}$

4.) $\frac{3}{4v^2+4v} - \frac{7}{2}\cdot\frac{2v(v+1)}{2v(v+1)}$
$4v(v+1)$

- $\frac{3}{4v(v+1)} - \frac{14v^2+14v}{4v(v+1)}$
- $\frac{-14v^2-14v+3}{4v(v+1)}$

5.) $\frac{2(n+3)}{2(n+3)}\cdot\frac{5}{n+5} + \frac{4n}{2n+6}\cdot\frac{(n+5)}{(n+5)}$
$2(n+3)$

- $\frac{10(n+3)}{2(n+3)(n+5)} + \frac{4n(n+5)}{2(n+3)(n+5)}$
- $\frac{10n+30}{2(n+3)(n+5)} + \frac{4n^2+20n}{2(n+3)(n+5)}$
- $\frac{4n^2+30n+30}{2(n+3)(n+5)} \rightarrow \frac{2(2n^2+15n+15)}{2(n+3)(n+5)}$
- $\frac{2n^2+15n+15}{(n+3)(n+5)}$

6.) $\frac{x^2-2x+3}{x^2+7x+12} - \frac{x^2-4x-5}{x^2+7x+12}$

- $\frac{2x+8}{x^2+7x+12}$
- $\frac{2(x+4)}{(x+3)(x+4)}$
- $\frac{2}{(x+3)}$

7.) $\frac{(x+2)}{(x+2)}\cdot\frac{7}{3x^2-6x} + \frac{x^2}{x^2-4x+4}\cdot\frac{3x}{3x}$
$3x(x-2)$ $(x-2)(x+2)$

- $\frac{7x+14}{3x(x-2)(x+2)} + \frac{3x^3}{3x(x-2)(x+2)}$
- $\frac{3x^3+7x+14}{3x(x-2)(x+2)}$

8.) $\frac{(k-2)}{(k-2)}\cdot\frac{k-4}{k^2+5x+6} + \frac{k-1}{k^2-4}\cdot\frac{(k+3)}{(k+3)}$
$(k+3)(k+2)$ $(k-2)(k+2)$

- $\frac{k^2-6k+8}{(k+3)(k+2)(k-2)} + \frac{k^2+2k-3}{(k+3)(k-2)(k+2)}$
- $\frac{2k^2-4k+5}{(k+3)(k+2)(k-2)}$

9.) $\frac{x+2}{x-7} - \frac{x^2+4x+13}{x^2-4x-21}$ (multiply by $\frac{x+3}{x+3}$; $x^2-4x-21 = (x-7)(x+3)$)

- $\frac{x^2+5x+6}{(x-7)(x+3)} - \frac{(x^2+4x+13)}{(x-7)(x+3)}$
- $\frac{x-7}{(x-7)(x+3)}$
- $\frac{1}{x+3}$

10.) $\frac{m+5}{m^2+3m-4} + \frac{m+2}{m^2-1}$ (multiply by $\frac{m+1}{m+1}$ and $\frac{m+4}{m+4}$; $m^2+3m-4 = (m+4)(m-1)$, $m^2-1 = (m+1)(m-1)$)

- $\frac{m^2+6m+5}{(m+1)(m-1)(m+4)} + \frac{m^2+6m+8}{(m+1)(m-1)(m+4)}$
- $\frac{2m^2+12m+13}{(m+1)(m-1)(m+4)}$

11.) $\frac{3t-2}{t^2+2t-24} - \frac{t-3}{t^2-16}$ (multiply by $\frac{t+4}{t+4}$ and $\frac{t+6}{t+6}$; $t^2+2t-24 = (t+6)(t-4)$, $t^2-16 = (t-4)(t+4)$)

- $\frac{3t^2+10t-8}{(t+6)(t-4)(t+4)} - \frac{(t^2+3t-18)}{(t+6)(t-4)(t+4)}$
- $\frac{2t^2+7t+10}{(t+6)(t-4)(t+4)}$

12.) $2 + \frac{x}{x-3} - \frac{3}{x^2-9}$ (multiply by $\frac{(x+3)(x-3)}{(x+3)(x-3)}$ and $\frac{x+3}{x+3}$; $x^2-9 = (x+3)(x-3)$)

- $\frac{2x^2-18}{(x+3)(x-3)} + \frac{x^2+3x}{(x+3)(x-3)} - \frac{3}{(x+3)(x-3)}$
- $\frac{3x^2+3x-21}{(x+3)(x-3)}$

13.) Building catapults in math classes this year really inspired Brad and Angelina to build a super-duper awesome catapult at home. Brangelina decide to be creative with their awe-inspiring catapult and climb to the highest point in Algonquin, the Algonquin water tower. From there, Brangelina decided to launch frogs at a velocity of 32 feet per second into the lake below. Brad who is really smart at figuring out parabolic calculations models the height of the frog to be the equation $f(x) = -16x^2 + 32x + 144$, where x represent the time in seconds and $f(x)$ is the height of the frog given in feet.

A.) What is the initial height of Brangelina's launch point?

$f(0) = -16(0)^2 + 32(0) + 144$

$= 144$

144 FT

B.) When will the frog reach its maximum height and what is the maximum height?

$x = \frac{-b}{2a} = \frac{-32}{2(-16)} = \frac{-32}{-32} =$ 1 SECOND

$f(1) = -16(1)^2 + 32(1) + 144$

$= -16 + 32 + 144$

$=$ 160 FT

C.) When will the frog land safely in the lake?

$0 = -16x^2 + 32x + 144$

$0 = -16(x^2 - 2x - 9)$

$0 = x^2 - 2x - 9$

$x^2 - 2x + 1 = 9 + 1$

$(x-1)^2 = 10$

$x - 1 = \pm\sqrt{10}$

$x = 1 \pm \sqrt{10}$

$x =$ 4.16 SEC

$x = -2.16$

D.) When will the frog reach a height of 80 feet?

$80 = -16x^2 + 32x + 144$

$16x^2 - 32x - 64 = 0$

$16(x^2 - 2x - 4) = 0$

$x^2 - 2x - 4 = 0$

$x^2 - 2x + 1 = 4 + 1$

$(x-1)^2 = 5$

$x - 1 = \pm\sqrt{5}$

$x = 1 \pm \sqrt{5}$

$x =$ 3.24 SEC

$x = -1.24$