

NAME: _____

UNIT 3 • LINEAR AND EXPONENTIAL FUNCTIONS

Lesson 1: Graphs As Solution Sets and Function Notation

Problem-Based Task 3.1.4: Party Time

A company is throwing a large party requiring a venue, tables, chairs, and waiters. There will be between 50 and 200 guests, so the party coordinator has been asked to predict the total cost of the event for 50, 100, 150, and 200 guests. The functions below describe the number of tables, chairs, and waiters needed, as well as the size of the venue in square feet. In each equation, x represents the number of guests.

- Number of tables: $t(x) = \frac{1}{10}x$
- Number of chairs: $c(x) = x + 10$
- Number of waiters: $w(x) = \frac{1}{5}x$
- Square feet of venue: $s(x) = 1000\left(2^{\frac{x}{50}}\right)$

Tables are \$50 each, chairs are \$3 each, waiters earn \$100 each, and venues charge \$2 per square foot. Therefore, the total estimate for the party, $P(x)$, is given by this equation:

$$P(x) = (50 \cdot t(x)) + (3 \cdot c(x)) + (100 \cdot w(x)) + (2 \cdot s(x))$$

How much will the party cost?

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Coaching

- a. What is the domain of $t(x)$?
- b. What is the domain of $c(x)$?
- c. What is the domain of $w(x)$?
- d. What is the domain of $s(w)$?
- e. What is the domain of $P(x)$?
- f. What is the most the venue can cost?
- g. What is the cost for tables and chairs for 100 guests?
- h. What is the entire cost of the party for 150 guests?
- i. What is the least amount the party can cost?
- j. Complete a table of values for the costs of the party.