

College Algebra, Section 1.1, #50
Functions and Models

Mortgage A couple can afford \$800 per month to purchase a home. As indicated in the table, if they can get an interest rate of 7.5% the number of years t that it will take to pay off the mortgage is a function of the dollar amount A of the mortgage for the home they purchase.¹

Amount A (\$)	t (years)
40,000	5
69,000	10
89,000	15
103,000	20
120,000	30

(Source: Comprehensive Mortgage Tables [Publication No. 492], Financial Publishing Co.)

- a. If the couple wishes to finance \$103,000, for how long must they make payments?
Write this correspondence in function form if $t = f(A)$.

For specific mortgage values of A , $f(A)$ represents the amount of time t it will take to pay off the mortgage. That is, $f(A) = t$.

Here, $A = \$103,000$ so look for the corresponding value of t in the chart and you will find $t = 20$. This tells us that the couple must make payments for 20 years.

In the form $t = f(a)$, $20 = f(103,000)$

- b. What is $f(120,000)$? Write a sentence that explains its meaning.

$f(120,000) = 30$. We can also say, when $A = 120,000$, $t = 30$.

This means, if the couple borrows \$120,000, it will take them 30 years to pay off their mortgage.

- c. What is $f(3 \cdot 40,000)$?

Doing the multiplication within the parentheses gives us $f(3 \cdot 40,000) = f(120,000)$. And we know from part b, above, that $f(120,000) = 30$.

- d. What value of A makes $f(A) = 5$ true?

Here we are given that $t = 5$ and we're looking for the corresponding value of A . From the table, when $t = 5$, $A = 40,000$. Thus, the amount borrowed that can be paid off in 5 years is \$40,000.

- e. Does $f(3 \cdot 40,000) = 3 \cdot f(40,000)$? Explain your reasoning.

Let's test the statement:

$$f(3 \cdot 40,000) \stackrel{?}{=} 3 \cdot f(40,000)$$

$$f(120,000) \stackrel{?}{=} 3 \cdot 5$$

$$30 \neq 15$$

No, these are not equal.

¹Harshbarger/Yocco, *College Algebra In Context*, 5e, p. 24, #50.