Beginning Activities for Section 6.4

Mathematical Reasoning: Writing and Proof, Version 3

Beginning Activity 1 (Constructing a New Function)

x	$f(x)$	$g(f(x))$
a	p	t
b	q	t
c	r	s
d	r	s

This represents a function from A to C since each element of A is associated with exactly one element of C.

This method of constructing a new function is called the **composition of f and g** and will be studied in this section.

Beginning Activities for Section 6.4

Mathematical Reasoning: Writing and Proof, Version 3

Beginning Activity 2 (Verbal Descriptions of Functions)

1.

Verbal Description	Symbolic Result
Choose an input.	x
Square it.	x^2
Multiply by 3.	$3x^2$
Add 2.	$3x^2 + 2$
Take the square root.	$\sqrt{3x^2 + 2}$

2.

Verbal Description	Symbolic Result
Choose an input.	x
Square it.	x^2
Multiply by 3.	$3x^2$
Add 2.	$3x^2 + 2$
Take the sine of the result.	$\sin\left(3x^2 + 2\right)$

3.

Verbal Description	Symbolic Result
Choose an input.	x
Square it.	x^2
Multiply by 3.	$3x^2$
Add 2.	$3x^2 + 2$
Apply the exponential function.	e^{3x^2+2}

Notice that the first four steps of each of these functions were identical. The only difference was in the last step.

4.

Verbal Description	Symbolic Result
Choose an input.	x
Raise it to the fourth power.	x^4
Add 3.	$x^4 + 3$
Apply the natural logarithm function.	$\ln\left(x^4 + 3\right)$

5.

Verbal Description	Symbolic Result
Choose an input.	x
Multiply by 4 and add 3.	$4x + 3$
Apply the sine function.	$\sin(4x + 3)$
Square the input (x) and add 1.	$x^2 + 1$
Divide $\sin(4x + 3)$ by $\left(x^2 + 1\right)$.	$\dfrac{\sin(4x + 3)}{x^2 + 1}$
Apply the cube root function.	$\sqrt[3]{\dfrac{\sin(4x + 3)}{x^2 + 1}}$