8.F High School Graduation

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.
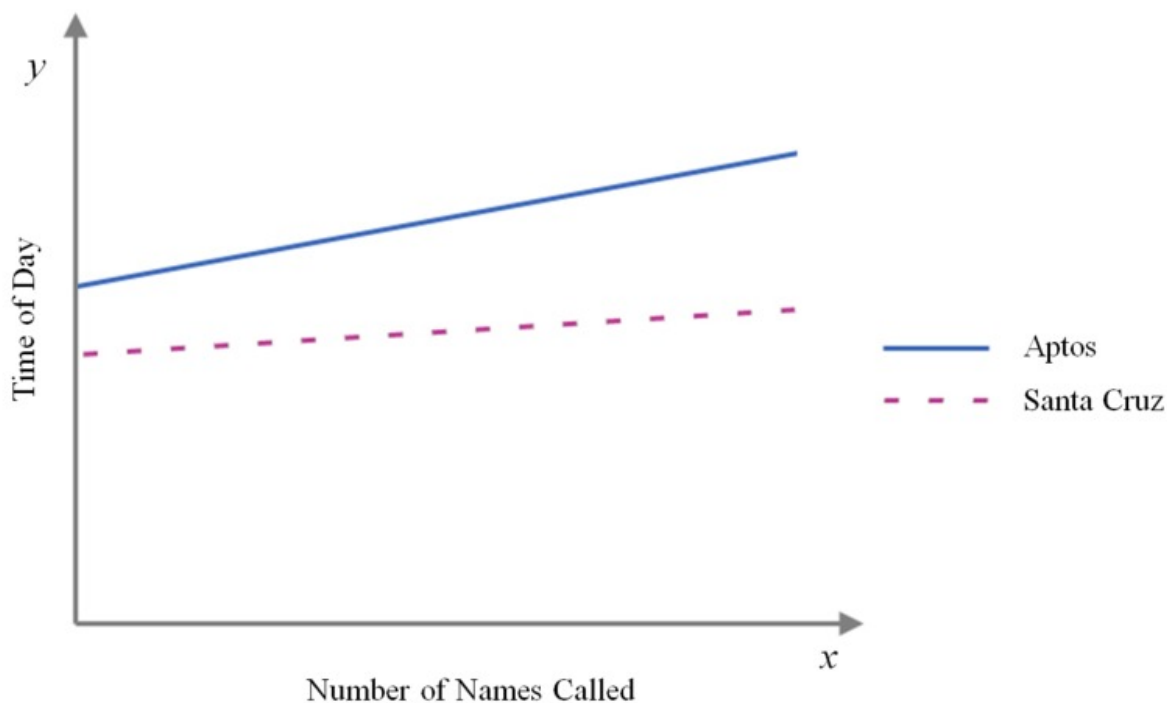
a. Use the bulletin shown below to estimate when the graduation will end.

San Lorenzo Valley High School
Class of 2011

Micah Stephen Adams	Amber Anne Chase	Nicholas Gregory Hargraves	Matthew Alexander Lipperd
Xavier Josue Alvin	Faye Elise Chavez	Alexander Samuel Harnett	Madeline Elizabeth Lopez
Connor James Antisdel	David Thomas Chesus	David Michael Hart	Emily Marie Madison
David Zachary Baker	Zoe Darlene Chinn	Melissa Lorraine Harvey	Rebecca Lynn Makita
Bradley Garrett Barnard	Emily Elizabeth Clements	Olivia Louise Herrera	Savanna San Mangelsen
Joseph Barnes	Claire Elizabeth Cloud	Kasia Adair Hill	Zane Michael Markham
James Alexander Barnes	Steven Dennis Connelly	Ludmila Eliana Hipsley	Alfredo Martinez
Michael Barton	Conor Thomas D'Amato	Jazelle Gina Hooper	Tyler Cameron Mattson
Sarah Raisha Beasley	Cassandra Suzanne Davis	Mariah Donna May Hopkins	Wayne Thomas McCarthy
Allison Rose Beasley	Lauren Marie Dempewolf	Lindsey Marie Hoppin	Theos Christopher McClish
Emily Anne Bechtle	Blake Bradley Dennis	Bryn Kathryn Horton	Annelise Marie McFarland
Brandon Scott Beevers	Jake Madison Debreuil	Thomas John Housek	Alexander Michael McIntosh
Patrick Fereva Belardi	Shannon Elaine Eisner	Ellen Joanne Innis	Dominique Sharee McIntosh
Kaitlyn Ella Benson	Emily Anne Engel	Jordan Isaacson	Victoria McKenzie
Jordan Starr Thomas Bereman	Samantha Marie Ferguson	Joseph Clifford Jansen	Violett Josette McNally
Taylor Renee Foster Berritto	Dominique Angelina Jones	Allison Kirstine Janus	Kendra Dee Messimer
Ashley Michelle Ann Billington	Cherina Marie Freitas	Nettie Pearl Mitchell Johnson	Marisa Grace Brudnick
Morgen King Biswa	Anju Friend	Lacey Marie Johnson	Sage Nicole Monack
Jaclyn Kate Black	Nathaniel Justin Fruzza	Felipe Johnson	Thomas Ocean Moreno
Xitlali Borreson	Mariah Nichole Galmez	Shelby Danielle Johnson	Rainbow Roxanne Muchamuel
Chere Nicole Brandon	Robin Lavendar Garcia	Zachary David Johnson	Nicholas Jefferey Newberry
Sydney Lauren Garcia Breili	Ronja Andrea Franklin	Dakota Shea Jones	George Austin Norfleet
Curtis Martin Brewer	Mason Garrett	Tanner William Jones	Travis James Nugent
Katherine Evelyn Brown	Kayle Anne Genis	Clara Joy Kamau	Joseph Carl Olson
Annika Bruce	Melanie Lauren Gleim	Mia Anne Kellogg	Lacie Marie Orlando
Amanda Lynn Bruce	Andrea Serena Godbout	Maxine Elaine Kelly	Mary Elaine Ivy Orr
David Michael Burgler	Angela Gonzales	Ryan Scott Kennedy	Austin Leonard Overton
Jourdan Donovan Burk	Chloe Chandler Goodreau	Jenny Rae Kersten	Haley Lauren Pace
Nicholas Ryan Burks	Dakota Makua Gorman	Andrew Benjamin King	James Evan Paolini
Joseph Thomas Burton	Dontae Jessie Greer	Russell Theodore Klair	Timothy William Parker
McLean Avery Camacho	Michael Marie Grindy	Zachariah Waya Tsgifi Klus	Carson Taylor Paynter
Alexander Austin Campbell	Erin Cassidy Groswird	Christina Rose Knoll	Zachary Alan Peabody
Jason William McGregor	Krista Marie Grunberger	Jessica Danielle Kraft	Katrina May Pearce
Taylor James Casey	Tyler Alan Hagen	Jessica Ann Lacy	Samuel Jackson Pelphrey
Kory Daniel Chadwick	Hazel Gladys Jane Haikkila	Joseph Allan Landry	Chandler Elizabeth Perazzo
Audrey Elizabeth Chapin	Marcus Taylor Halversen	Abbie Mae Leveque	Sebastian Thomas Peterson

(handwritten annotations: "1:28pm" pointing to Zoe Darlene Chinn; "1:33pm" pointing to Dakota Makua Gorman)

San Lorenzo Valley High School
Class of 2011

Hannah Mae Petras
Rachael Danielle Pfister
Jesse Dean Phillips
Saree Iris Potter
Kirstin Jane Prather
Haley Brooke Prunella
Brittany Lynette Ramirez
Sondra Marie Raymond
Nathan Dawes Reader
Kristy Marie Rector
Sergio Aldo Ringelman
Christopher Ross Rinkert
Joshua David Roberts
Lara Elaine Rodriguez
Brandon Bouchard Ruiz
Kaiya Irene Salangsang
Erik Mark Sanchez
Fiona Darlene Sans
James Trevor Sawyer
Jared Warrior Schell
Lisi Melissa Sherrell
Jessica Marie Simonson
Megan Danielle Skrabak
David Tayamen Sladwick
Logan James Smith
Elizabeth Smith
Dillon Sean Sohoza
Nicolas Aaron Sovulewski
Miles Random Staggs
Bruce Louis Steinberg
Matthew McCrea Stewart
Kelsey Anne Stiller
Daniel Todd Sutton
Deanna Marie Tindell
Ariannna Jordan Townsend
Joseph Ryan Tumbale

Rachel Ana Unti
Natalie Vernazza
Rochelle Whitney Viele
Carson Alexander Walker
Daniel Herrera Wetterhorn
Quillan Arthur White
Jessica Lynn Whitehill
Stephanie Anne Wildman
Jessica Kayla Wood
Alajha Kathleen Wyllie
Peter Francis Zavaroni

Graduation coordinators:

Class President - Hazel Haikkila
Vice President - Lindsey Hoppin
Secretary - Morgen Biswa
Treasurer - Bradley Barnard

Principal — Michael Billings

Assistant Principal — Keri Arredondo

Counselors — Leslie Ebbage
Noreen Rorden
Annabel Nolan
Jeff Burns

Board of Trustees — Kip Dakota, President
Lea Tellez, Clerk
Laura Ritchie, Trustee
Kathy Wylie, Trustee
George Dolson, Trustee

Superintendent — Julie Belardi

Director Student Activities — Leslie Ebbage

Program cover artwork — Shannon Haff '11

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.

Time of Day

Number of Names Called

Aptos

Santa Cruz

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.

$$\frac{126 \text{ names}}{5 \dfrac{\text{names}}{\text{minute}}} = 25.2 \text{ minute}$$

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

$$40 \text{ names} \cdot \frac{1 \text{ minute}}{5 \text{ names}}$$

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 1/5 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.