Welcome to Honors Algebra 2

-Cell phones in holder

Answers to Division

1) $x^2 + 3x + 8 - \frac{1}{3x+3}$ 2) $n^2 + 2n + 3 + \frac{3}{10n+4}$ 3) $10x^2 + 6x + 5 - \frac{9}{7x+7}$

4) $v^2 - 2v + 9 + \frac{3}{2v+10}$ 5) $k^2 - 9k + 7 + \frac{5}{2k+4}$ 6) $4m^2 + 4m + 4 - \frac{8}{m+3}$

7) $4k^2 + 9k + 7 - \frac{2}{k-1}$ 8) $n^2 - 6n - 2 + \frac{2}{n+3}$ 9) $b^2 + 3b + 9 - \frac{2}{b-7}$

10) $n^2 + 4n - 5 - \frac{3}{n-5}$

Operations with Functions

Adding Functions

$(f+g)(x) = f(x) + g(x)$

Subtracting Functions

$(f-g)(x) = f(x) - g(x)$

Multiplying Functions

$(f \cdot g)(x) = [f(x)][g(x)]$

$(f \circ g)(x)$

Dividing Functions

$(f/g)(x) = f(x)/g(x)$

Let $f(x) = x - 5$ and $g(x) = x^2 - 2x - 15$.

Adding Functions

$(f+g)(x) = f(x) + g(x)$

Find $(f + g)(x)$.

$(x-5) + (x^2 - 2x - 15)$

$x^2 - x - 20$

Subtracting Functions

$(f-g)(x) = f(x) - g(x)$

Find $(g - f)(x)$

$(x^2 - 2x - 15) - (x - 5)$

$x^2 - 2x - 15 - x + 5$

$x^2 - 3x - 10$

Let $f(x) = x - 5$ and $g(x) = x^2 - 2x - 15$.

Multiplying Functions

$(f \cdot g)(x) = [f(x)][g(x)]$

Find $(f \cdot g)(x)$.

$(x-5)(x^2-2x-15)$

x^3-2x^2-15x

$-5x^2+10x+75$

$x^3-7x^2-5x+75$

Let $f(x) = 6x^5 - 12x^3 - 15x$ and $g(x) = 3x$.

Dividing Functions

$(f/g)(x) = f(x)/g(x)$

Find $(f/g)(x)$.

$\frac{6x^5-12x^3-15x}{3x} = 2x^4-4x^2-5$

$\frac{x-5}{x^2-2x-15}$

Direct Substitution

- Plug x value into equation

Evaluate the following using each method

$p(x) = x^2 - 5x + 3$ for p(-2)

$x = -2$

$P(-2) = (-2)^2 - 5(-2) + 3$

$P(-2) = 17$

$x = -2 \quad y = 17$

$(-2, 17)$

Synthetic Substitution

- use remainder of synthetic division

$$\begin{array}{c|ccc} -2 & 1 & -5 & 3 \\ & \downarrow & -2 & 14 \\ \hline & 1 & -7 & \boxed{17} \end{array}$$

$P(-2) = 17$

division $x - 7 + \frac{17}{x+2}$

Problems 1-3: Use synthetic substitution and direct substitution to evaluate the polynomial for the given value.

1. $P(x) = 2x^3 - 5x^2 + 7x - 3$ *for* $x = 4$

$P(4) = 73$

3. $P(-2) = -8$

2. $P(x) = 4x^3 - 7x^2 + 2x + 3$ *for* $x = -3$

$P(-3) = -174$

3. $P(x) = x^3 - x^2 + 4$ *for* $x = -2$

$P(-2) = (-2)^3 - (-2)^2 + 4$

$-8 - 4 + 4$

-8

$-2 \mid 1 \quad -1 \quad 0 \quad 4$

$\quad\quad -2 \quad 6 \quad -12$

$1 \quad -3 \quad 6 \quad \boxed{-8}$

Add/subtract Polynomial

Classify (degree term)

mult. Polynomial

Binomial expansion (Pascal's)

```
      1
     1 1
    1 2 1
   1 3 3 1
```

Division - Long
- Synthetic

Substitution - Direct
- Synthetic

Function/
Function notation
$(f+g)(x)$