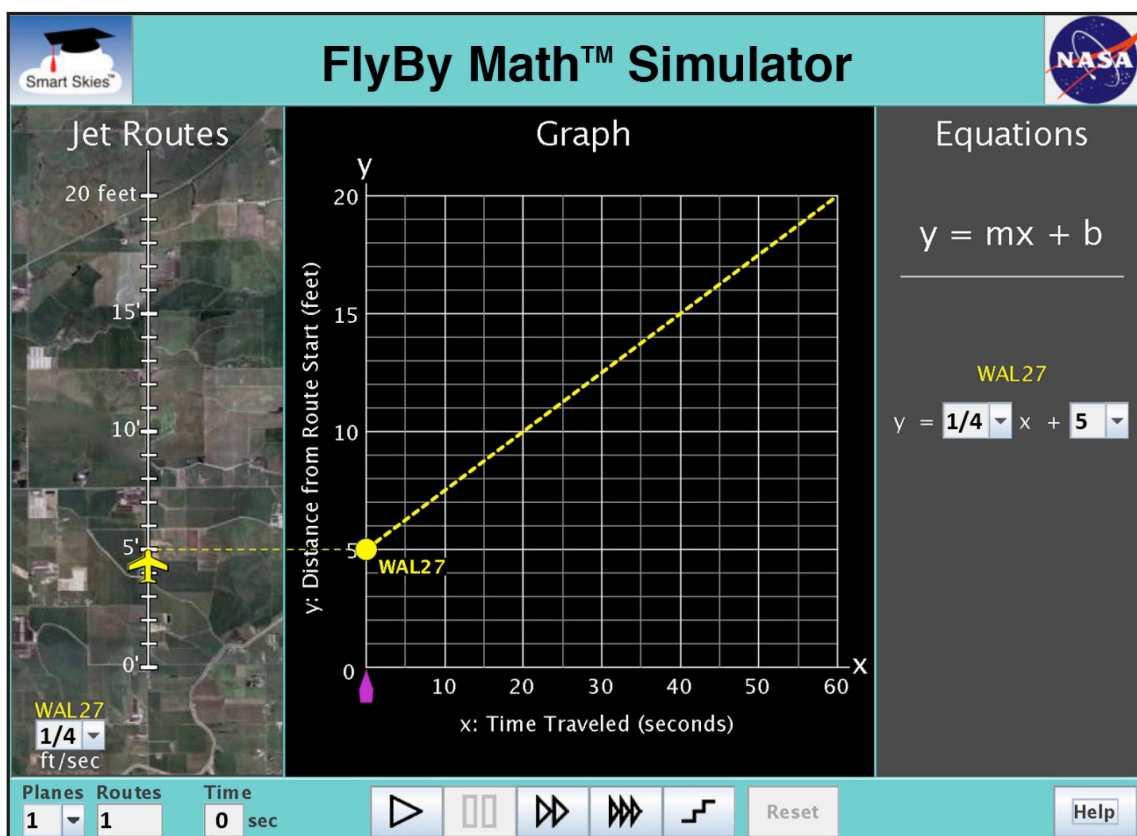Name _____   *Answers*

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.
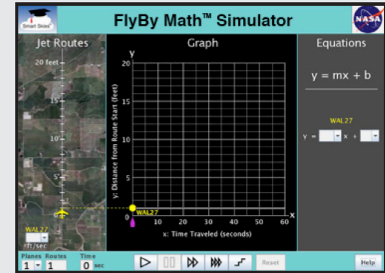
You will use the simulator to learn:
- How to find a plane's starting position using the **Jet Route Panel**, the **Graph Panel**, and the **Equation Panel**.

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 Graph Panel, how does the graph change as you drag the plane?

- ○ The line slides up or down.
- ● The line rotates.

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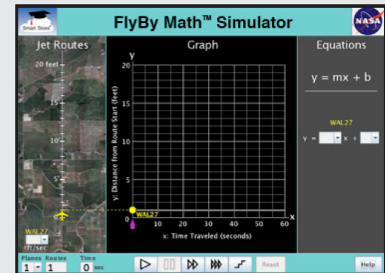
(a) In the **Jet Route Panel**, what WAL27 starting position did you choose?

Any integer between 1 and 10, inclusive, is correct.

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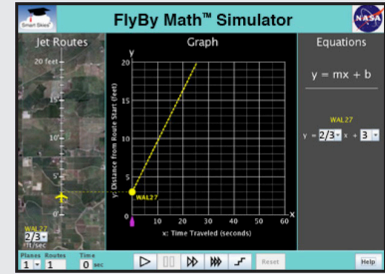
(x, y) = (0 seconds, _____ ft)

The answer is the same as Problem 2a.

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

b = _____ ft   *The answer is the same as Problem 2a.*

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

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

(x, y) = (0 seconds, _____**3**_____ft)
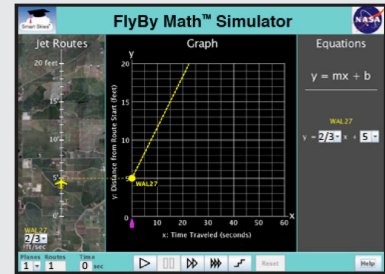
(c) In the **Equation Panel**, look at the WAL27 equation. Fill in the missing value in the WAL27 equation below.

y = ⅔ x + _____**3**_____

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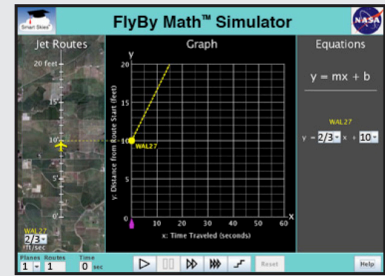
(c) In the **Equation Panel**, the equation y = ⅔ x + 5 is in slope-intercept form, y = mx + b.
Circle the **letter** below that represents the WAL27 starting position.

y = m x + ⓑ

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**? __**10**__ ft

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

$(x , y) = ($ __**0**__ seconds, __**10**__ 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
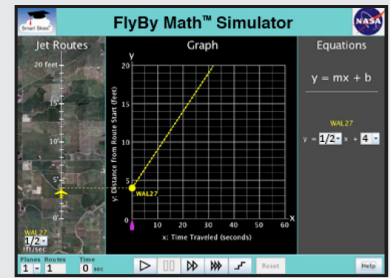
GO BEYOND: You have just studied a plane's **starting position**. Now let's run a problem and look at a plane's **ending position**.

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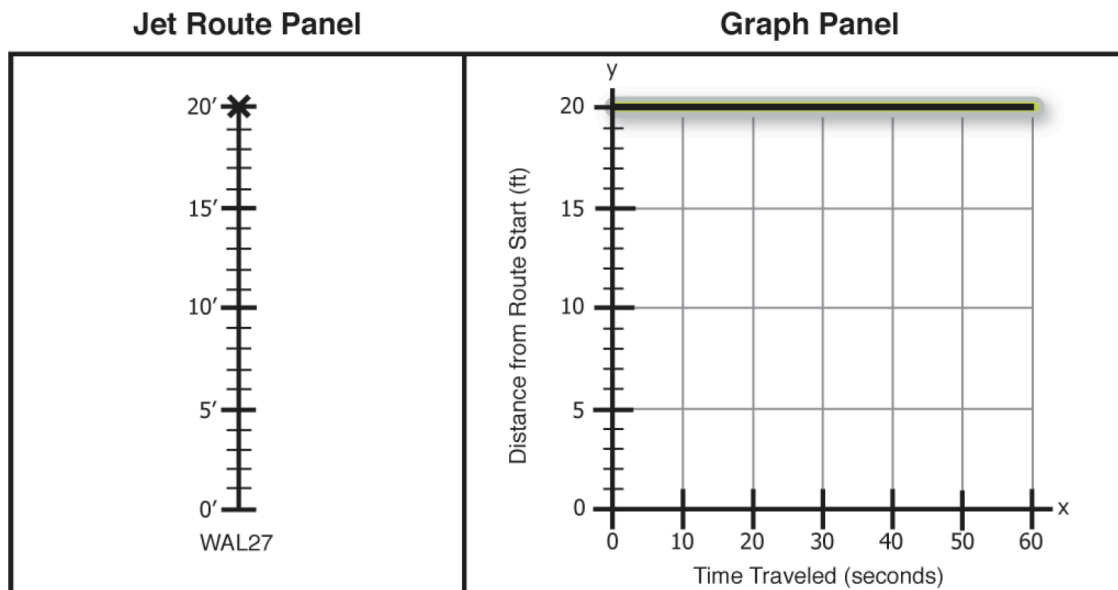
(b) In the **Graph Panel**, when the simulator stops, what is the y-coordinate (second coordinate) of the dot (•) on the WAL27 line?

$$(x , y) = (32 \text{ seconds}, \underline{\quad \textbf{20} \quad} \text{ ft})$$

(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.)
- ○ Cannon determine the location of the plane on its jet route.