Functions and Function Notation

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1 Functions

Recall that a function is a rule taking inputs and giving outputs which obeys the NO-AMBIGUITY RULE: for every input, there is EXACTLY ONE output.

1. Determine which of the following tables is a function where x is the input and y is the output. If your answer is no, state which inputs give more than one output.

x	4	5	6	7	5
y	-2	-1	0	1	2

x	-2	-1	0	1	2
y	4	1	0	1	4

2. Solve the following for y and determine which determines a function where the input is x and the output is y:

   (a) $y^2 + (x-1)^2 = 16$

   (b) $y^3 - x^5 = 143$.

2 Function Notation

Recall that if y is a function of x (which means x is the input and y is the output) we write $y = f(x)$, where f represents the function. So if, for example, the input $x = 3$ corresponds to the output $y = 11$, we can write $11 = f(3)$.

When we plug something into a function and find the output, we are "evaluating" the function at that input.

1. For $f(x) = 3x + 7$, evaluate the following:

   (a) $f(2)$

(b) $f(3)$
(c) $f(a)$
(d) $f(2+3)$
(e) $f(2)+f(3)$
(f) $f(a+b)$
(g) $f(a)+f(b)$

2. For $f(x) = x^2 - 2x + 3$, evaluate the following:

   (a) $f(5)$
   (b) $f(s)$
   (c) $f(s+1)$

3. For $f(x) = \dfrac{1}{\sqrt{x-5}}$, evaluate the following:

   (a) $f(9)$
   (b) $f(5)$
   (c) $f(1)$.