

Algebra II

From Tom Sawyer to Tarzan¹

Name _____

Hour _____

Steamboat Problem

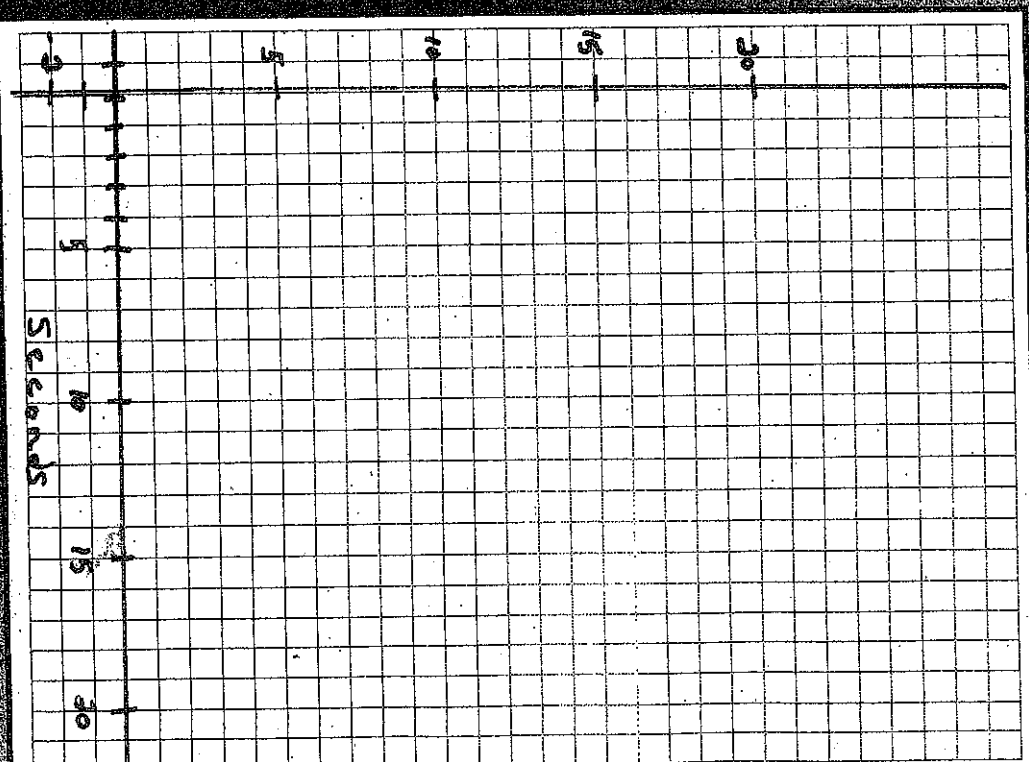
Mark Twain sat on the deck of a river steamboat. As the paddlewheel turned, a point on the paddle blade moved in such a way that its distance, d , from the water's surface was a function of time. When his stopwatch read 4 seconds, the point was at its highest, 18 feet above the water's surface. The wheel's diameter was 18 feet, and it completed a revolution every 10 seconds.

- a) Sketch a graph of this relationship. Use graph paper.
- b) Write the function of the motion of the steamboat's paddle.
b) _____
- c) How far above the surface was the point when Mark's stopwatch read 5 seconds?
c) _____
- d) How long was the point below the water's surface?
d) _____

¹ Adapted from assignment written by Melissa Cavett, Millsaps College, Jackson, MS & Sallie Moseley, St. Andrews Episcopal Day School, Jackson, MS

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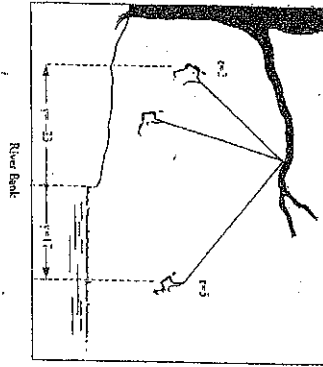
Height



Steamboat Problem

Tarzan Problem

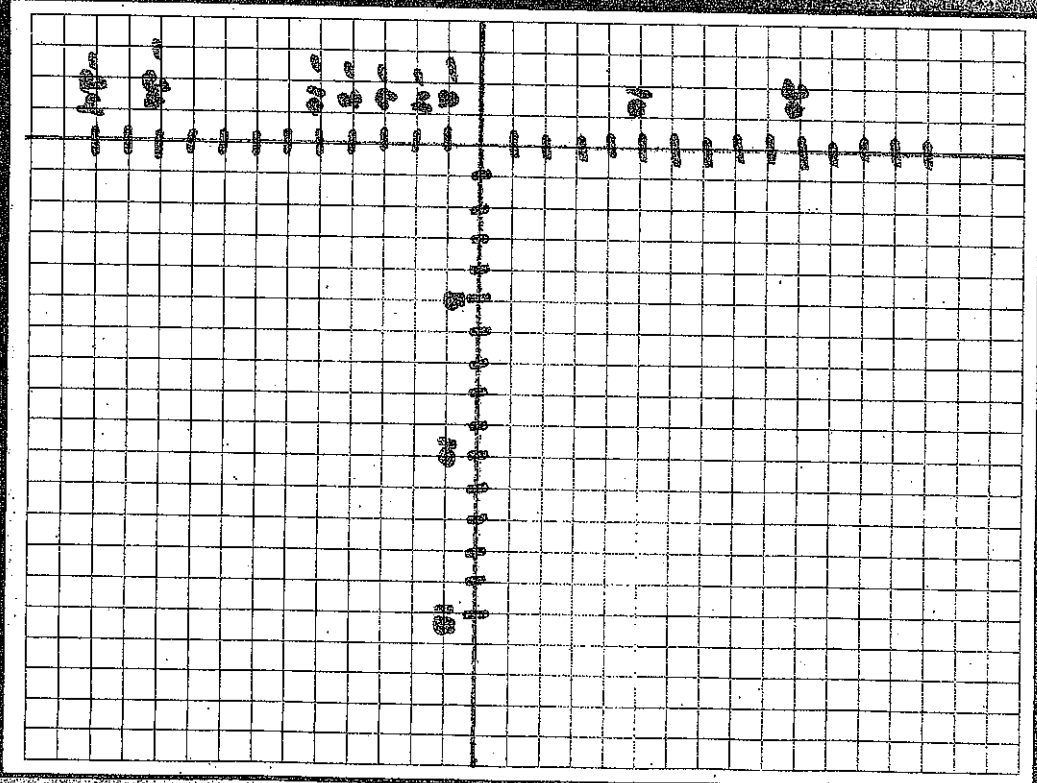
Tarzan is swinging back and forth on his grapevine. As he swings, he goes back and forth across the riverbank, going alternately over land and water. Jane (being an astute mathematician as well as an able jungle princess) decides to model mathematically his motion and starts her stopwatch. Let t be the number of seconds the stopwatch reads, and let y be the number of meters Tarzan is from the riverbank measured horizontally. Jane finds that when $t = 2$, Tarzan is at one end of his swing, where $y = 23$. She finds that when $t = 5$ he reaches the other end of his swing and $y = 17$.



- Sketch the graph that would represent Tarzan's motion. Use graph paper.
- Write a function expressing Tarzan's distance from the riverbank in terms of t .
b) _____
- How long is Tarzan over the water?
c) _____
- Where was Tarzan when Jane started the stopwatch?
d) _____
- Find the least possible value of t for which Tarzan is directly over the riverbank.
e) _____

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Meters from Riverbank



Tarzan Problem