8.F High School Graduation

Alignments to Content Standards: 8.F.B.4

Task

The SLV High School graduation started at 1:00PM. After some speeches, the principal started reading off the names of the students, alphabetically by last name. When he finishes, the graduation will end.

a. Use the bulletin shown below to estimate when the graduation will end.
San Lorenzo Valley High School
Class of 2011

Nicolas Gregory Hargreaves
Alexander Samuel Hammet
David Thomas Chesus
Sarah Lorraine Harvey
Olivia Louise Herrera
Kasia Adalr Hill
Ludmila Eliana Hipsley
Jazelle Gina Hooper
Marilyn Donna May Hopkins
Lindsey Marie Hopkin
Bryn Kathryn Horton
Thomas John Housek
Ellen Joanne Innis
Jordan Issacson
Joseph Clifford Jansen
Allison Kristine Janus
Nellie Pearl Mitchell Johnson
Lacey Marie Johnson
Felipe Johnson
Shelby Danielle Johnson
Zachary David Johnson
Dakota Shea Jones
Tanner William Jones
Clara Joy Kamau
Mia Anne Kellogg
Maxine Elaine Kelly
Ryan Scott Kennedy
Jenny Rae Kersten
Andrew Benjamin King
Russell Theodore Klein
Zachariah Waya Tegfli Klus
Christina Rose Knoll
Jessica Danielle Kraft
Jessica Ann Laey
Joseph Allan Landry
Abbie Mae Leverette
Matthew Alexander Lipperd
Madeline Elizabeth Lopez
Emily Marie Medison
Rebecca Lynn Makita
Savanna Sun Mangelson
Zane Michael Markham
Alfredo Martinez
Tyler Cameron Mattson
Wayne Thomas McCarthy
Theo Christopher McClush
Aneila Lisa McFarland
Alexander Michael McIntosh
Dominique Sharii McIntosh
Victoria McKenzie
Violet Josette McNally
Kendra Dee Messimer
Marisa Grace Brudnick
Sage Nicole Monack
Thomas Oceen Moreno
Rainbow Roxanne Muchamuel
Nicholas Jeffrey Newberry
George Austin Norfleet
Travis James Nugent
Joseph Carl Olson
Lacie Marie Orlando
Mary Elaine Ivy Orr
Austin Leonard Overton
Haley Lauren Pace
James Bryn Paulini
Timothy William Parker
Carson Taylor Paynter
Zachary Allen Peabody
Kirstina May Pearce
Samuel Jackson Pelphrey
Chandler Elizabeth Perauzzo
Sebastian Thomas Peterson

Illustrative Mathematics
b. Estimate how long the speeches took. How do you know?

c. Write an equation that the parents could use to find the approximate time the principal will call their child's name given the child's position in the list in the graduation program.

d. Aptos High School and Santa Cruz High School started their graduations at the same time. The graphs shown below show the time of day as a function of the number of names the principal has read at each school. Write down as many differences between the two graduations as you can based on differences in the two graphs. Give your reasons for each.
**IM Commentary**

Students will need to make the assumption that the principal reads the names at a constant rate to solve this problem. While not a full-blown modeling problem, this task does address some aspects of modeling as described in Standard for Mathematical Practice 4. Also, students often think that time must always be the independent variable, and so may need some help understanding that one chooses the independent and dependent variable based on the way one wants to view a situation.

This task was submitted by Dan Meyer for the first Illustrative Mathematics task writing contest 2011/12/18.

**Solution**

a. The principal had read 40 names by 1:28 and 65 names by 1:33. That yields a differential of 25 names in 5 minutes or 5 names per minute. There are 126 names remaining to be called.
The graduation will last approximately 25 minutes after 1:33. If it takes exactly 25 more minutes, the graduation will end at 1:58. It is reasonable to say that the graduation ceremony will end close to 2:00 p.m.

b. Assuming the principal read 5 names per minute, the initial 40 names took

\[
\frac{126 \text{ names}}{5 \text{ names/minute}} = 25.2 \text{ minute}
\]

or 8 minutes to read. We know the 40th name was read at 1:28, which means the principal began reading names at 1:20 or so. Since the graduation itself started at 1:00, the speeches took about 20 minutes.

c. The principal began reading names at 20 minutes past 1:00. Let \( n \) be the child's position in the list in the graduation bulletin and \( t \) be the number of minutes past 1:00 the child's name will be called. Assuming each name requires \( \frac{1}{5} \text{ minutes} \), then one equation would be:

\[
t = \frac{n}{5} + 20
\]

We can emphasize the fact that \( t \), the number of minutes after 1:00 is a function of \( n \), the position in the graduation list by writing the answer using function notation:

\[
t(n) = \frac{n}{5} + 20
\]

d. Aptos started calling names later because its \( y \)-intercept is greater; in other words, more time has passed before Aptos started calling names. The principal at Aptos calls out names more slowly because the slope, which corresponds to the number of "minutes per name," is greater. In other words, it takes the principal a greater number of minutes per name to read the list.