

Bellwork: Algebra 1

1. Write down your homework for the night in your planner.
2. Make sure you have a calculator and Algebra Nation book.
3. Take out your homework from last night and be ready to check.
5. Answer the following on your THURSDAY bellwork sheet:

1. The Hamptons Family has a fish tank holding 10,450 ml of water. The water is leaking at a rate of 270 ml per minute.

Part A: Define the input and output in the given scenario.

Part B: Write a function to model this situation.

Part C: How many liters of water will be left in the tank after 10 minutes?

input: time (m)
output: water (mL)

$$f(m) = 10450 - 270m \quad f(10) = 10450 - 270(10)$$
$$7750 = 7.75 \text{ L}$$

2. Consider the following relation: $\{(1,12), (3,8), (3,11), (6,9), (7,11)\}$. Which ordered pair could be removed so that the relation is a function?

$(3,8)$ or $(3,11)$

1. You earn \$20 per hour doing landscaping work. Your total earnings depend on the amount of hours you spend landscaping.

Part A: What is the independent variable? **hours worked**

Part B: What is the dependent variable? **\$ made**

Part C: Write a function to represent the situation. **$f(h) = 20h$**

2. Mr. Khans is buying staplers for his office. Each stapler costs \$16.99.

Part A: What does his final total cost depend upon? **amount of staplers**

Part B: In this scenario, what is the input? What is the output?

input: staplers purchased output: \$

Part C: Write a function to represent the situation. **$f(s) = 16.99s$**

Part D: If Mr. Khans buys 15 staplers, it would cost him \$254.85. How would you write this using function notation?

$$f(15) = 254.85$$

3. Cristiano Ronaldo has a messy house. The function that represents the total cost Cristiano spends having his house cleaned is $C(v) = 125v$, where v represents the number of visits.

Part A: How much does Cristiano spend per visit? **\$125**

Part B: Define the input and output in the given scenario.

input: visits

output: cost

4. The cost to manufacture x chairs can be represented by the function $C(x) = 36x$. Circle the pair of numbers (one in each box) that correctly completes the statement about the function.

If $C(63) = 2268$, then

0 6 63 378	chairs cost \$	6. 189. 378. 2,268.
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$$(x, y)$$

5. Which of the following relations are not functions? Select all that apply.

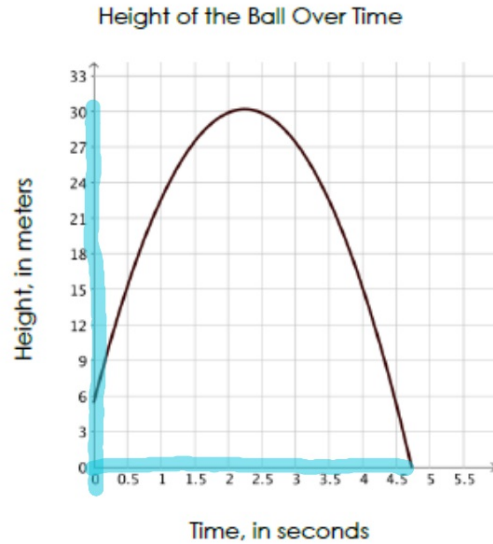
- $\{(1, 3), (3, 7), (5, 11), (7, 15), (9, 19)\}$
- $\{(1, 3), (1, 7), (5, 11), (5, 15), (9, 19)\}$
- $\{(-2, 4), (-1, 1), (0, 0), (1, 1), (2, 4)\}$
- $\{(2, 4), (1, 1), (0, 0), (1, -1), (2, -4)\}$
- $\{(6, 3), (4, 1), (2, 1), (0, -1), (-2, -3)\}$
- $\{(1, 3), (3, 7), (3, 11), (7, 15), (9, 19)\}$
- $\{(1, 3), (3, 7), (5, 11), (9, 15), (9, 19)\}$

A ball is thrown into the air with an initial velocity of 22 meters per second. The quadratic function $h(t) = -4.9t^2 + 22t + 5.5$ represents the height of the ball above the ground, in meters, with respect to time t , in seconds.

Part A: Determine $h(3)$ and explain what it represents.

$$h(3) = -4.9(3)^2 + 22(3) + 5.5 = 27.4 \text{ m}$$

The graph below represents the height of the ball with respect to time.



Part B: What is a reasonable domain for the function? $0 \leq x \leq 4.7$

Part C: What is a reasonable range for the function? $0 \leq y \leq 31$

Let $h(x) = 2x^2 + x - 5$ and $g(x) = -3x^2 + 4x + 1$.

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

$$\underline{\underline{(2x^2 + x - 5)}} + 1(\underline{\underline{-3x^2 + 4x + 1}})$$

$$\boxed{-x^2 + 5x - 4}$$

Find $h(x) - g(x)$.

$$(2x^2 + x - 5) - 1(-3x^2 + 4x + 1)$$

$$\underline{\underline{2x^2 + x - 5}} + \underline{\underline{3x^2 - 4x - 1}}$$

$$\boxed{5x^2 - 3x - 6}$$

Let's Practice!

1. Consider the following functions.

$$\begin{aligned} f(x) &= 3x^2 + x + 2 \\ g(x) &= 4x^2 + 2(3x - 4) = 4x^2 + 6x - 8 \\ h(x) &= 5(x^2 - 1) = 5x^2 - 5 \end{aligned}$$

a. Find $f(x) - g(x)$.

$$\begin{aligned} &(3x^2 + x + 2) - (4x^2 + 6x - 8) \\ &\underline{3x^2 + x + 2} \quad \underline{-4x^2 - 6x + 8} \\ &\boxed{-x^2 - 5x + 10} \end{aligned}$$

b. Find $g(x) - h(x)$.

$$\begin{aligned} &(4x^2 + 6x - 8) - (5x^2 - 5) \\ &\underline{4x^2 + 6x - 8} \quad \underline{-5x^2 + 5} \\ &\boxed{-x^2 + 6x - 3} \end{aligned}$$

Try It!

2. Recall the functions we used earlier.

$$\begin{aligned}f(x) &= 3x^2 + x + 2 \\g(x) &= 4x^2 + 2(3x - 4) \\h(x) &= 5(x^2 - 1)\end{aligned}$$

a. Let $m(x)$ be $f(x) + g(x)$. Find $m(x)$.

$$\begin{aligned}(\underline{3x^2 + x + 2}) + (\underline{4x^2 + 6x - 8}) \\ \underline{\underline{7x^2 + 7x - 6}}\end{aligned}$$

b. Find $h(x) - m(x)$.

$$\begin{aligned}(\underline{5x^2 - 5}) - (\underline{7x^2 + 7x - 6}) \\ \underline{\underline{5x^2 - 5 - 7x^2 - 7x + 6}} \\ \underline{\underline{-2x^2 - 7x + 1}}\end{aligned}$$

BEAT THE TEST!

1. Consider the functions below.

$$f(x) = 2x^2 + 3x - 5$$
$$g(x) = 5x^2 + 4x - 1$$

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

Which of the following is the resulting polynomial when $f(x)$ is subtracted from $g(x)$?

- A ~~$-3x^2 - x - 4$~~
- B ~~$-3x^2 + 7x - 6$~~
- C $3x^2 + x + 4$
- D $3x^2 + 7x - 6$

$$(5x^2 + 4x - 1) - (2x^2 + 3x - 5)$$

$$\begin{array}{r} 5x^2 + 4x - 1 - 2x^2 - 3x + 5 \\ \hline \hline 3x^2 + x + 4 \end{array}$$

Section 3 – Topic 4
Multiplying Functions

Use the distributive property and modeling to perform the following function operations.

Let $f(x) = 3x^2 + 4x + 2$ and $g(x) = 2x + 3$.

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

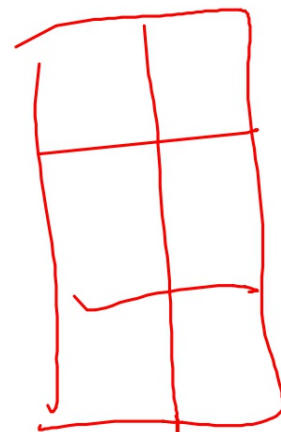
	$3x^2$	$4x^1$	2
$2x^1$	$6x^3$	$8x^2$	$4x$
3	$9x^2$	$12x$	6

$$6x^3 + 17x^2 + 16x + 6$$

Let $m(y) = 3y^5 - 2y^2 + 8$ and $p(y) = y^2 - 2$.

Find $m(y) \cdot p(y)$.

	$3y^5$	$-2y^2$	8
y^2	$3y^7$	$-2y^4$	$8y^2$
-2	$-6y^5$	$4y^2$	-16



$$3y^7 - 6y^5 - 2y^4 + 12y^2 - 16$$

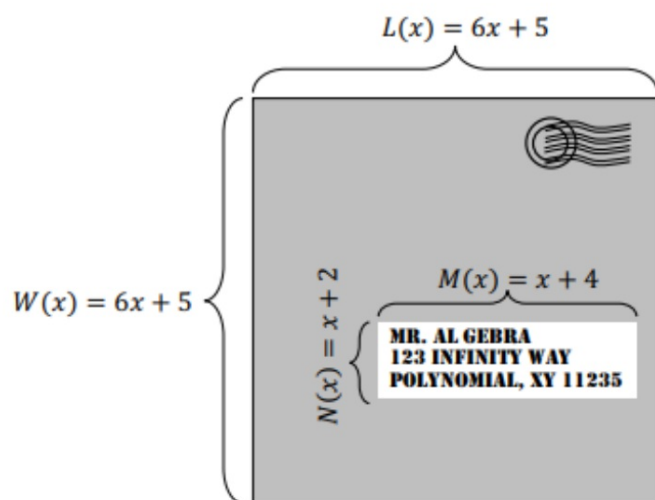
Let's Practice!

1. Let $h(x) = x - 1$ and $g(x) = x^3 + 6x^2 - 5$.

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

Try It!

2. The envelope below has a mailing label.



a. Let $A(x) = L(x) \cdot W(x) - M(x) \cdot N(x)$. Find $A(x)$.

- b. What does the function $A(x)$ represent in this problem?

BEAT THE TEST!

1. The length of the sides of a square are s inches long. A rectangle is six inches shorter and eight inches wider than the square.

Part A: Express both the length and the width of the rectangle as a function of a side of the square.

Part B: Write a function to represent the area of the rectangle in terms of the sides of the square.

2. Felicia needs to find the area of a rectangular field in her backyard. The length is represented by the function $L(x) = 4x^4 - 3x^2 + 6$ and the width is represented by the function $W(x) = x + 1$. Which of the following statements is correct about the area, $A(x)$, of the rectangular field in Felicia's backyard? Select all that apply.

- $A(x) = 2[L(x) + W(x)]$
- The resulting expression for $A(x)$ is a fifth-degree polynomial.
- The resulting expression for $A(x)$ is a polynomial with a leading coefficient of 5.
- The resulting expression for $A(x)$ is a binomial with a constant of 6.
- $W(x) = \frac{A(x)}{L(x)}$