7.6 Shifting Functions

A Practice Understanding Task

Part I: Transformation of an exponential function.

The table below represents the property value of Rebekah's house over a period of four years.

Rebekah's Home

Time (years)	Property Value	Common Ratio
0	150,000	
1	159,000	
2	168,540	
3	178,652	
4	189,372	

Rebekah says the function $P(t) = 150{,}000(1.06)^t$ represents the value of her home.

1. Explain how this function is correct by using the table to show the initial value and the common ratio between terms.

Jeremy lives close to Rebekah and says that his house is always worth $20,000 more than Rebekah's house. Jeremy created the following table of values to represent the property value of his home.

Jeremy's Home

Time (years)	Property Value	Relationship to Rebekah's table
0	170,000	
1	179,000	
2	188,540	
3	198,652	
4	209,372	

When Rebekah and Jeremy tried to write an exponential function to represent Jeremy's property value, they discovered there was not a common ratio between all of the terms.

2. Use your knowledge of transformations to write the function that could be used to determine the property value of Jeremy's house.

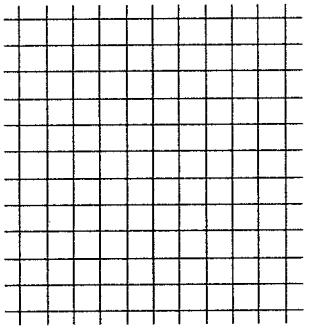
Part 2: Shifty functions.

Given the function $g(x)$ and information about $f(x)$,

- write the function for $f(x)$,
- graph both functions on the set of axes, and
- show a table of values that compares $f(x)$ and $g(x)$.

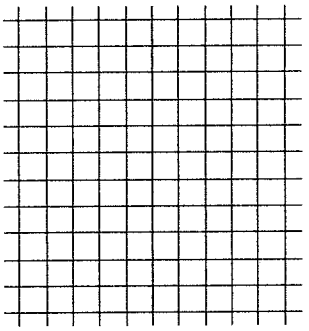
3. *If* $g(x) = 3(2)^x$ *and* $f(x) = g(x) - 5$, *then* $f(x) =$ _____

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



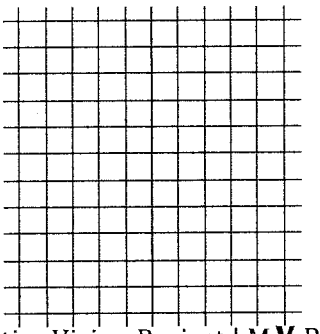
4. *If* $g(x) = 4(.5)^x$ *and* $f(x) = g(x) + 3$, *then* $f(x) =$ _____

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



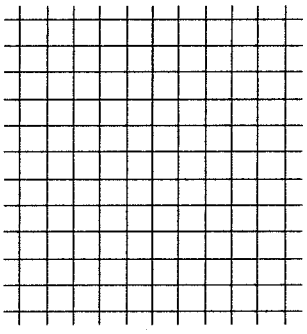
5. *If* $g(x) = 4x + 3$ *and* $f(x) = g(x) + 7$, *then* $f(x) =$ _____

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



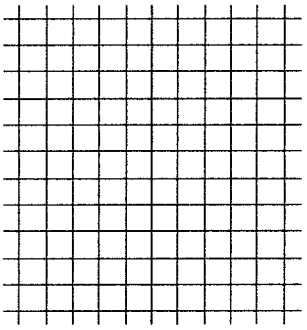
6. *If* $g(x) = 2x + 1$ *and* $f(x) = g(x) - 4$, *then* $f(x) =$ _____

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



7. *If* $g(x) = -x$ *and* $f(x) = g(x) + 3$, *then* $f(x) =$ _____

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



Part III: Communicate your understanding.

8. If $f(x) = g(x) + k$, describe the relationship between $f(x)$ and $g(x)$. Support your answers with tables and graphs.