# HS Functions Assignment

This assignment is **strongly aligned** to the standards.

Pizza Place Promotion
Task: In order to gain popularity among students, a new pizza place near school plans to offer a special promotion. The cost of a large pizza (in dollars) at the pizza place as a function of time (measured in days since February 10th) may be described as:

C(t)=9, when t is greater than or equal to 0 and less than or equal to 3
C(t)=9+t when t is greater than 3 and less than or equal to 8
C(t)=20 when t is greater than 8 and less than 28
(Assume t only takes whole number values)

a. If you want to give their pizza a try, on what date(s) should you buy a large pizza in order to get the best price?
Student has written in which dates correspond to which equation, then written "The best price is on Feb 10, 11, 12, 13"

b. How much will a large pizza cost on Feb 18th?
C(Feb 18th)=9+8=$17

c. On what date, if any, will a large pizza cost 13 dollars?
9+4=13
On Feb 14 it will cost $13. d. Write an expression that describes the sentence "The cost of a large pizza is at least A dollars B days into the promotion," using function notation and mathematical symbols only.
Cost is greater than or equal to A for B days after Feb 10

e. Calculate C(9)-C(8) and interpret its meaning in the context of the problem.

f. On average, the cost of a large pizza goes up about 85 cents per day during the first two weeks of the promotion period. Which of the following equations best describes this statement? (two options given)

Overview

High school students are asked to use a piecewise-defined function representing a real-world scenario to answer questions and solve problems. The assignment is strongly aligned to the standards because it involves an authentic real-world situation and requires students to do grade-appropriate analysis.

Related Standards

We looked at how well the assignment aligned to the following standard:

KY.HS.F.1: Understand properties and key features of functions and the different ways functions can be represented.

KY.HS.F.1.a: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If *f* is a function and *x* is an element of its domain, then *f(x)* denotes the output of *f* corresponding to the input *x*.

KY.HS.F.1.b: Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context.

Why is this assignment Strongly aligned?

The assignment uses an authentic scenario represented by a piecewise-defined function, a specialty function reserved for high school study. The problems allow students to engage with the function in several ways, including interpreting the quantities and expressions, connecting the mathematics to verbal descriptions, and analyzing and interpreting the function’s domain.

Note: If students were asked to graph a piecewise function this task would align to KY.HS.F.4f (+). Plus (+) standards are additional mathematics concepts students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics. Plus (+) standards are not required learning for every Kentucky student.

Students use equations to model real-world contexts as early as middle school. By high school, both the mathematics and the reasoning should increase in complexity and sophistication, like they do in this assignment. The use of a piecewise-defined function and questions addressing the domain, the mathematical representations, and the average rate of change all ensure that the assignment is appropriate to high school.

[**Practice Standards**](https://tntp.org/student-work-library/view/strongly-high-school-functions-assignment)The connection to a familiar context allows students to engage with Mathematical Practice Standard #2 (“Reason abstractly and quantitatively”). Students mentally convert between the context (for example, “days since February 10”) and the mathematical representations of compound inequalities. They are specifically asked to translate a verbal description into a mathematical expression and are asked to calculate a mathematical expression and interpret its meaning in the context of the problem.