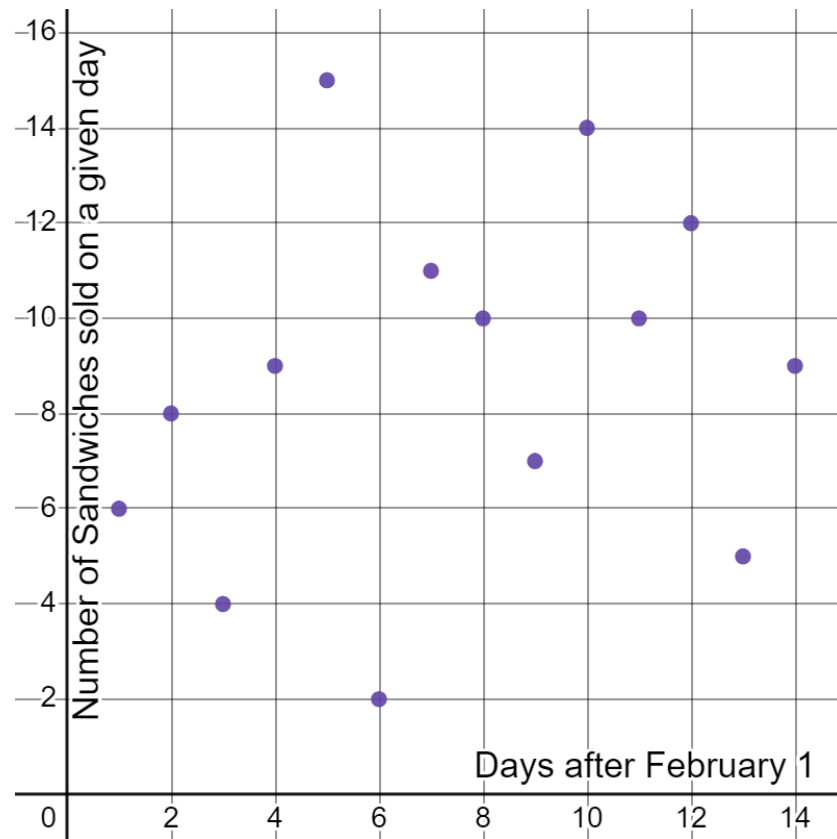


7 HARD Problems for the OCT 2023 DSAT (Problem Sette #2)

Video Solutions at: <https://youtu.be/puUIkl4SoDI>

Question 1

A circle in the xy -plane has the equation $(x + 3)^2 + (y - 8)^2 = 25$. Line k is tangent to the circle at $(1, 5)$. The equation for line k is represented by the linear function, $k(x)$. For what value of x does $k(x) = 12$?

Question 2

The scatterplot shows the relationship between the number of sandwiches sold on a given day y , at a restaurant and the number of days after February 1, x . The average rate of change, in sandwiches per day, of the number of sandwiches the restaurant sold on February 4 to the number of sandwiches the restaurant sold on February 8 is equal to a . The average rate of change, in sandwiches per day, of the number of sandwiches the restaurant sold on February 7 to the number of sandwiches the restaurant sold on February 11 is equal to b . The number b is $p\%$ greater than the number a . What is the value of p , rounded to the nearest hundredth?

Question 3

The function f is defined by $f(x) = ax^2 + bx + c$ where a , b , and c are constants and $2 < b < 5$. The graph of $y = f(x)$ in the xy -plane is a parabola where $f(-12) = f(7)$. If b is an integer, what could be the value of $b - a$?

Question 4

The value of a video game console increased by 285% from the end of 2015 to the end of 2016. The value of the console then decreased by 21% from the end of 2016 to the end of 2017. Finally, the value of the console increased by 63% from the end of 2017 to the end of 2018. What was the net percentage increase in the value of the video game console from the end of 2015 to the end of 2018? (Round to the nearest hundredth of a percent)

Question 5

The functions f and g are defined by the given equations, where $2 \leq x \leq 8$.

Which of the following equations displays, as a constant or coefficient, the minimum value of the function it defines, where $2 \leq x \leq 8$?

I. $f(x) = 0.0625(0.5)(2)^{x+2}$

II. $g(x) = 1500(0.2)^{x-3}$

A) I only

B) II only

C) I and II

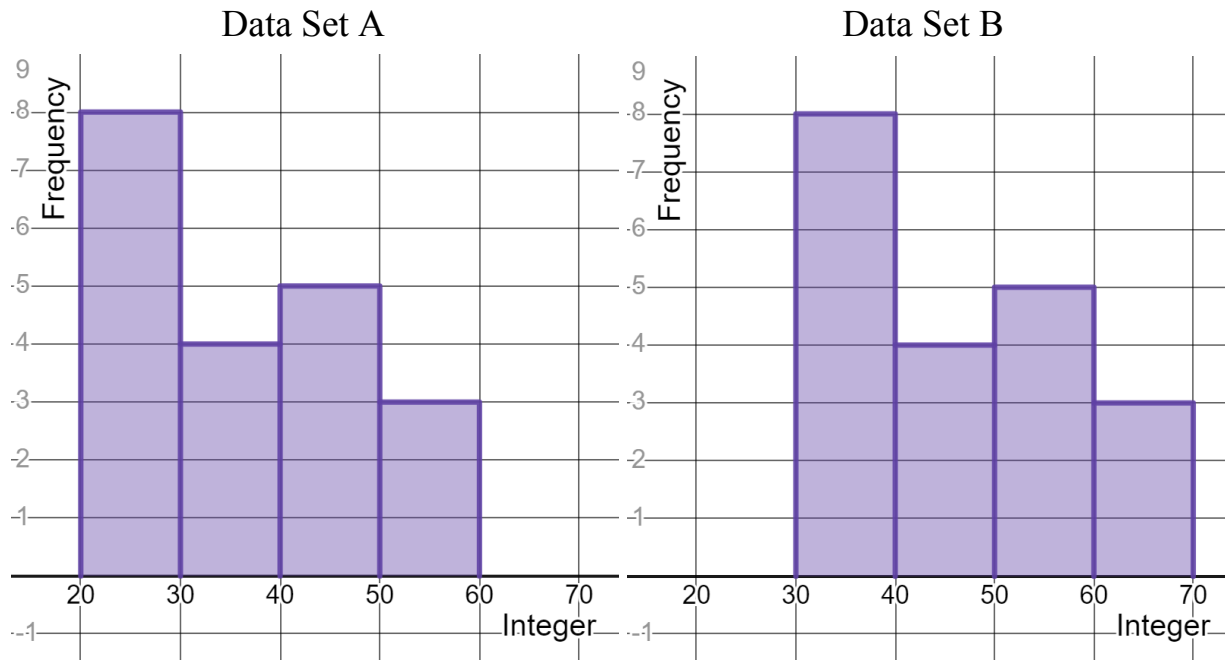
D) Neither I nor II



Question 6

	Volume (cubic inches)
Square pyramid A	16
Square pyramid B	5488

In geometry, a square pyramid is a pyramid that has a square base and four lateral faces. Square pyramid A is similar to Square pyramid B. The table gives the volumes, in cubic inches, of the two square pyramids. If the height of Square pyramid A is 8 inches, what is the perimeter of the square base of Square pyramid B, in inches? (Round your answer to the nearest tenth of an inch).

Question 7

Two data sets each containing 20 integers are summarized in the histograms shown. For the histogram, the first interval represents the frequency of integers greater than or equal to 20, but less than 30. The second interval represents the frequency of integers greater than or equal to 30, but less than 40, and so on. The mean of Data Set A is equal to a . The mean of Data Set B is equal to b . What is the smallest possible value of $\frac{b}{a}$?