

Do Now: Remember to complete these problems on your do now sheet!

- $5 - 3(2 - 3^2) = 26$
- If $y = x^4 - 200$, and $y = 43$, find x .
 3.95 or -3.95

- ACT Question of the Day: When $x = 3$ and $y = 5$, by how much does the value of $3x^2 - 2y$ exceed the value of $2x^2 - 3y$?
A. 4 **B. 14** C. 16 D. 20 E. 50

Functions

A function is a rule
that relates two variables

Functions have inputs
and out puts

Function notation

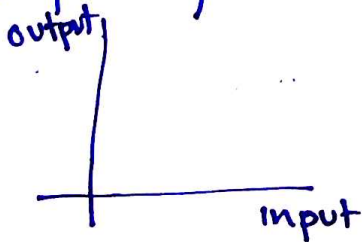
name (input) = output

We can represent all functions in at least 4 ways:

- Algebraically

$f(x) = \text{rule}$
substitute ^{input} into rule

- Graphically



- Numerically

input	output
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- Verbally

- What is changing?
= variables
- What causes what?
input causes output

Example:

vending machine
input = button pressed
output = snack received

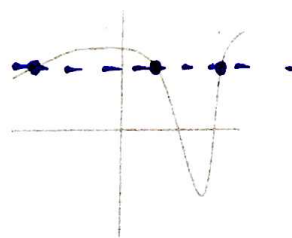
$f(x) = y$; vend (button) = snack

If $f(x) = x^2 - 4x$, find $f(-4)$. Find $f(-2b)$

$$f(-4) = (-4)^2 - 4(-4) = 16 + 16 = 32$$

$$f(-2b) = (-2b)^2 - 4(-2b) = 4b^2 + 8b$$

If $h(x)$ is shown below, find the input(s) that make $h(x) = 4$



↑ input ↑ output

- $x = -5$
- $x = 2$
- $x = 6$

If $d(x)$ is shown in the table below, find $d(2) + 5$:

x	d(x)
-3	2
2	-2
7	-6

$d(2) + 5 = -2 + 5 = 3$

$d(2+5) = d(7) = -6$

If $g(x)$ is a function that represents how much a computer is worth based on how many years you have had it, and $g(3) = 500$, explain what $g(3)$ represents in terms of the problem.

- Worth & years $3 = \text{input}$
 $500 = \text{output}$

- years you have had comp causes worth to change
 $\text{year} = \text{input}$ $\text{worth} = \text{output}$

context: after 3 years, comp is worth \$500

1. The cost in dollars of a cell phone plan in terms of how many text messages are sent can be modeled by the equation $f(x) = 20 + .15x$

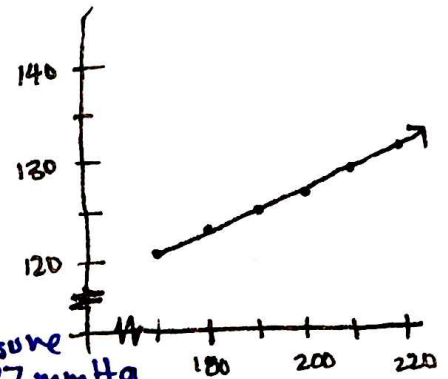
a. Find $f(546) \rightarrow$ substitute in input = \$101.90

b. Explain the meaning of $f(546)$ in the real world context

When you send 546 texts, plan costs \$101.90

2. The table at right shows $g(x)$. Remember order of operations!
- Find $g(2 + 3) = g(5) = 8$
 - Find $-3 * g(2) = -3 * g(2) = -3 * 2 = -6$
 - For what value of x does $g(x) = 9$?

x	g(x)
-5	9
2	2
3	1
5	8



3. The graph of $h(x)$ at right shows the average blood pressure in millimeters of mercury (mmHg) of 35-year-old males according to their weight.

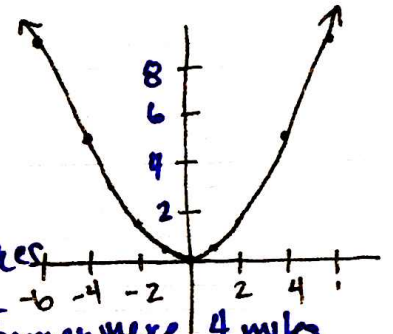
- What is the input and what is the output of $h(x)$? input = weight output = blood pressure
- Find $h(200) \approx 127$ mmHg
- Explain what $h(200)$ means in terms of the real world context

the average blood pressure of a 200 lb 35 yr old male is 127 mmHg

4. A computer programmer found that the time a computer program takes to run (in milliseconds) is a function of how many pieces of data you give it, and this can be modeled by the function $t(n) = n^3 - 4$. It takes 339 milliseconds for a certain trial of the program to run, and Ms. Hindal is trying to figure out how many pieces of data were given. She does the following. Did she do it correctly? If not, explain what she did wrong.

$$t(339) = 339^3 - 4 = 38,958,219 - 4$$

Ms. Hindal is incorrect. = 38,958,215 pieces of data
She thought 339 was the input, but it is the time which is the output.



5. $F(x)$, at right, describes how long it takes Ms. Army to get somewhere based on how many miles that place is east of POB. Does $f(-4) = f(4)$? What does this mean in the context of the problem?

yes! $f(-4) = 5$ and $f(4) = 5$ this means it takes her 5 minutes to get somewhere 4 miles

6. If $f(3 + 2) = 8$ does $f(3) + 2$ always, sometimes, or never equal 8? To help, think about order of operations and simplify as much as possible. If $f(3) + 2$ can equal 8, write a table of values where this is the case. If $f(3) + 2$ can equal something else, write a table of values where this is the case.

sometimes here are both cases

x	f(x)
3	6
5	8

or

x	f(x)
3	-2
5	8

7. Graph a function $g(x)$ so that $g(-3) = -2$, $g(5) = 3$, and $g(7) = -6$

8. If $g(x) = 2x^4 + x^2$, find $g(-x)$ and simplify as much as possible. Does $g(x) = g(-x)$?

$$g(-x) = 2(-x)^4 + (-x)^2 = 2x^4 + x^2 \text{ yes!}$$

9. if $h(x) = x^3 - 2x^2$, find $-2h(x)$.

$$-2x^3 + 4x^2$$

10. Above and Beyond (Optional but can earn you a raffle ticket!): Create a table of values of the function $h(x)$ where $h(-3) = 5$ and $h(x + 1) = h(x) + 2$

Homework: It is your homework to understand how to complete the assigned problems each night. If you are struggling, you may ask a friend, find similar problems in your notes or ask Ms. Hindal, but you should be sure that you know how to complete them. Ms. Hindal will not collect homework, but will grade based on short quizzes that ask you to complete a problem from the homework or one that is very similar to the homework. On these quizzes you will be able to use your homework if you have completed it. If you want extra practice, need extra help, or want to know the answers to the problems, you can check my website: <http://bit.ly/Hindal364>

1. If $f(x) = x^2 - 3x + 4$, $f(-3) = ?$ **22**
2. If $h(x) = (x + 2)^3 / 5$, what is x when $h(x) = -25$

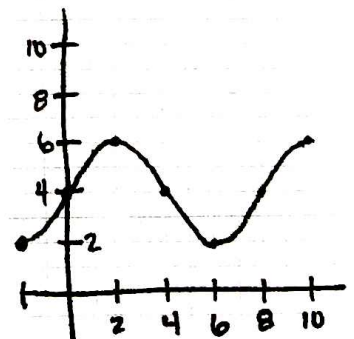
$$x = -7$$

If $g(x)$ is described by the table at right

3. Find $g(8) - g(6) = -6$
4. If $g(x) + 2 = 14$, find x

$$x = 4$$

x	g(x)
4	12
6	6
8	0
10	-6



The height of the tide at the beach can be modeled as a function of time by the function $T(x)$ at right.

5. Does $T(-2) = T(10)$? **No**
6. Explain what the value of $T(5)$ means in the real world context

When the time is 5, the tide is about 3