

Date: _____

Adding and Subtracting Functions

Functions can be combined by adding, subtracting, multiplying, dividing and composing functions to create more complex functions.

Example 1:

Profits for companies are given on a month to month basis

Company f: (month, profit) = (Jan 10), (Feb 25), (March 3)

Company g: (month, profit) = (Jan 5), (Feb 20), (March 5)

If the companies are combined, what is the profit for the new company?

January _____

February _____

March _____

To add or subtract functions:

For each x-value, combine the y-values by adding or subtracting.

Example 2:

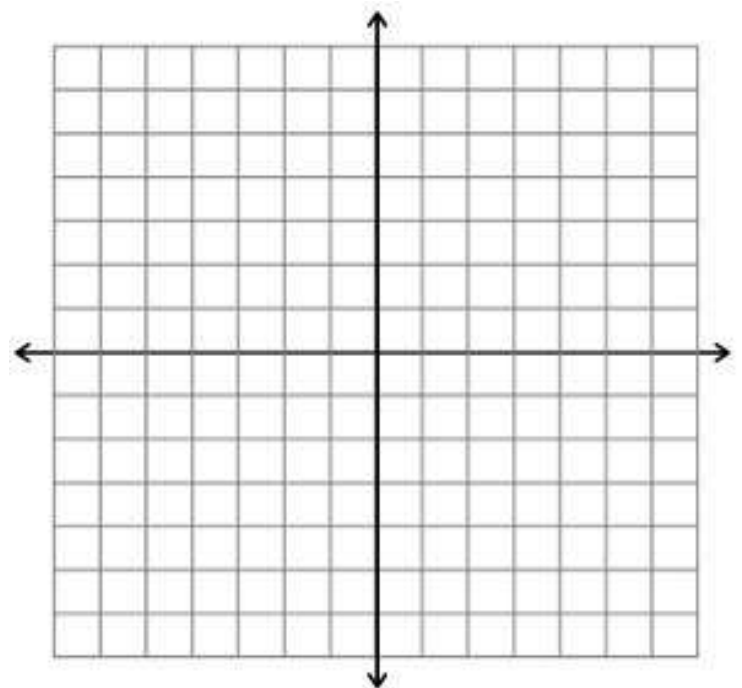
Given:

$$f(x) = x^2 + 1 \qquad g(x) = 2x$$

a) Graph $f(x)$, $g(x)$ and $f(x) + g(x)$

b) Find the equation of $f(x) + g(x)$

c) Find the domain and range of $f(x)$, $g(x)$ and $f(x) + g(x)$



Example 3:

$y = x^2 + 2x + 1$ can be expressed as the sum of 3 monomials.

a) Write down the 3 monomials.

b) Complete the table of values then graph each monomial as well as the sum.

x	f(x)	g(x)	h(x)	y

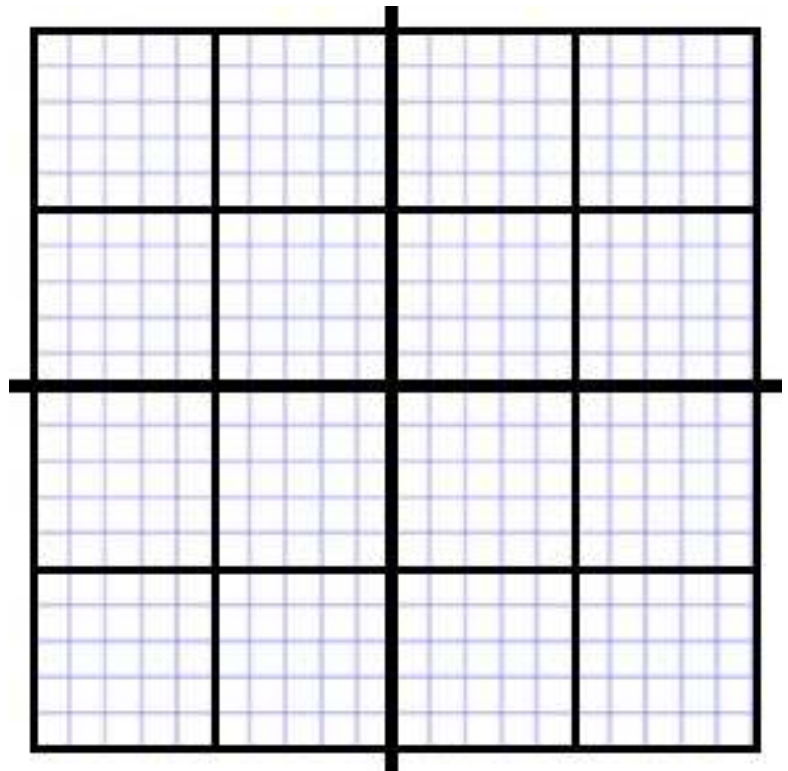
Example 4:

Given $f(x) = \sqrt{x}$ and $g(x) = x^2 + 3$

a) Sketch $f(x) - g(x)$

b) Find the domain of $f(x) - g(x)$

c) Find the equation of $f(x) - g(x)$



Given $f(x)$ and $g(x)$:

1) The Domain of $f(x)+g(x)$ and of $f(x)-g(x)$ is the intersection of the domain of $f(x)$ and $g(x)$ $D_{f+g} = D_f \cap D_g$ or $D_{f-g} = D_f \cap D_g$

2) Ordered pairs of $f(x)+g(x)$ and $f(x)-g(x)$ are created by adding or subtracting the y-coordinates of $f(x)$ and $g(x)$ for each x where x exists $(x, f(x)+g(x))$ or $(x, f(x)-g(x))$

3) The equation of $f(x)+g(x)$ by adding the two functions $(f+g)(x) = f(x)+g(x)$
The equation of $f(x)-g(x)$ by subtracting the two functions $(f-g)(x) = f(x)-g(x)$

Review:

Domain Restrictions on various functions:

Polynomials $f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x + a_0$

Square root $f(x) = \sqrt{x}$

Rational $\frac{f(x)}{g(x)}$

Sine $f(x) = \sin(x)$

Cosine $f(x) = \cos(x)$

Tangent $f(x) = \tan(x)$

Exponential $f(x) = a(b)^x$

Logarithmic $f(x) = \log(x)$

Homework:

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Questions 2, 6, 7, 10, 11a, 12