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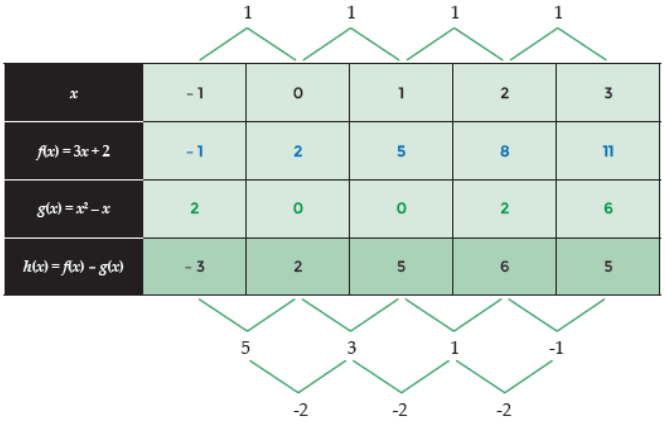
Study Guide and Intervention

Subtracting Functions Using Tables and Equations

Example **Use a table to write a function rule for h(x) if f(x) = 3x + 2 and g(x) = x^2 – x, and h(x) = f(x) - g(x).**

Solution

Step 1 **Calculate the finite differences for the table**



Step 2 **Use patterns in the finite differences to write a function rule for n(x).**

Since the second finite difference is constant, this is a quadratic function.

Input the values into the calculator and perform a quadratic regression.

Step 3: **Write the values into the equation.**

$h(x) = -x^2 + 4x + 2$

Exercises

For questions 1-4, use a table to write a function rule for h(x).

1.

x	f(x) = 3x + 7	g(x) = 8x – 3	h(x) = f(x) – g(x)
1	10	5	5
2	13	13	0
3	16	21	-5
4	19	29	-10
5	22	37	-15
6	25	45	-20

2.

x	f(x) = 4x² – 6	g(x) = -2x + 12	h(x) = f(x) – g(x)
-3	30	18	12
-2	10	16	-6
-1	-2	14	-16
0	-6	12	-18
1	-2	10	-12
2	10	8	2

3.

x	f(x) = 0.5x² – 3	g(x) = -x + 5	h(x) = f(x) – g(x)
0	-3	5	-8
1	-2.5	4	-6.5
2	-1	3	-4
3	1.5	2	-0.5
4	5	1	4
5	9.5	0	9.5

4.

x	f(x) = 2x³ – 4x	g(x) = -2x + 12	h(x) = f(x) – g(x)
-2	-8	16	-24
-1	2	14	-12
0	0	12	-12
1	-2	10	-12
2	8	8	0
3	42	6	36
4	112	4	108

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Study Guide and Intervention

Subtracting Functions Using Tables and Equations (cont.)

Example **If $h(x) = f(x) - g(x)$, $f(x) = -3(x + 1)^2 + 2$, and $g(x) = (x - 3)^2 - 4$, write the most simplified form of $h(x)$.**

Solution

Step 1 **Substitute the equations for f(x) and g(x) into the equation h(x) = f(x) – g(x).**

$$h(x) = f(x) - g(x)$$
$$h(x) = [-3(x + 1)^2 + 2] - [(x - 3)^2 - 4]$$

Step 2 **Simplify the polynomial expression.**

$$h(x) = [-3(x + 1)^2 + 2] - [(x - 3)^2 - 4]$$
$$h(x) = [-3(x + 1)(x + 1) + 2] - [(x - 3)(x - 3) - 4]$$
$$h(x) = [-3(x^2 + 2x + 1) + 2] - [(x^2 - 6x + 9) - 4]$$
$$h(x) = [-3x^2 - 6x - 3 + 2] - [x^2 - 6x + 9 - 4]$$
$$h(x) = [-3x^2 - 6x - 1] - [x^2 - 6x + 5]$$
$$h(x) = -3x^2 - 6x - 1 - x^2 + 6x - 5$$
$$h(x) = (-3x^2 - x^2) + (-6x + 6x) + (-1 - 5)$$
$$h(x) = -4x^2 + 0x - 6$$
$$h(x) = -4x^2 - 6$$

Exercises

For problems 5 – 10, write the simplified form of h(x) if h(x) = f(x) – g(x).

5. $f(x) = 0.5x + 15$
$g(x) = -3x - 5$

6. $f(x) = 2x^2 + 7$
$g(x) = x^2 + 2x - 1$

7. $f(x) = x^3 - 2x$
$g(x) = x^2 + 5$

8. $f(x) = 8x + 13$
$g(x) = (x - 5)^2$

9. $f(x) = x^3 + 1$
$g(x) = 5x + 9$

10. $f(x) = 5x - 3$
$g(x) = 0.5x^2 - 4$