Math 3 4.1 Combining Functions Unit 4

*EQ: How do you combine functions through addition, subtraction, and multiplication to create new functions?*

**Standard Form:** When a polynomial is ordered from the variable with the highest exponent down to the lowest.

**Degree of a Polynomial:** The highest exponent of a function when it is in standard form.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Example 1:  | Example 2:  | Example 3:  | Example 4:  |
| Standard Form: |  |  |  |  |
| Number of Terms: |  |  |  |  |
| Degree: |  |  |  |  |
| Name: |  |  |  |  |

**Example 5:** Hypothesize what type of function will be created when you combine the following functions in the manner listed.

|  |  |  |  |
| --- | --- | --- | --- |
| **Statement** | **Example** | **Hypothesis** | **Conclusion** |
| 1. Adding two linear functions together will create a…
 | (x + 1) + (x – 3) |  |  |
| 1. Multiplying two linear functions together will create a…
 | (x + 1)(x – 3) |  |  |
| 1. Adding a linear and a quadratic function together will create a…
 | (x + 1) + (x2 + 3) |  |  |
| 1. Multiplying a linear and a quadratic function together will create a…
 | (x + 1)(x2 + 3) |  |  |
| 1. Subtracting a linear function from a quadratic will create a…
 |  (x2 + 3) – (x + 1)  |  |  |
| 1. Dividing a cubic function by a linear function will create a…
 | $$\frac{x^{3}}{x}$$ |  |  |
| 1. Dividing a cubic function by a quadratic function will create a…
 | $$\frac{x^{3}}{x^{2}}$$ |  |  |

When combining functions, you may see a variation of the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Addition | Subtraction | Multiplication | Division |
| f(x) + g(x) | f(x) – g(x) | f(x)•g(x) | $$\frac{f(x)}{g(x)}$$ |
| (f + g)(x) | (f – g)(x) | (f•g)(x) | $$\left(\frac{f}{g}\right)(x)$$ |

**Example 6:** Solve the following problems given the functions below:

*f(x)* = -x + 4

*g(x)* = x – 1

*h(x)* = x + 5

*m(x)* = x2 + 2x + 1

*n(x)* = 3x3 – 3x2 + 3x – 1

*p(x)* = 3x + 1

1. *f(x) + g(x)*
2. *f(x) – h(x)*
3. *f(x) + p(x)*
4. *g(x) + h(x)*
5. *m(x) + g(x)*
6. *n(x) + m(x)*
7. *m(x) – g(x)*
8. f(x)•g(x)
9. g(x)•m(x)