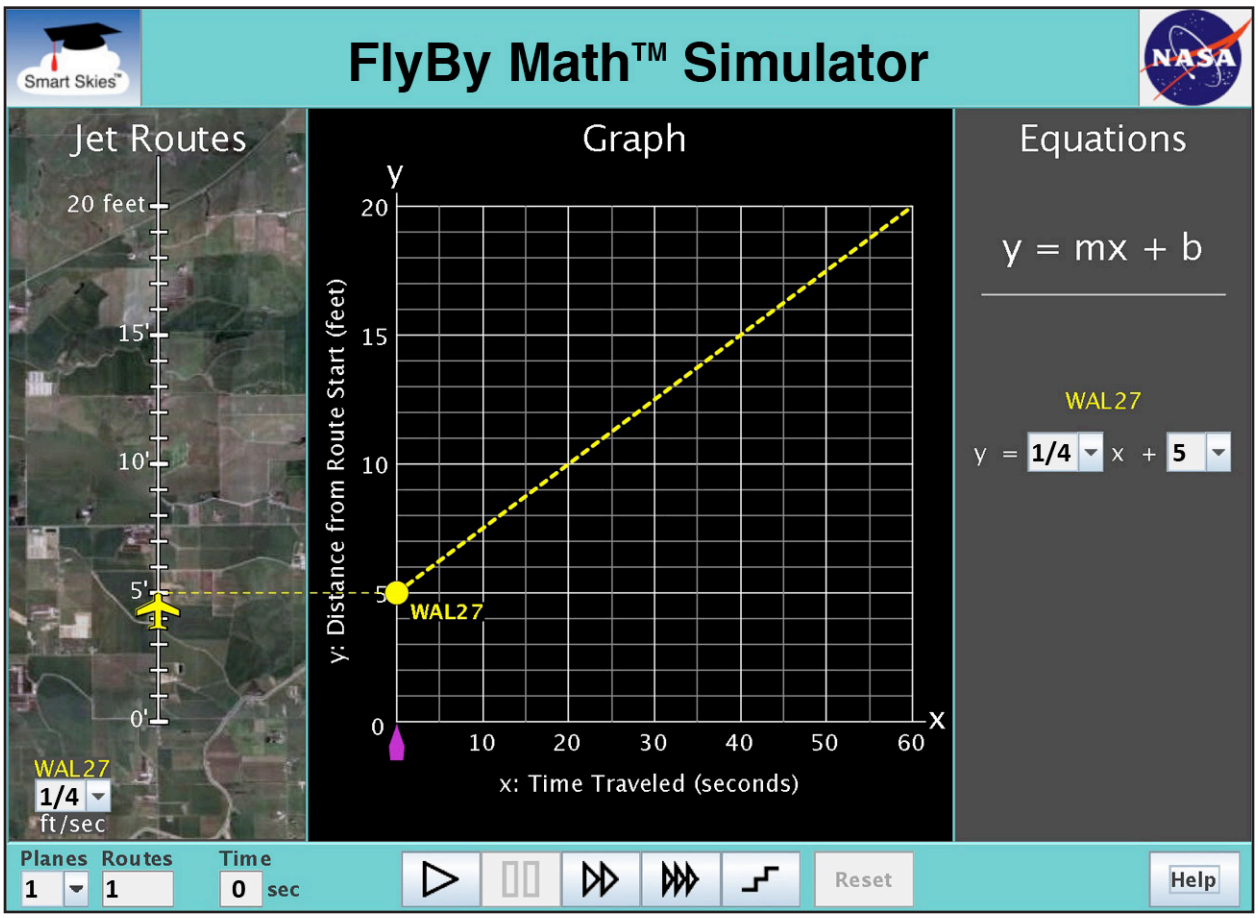
Name _____

Student Worksheet B

Analyzing the Starting Position of One Plane

In this worksheet, you will work with 1 plane and 1 jet route.

- The jet route is 20 feet long.
- The plane's STARTING POSITION is its location on the jet route at time zero.
- Since we are interested in a plane's **starting** position, we will work mainly at time zero without running the simulator.

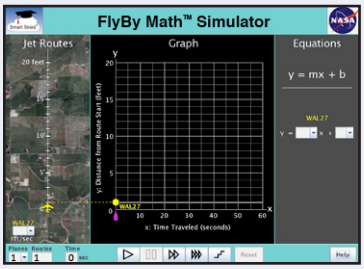


You will use the simulator to learn:

- How to find a plane's starting position using the **Jet Route Panel**, the **Graph Panel**, and the **Equation Panel**.

Problem 1: Set up the simulator

- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 starting position: Choose any position from 1 ft to 10 ft.
- WAL27 speed: Choose any speed greater than 0 ft/sec.



(a) In the **Jet Route Panel**, slowly drag the plane forward and backward along its route. In the **Graph Panel**, how does the graph change as you drag the plane?

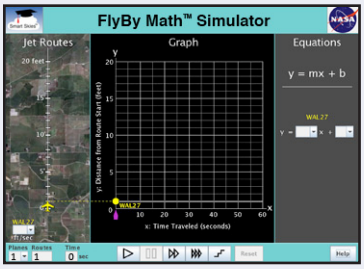
- ❍ The line slides up or down.
- ❍ The line rotates.

(b) In the **Jet Route Panel**, slowly drag the plane forward and backward along its route. In the **Equation Panel**, how does the equation change as you drag the plane?

- ❍ The value of m (the slope) changes.
- ❍ The value of b (the y-intercept) changes.

Problem 2: Set up the simulator

- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 starting position: Choose any position from 1 ft to 10 ft.
- WAL27 speed: Choose any speed greater than 0 ft/sec.



(a) In the **Jet Route Panel**, what WAL27 starting position did you choose? _____ ft

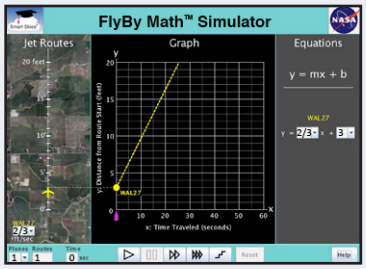
(b) In the **Graph Panel**, at x = 0 seconds, what is the **y-coordinate** of the dot (●) on the WAL27 line?

(x , y) = (0 seconds , _____ ft)

(c) In the **Equation Panel**, what is the value of b (the y-intercept) for the WAL27 equation?

b = _____ ft

Problem 3: Set up the simulator



- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 speed: ⅔ ft/sec
- On the jet route, drag the WAL27 plane to this starting position: 3 ft.

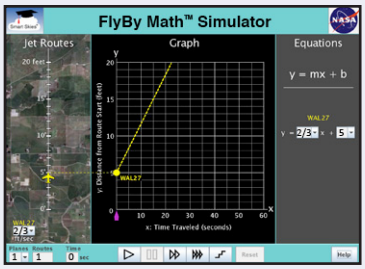
(a) In the **Graph Panel**, at time zero, what is the **y-coordinate** of the dot on the graph?

(x , y) = (0 seconds , _____ ft)

(b) In the **Equation Panel**, look at the WAL27 equation.
Fill in the missing value in the WAL27 equation below.

y = ⅔ x + ____

Problem 4: Set up the simulator



- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 speed: ⅔ ft/sec
- On the graph, drag the dot on the y-axis to the point (0, 5).
  Note: The y-axis is the vertical (↕) axis.

(a) In the **Jet Route Panel**, what is the WAL27 **starting position**? _____ ft

(b) In the **Equation Panel**, look at the WAL27 equation.
Circle the **number** below that represents the WAL27 starting position.

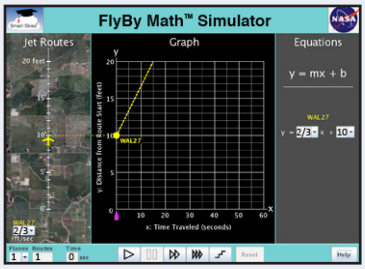
y = ⅔ x + 5

(c) In the **Equation Panel**, the equation y = ⅔ x + 5 is in *slope-intercept form*, y = mx + b.
Circle the **letter** below that represents the WAL27 starting position.

y = m x + b

Problem 5: Set up the simulator

- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 speed: ⅔ ft/sec
- Enter the WAL27 equation: $y = \frac{2}{3}x + 10$



(a) In the **Jet Route Panel**, what is the WAL27 **starting position**? _____ ft

(b) In the **Graph Panel**, at time zero, what are the **coordinates** of the dot on the y-axis?

(x , y) = (_____ seconds , _____ ft)

Summarizing Starting Position

Problem 6:

SUMMARIZE: Circle *all* the ways you can use the simulator to change a plane's **starting** position at time zero.

In the **Jet Route Panel**	In the **Graph Panel**	In the **Equation Panel**
Drag the plane on its jet route.	Drag the dot on the y-axis up or down.	Change the value of m.
Change the plane speed.	Rotate the line.	Change the value of b.

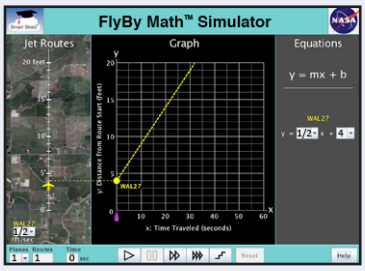
Problem 7:

SUMMARIZE: Check the box for *each* quantity that is **always the same as** the WAL27 starting position.

- ❑ The value of m (the slope) in the WAL27 equation.
- ❑ The value of b (the y-intercept) in the WAL27 equation.
- ❑ The x-coordinate (first coordinate) of the point where the WAL27 line meets the y-axis (the vertical axis).
- ❑ The y-coordinate (second coordinate) of the point where the WAL27 line meets the y-axis (the vertical axis).

Problem 8: Set up the simulator

- Time slider: 0 seconds
- 1 plane, 1 route
- WAL27 speed: ½ ft/sec
- WAL27 starting position: 4 ft



GO BEYOND: You have just studied a plane's **starting position**. Now let's run a problem and look at a plane's **ending position**.

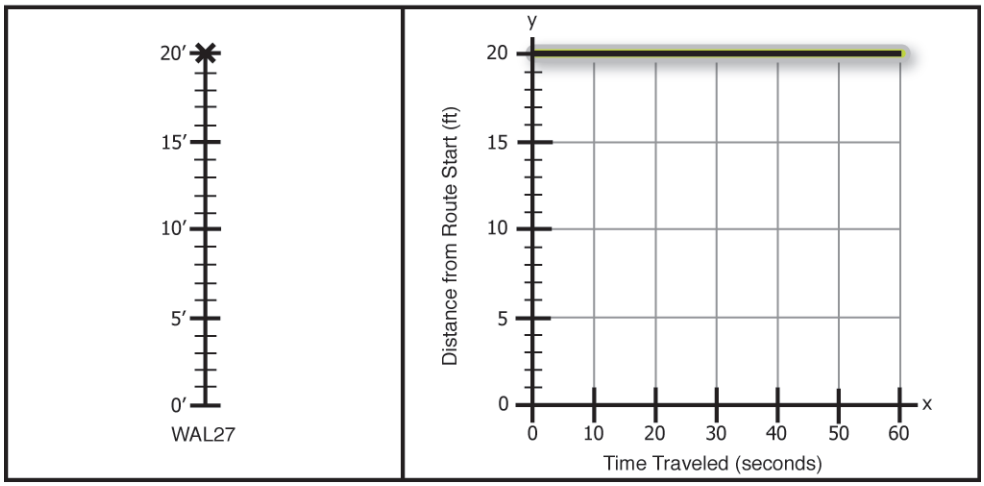
(a) Click Play (▷) to run the simulator until it stops. *Note: the simulator will stop at 32 seconds.*
In the **Jet Route Panel**, where is WAL27 when the simulator stops?
That is, what is the WAL27 **ending position**? _____ ft

(b) In the **Graph Panel**, when the simulator stops, what is the **y-coordinate** (second coordinate) of the dot (●) on the WAL27 line?

(x , y) = (32 seconds , _____ ft)

(c) In the **Graph Panel** below, find the highlighted horizontal line at the top of the grid.

Jet Route Panel | **Graph Panel**



Each point on that horizontal line has y-coordinate 20 feet.
When the dot is anywhere on the horizontal line at 20 feet, where is the plane on its jet route?

- ❍ The plane is at the start of its jet route.
- ❍ The plane is at the end of its jet route.
- ❍ Cannot determine the location of the plane on its jet route.