

Name: _____

Date: _____

Course: _____

Nyack College

College Algebra

Preliminary Assessment #4

Directions: Provide complete responses to each question. Make sure to show your work.

1. Find the QUOTIENT of the following polynomials using the SYNTHETIC DIVISION method:

a. $(x^5 - 4x^4 + x)$ divided by $(x + 3)$

~~$$\begin{array}{r} x^5 - 4x^4 + x \\ (x+3) \end{array}$$~~ ~~$$\begin{array}{r} x^4 - 7x^3 + 21x^2 - 63x + 190 \\ 3 \end{array}$$~~

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

$$\begin{array}{r} x+3 \overline{) x^5 - 4x^4 + x} \rightarrow \begin{array}{r} x^4 - 7x^3 + 21x^2 - 63x + 190 \\ x+3 \overline{) x^5 - 4x^4 + 0x^3 + 0x^2 + x + 0} \\ \underline{-x^5 + 3x^4} \\ -7x^4 + 0x^3 + 0x^2 + x + 0 \\ \underline{+7x^4 + 21x^3} \\ 21x^3 + 0x^2 + x + 0 \\ \underline{-21x^3 + 63x^2} \\ -63x^2 + x + 0 \\ \underline{+63x^2 + 189x} \\ 190x + 0 \\ \underline{-190x - 570} \\ -570 \end{array} \end{array}$$

$x^4 - 7x^3 + 21x^2 - 63x + 190 - \frac{570}{x+3}$

Name: _____

Date: _____

Course: _____

Nyack College

b. $(2x^4 - x^3 + 2x - 1)$ divided by $(x - \frac{1}{2})$

$$\frac{2x^4 - x^3 + 2x - 1}{2x - 1}$$

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

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

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

$$2(x^3+1)$$

$$\boxed{2x^3 + 2}$$

Name: _____

Date: _____

Course: _____

Nyack College

2. Please simplify the following rational expressions:

a. $\frac{3x+9}{x^2-9}$

$$\frac{3x+9}{x^2-9} \rightarrow \frac{3(x+3)}{(x-3)(x+3)}$$

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

Name: _____

Date: _____

Course: _____

Nyack College

b. $\frac{3x+6}{5x^2} \cdot \frac{x}{x^2-4}$

$$\frac{3(x+2)}{5x} \cdot \frac{1}{(x-2)(x+2)}$$

$$\frac{3}{5x} \cdot \frac{1}{(x-2)}$$

$$\frac{3}{(5x)(x-2)}$$

$$\boxed{\frac{3}{5x^2-10x}}$$

Name: _____

Date: _____

Course: _____

Nyack College

$$\frac{6x}{\frac{x^2-4}{3x-9}} \cdot \frac{2x+4}{2x+4}$$

$$\frac{6x(2x+4)}{(x^2-4)(3x-9)} \rightarrow \frac{6x \cdot 2(x+2)}{(x-2)(x+2)3(x-3)}$$

$$\frac{2x \cdot 2}{(x-2)(x-3)} \rightarrow \frac{4x}{(x-2)(x-3)}$$

$$\frac{4x}{x^2-2x-3x+6}$$

$$\frac{4x}{x^2-5x+6}$$

Name: _____

Date: _____

Course: _____

Nyack College

d.

$$\begin{array}{r} x^2+7x+12 \leftarrow \\ x^2-7x=12 \leftarrow \\ \hline x^2+x+12 \\ \hline x^2-x=12 \end{array}$$

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

$$\frac{x^4 - x^3 - 12x^2 + 7x^3 - 7x^2 - 84x + 12x^2 - 12x - 144}{x^4 + x^3 + 12x^2 - 7x^3 - 7x^2 - 84x - 12x^2 - 12x - 144}$$

$$\frac{x^4 + 6x^3 - 7x^2 - 96x - 144}{x^4 - 6x^3 - 7x^2 - 96x - 144}$$

Name: _____

Date: _____

Course: _____

Nyack College

$$e. \frac{x^2}{2x-3} - \frac{4}{2x-3} \rightarrow \boxed{\frac{x^2-4}{2x^2-3}}$$

Name: _____

Date: _____

Course: _____

Nyack College

$$f. \frac{x}{x+1} - \frac{2x-3}{x-1}$$

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

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

$$\frac{\cancel{x^2} - \cancel{x} - 2\cancel{x^2} + \cancel{3x} + \cancel{2x} - 3}{x^2 - 1}$$

$$\boxed{\frac{-x^2 + 3}{x^2 - 1}}$$

Name: _____

Date: _____

Course: _____

Nyack College

$$g. \frac{4x}{x^2-4} - \frac{2}{x^2+x-6}$$

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

↓

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

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

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

$$\boxed{\frac{4x^2 + 10x - 4}{x^3 - 3x^2 - 4x - 12}}$$