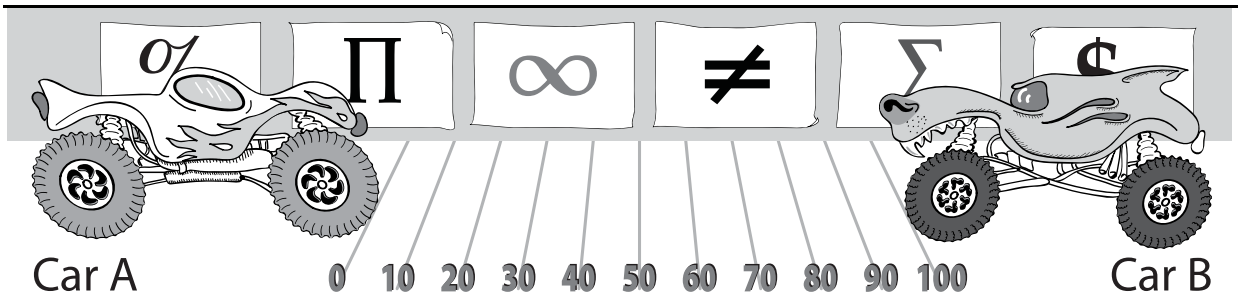
Collision
Road Rage Pre-Activity

NAME _____

Car A begins at position 0 and drives to the right. Car B begins at position 100 and drives to the left. Answer the following questions to find where and when the cars will collide.



1. Assume that car A travels 5 units per second and begins at position 0. Where will the car be after 10 seconds?

2. **a)** Write an equation in slope-intercept form that can be used to calculate the position of car A after x seconds.

b) Explain the meanings of x, y, slope, and y-intercept in terms of the problem situation.

3. Assume that car B travels 4 units per second and begins at position 100. Where will the car be after 10 seconds?

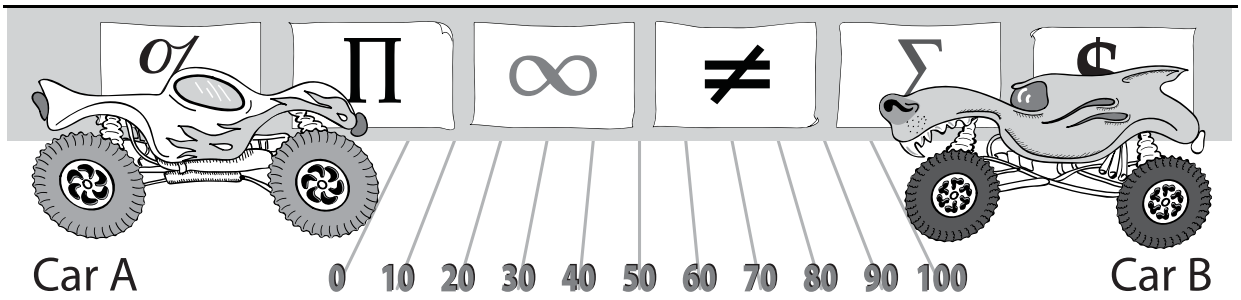
4. **a)** Write an equation in slope-intercept form that can be used to calculate the position of car B after x seconds.

b) Explain the meanings of x, y, slope, and y-intercept in terms of the problem situation.

5. Calculate when and where the cars will crash into each other using the equations you found.

Answer Key – Collision
Road Rage Pre-Activity

Car A begins at position 0 and drives to the right. Car B begins at position 100 and drives to the left. Answer the following questions to find where and when the cars will collide.



1. Assume that car A travels 5 units per second and begins at position 0. Where will the car be after 10 seconds?

$5 \times 10 = 50$, or at position 50

2. **a)** Write an equation in slope-intercept form that can be used to calculate the position of car A after x seconds.

$y = 5x$

b) Explain the meanings of x, y, slope, and y -intercept in terms of the problem situation.

x is time in seconds.
y is the position of the car.
The slope represents the velocity (or speed) in units/sec, which is 5 units/sec for car A.
The y-intercept is the position at time 0, which is 0 units for car A.

3. Assume that car B travels 4 units per second and begins at position 100. Where will the car be after 10 seconds?

$100 - 4 \times 10 = 60$, or at position 60

4. **a)** Write an equation in slope-intercept form that can be used to calculate the position of car B after x seconds.

$y = 100 - 4x$
or
$y = -4x + 100$

Note: For many students, it is more natural to write the y-intercept first because of how they verbally describe the problem.

b) Explain the meanings of x, y, slope, and y -intercept in terms of the problem situation.

x is time in seconds.
y is the position of the car.
The slope represents the velocity in units/sec, which is -4 units/sec for car B.
The negative value reflects the fact that the position decreases as the car moves left.
The y-intercept is the position at time 0, which is 100 units for car B.

5. Calculate when and where the cars will crash into each other using the equations you found.

Solve the system of linear equations:

$$y = 5x$$
$$y = 100 - 4x$$

Substitute $5x$ for y in the second equation:

$$5x = -4x + 100$$

Solve for x:

$$9x = 100$$
$$x \approx 11$$

Substitute the value of x into either of the original equations:

$$y = 5x \approx 5(11) = 55$$

or

$$y = 100 - 4x \approx 100 - 4(11) = 56$$

The cars will crash into each other approximately 11 seconds after they start driving between positions 55 and 56.

Note: The difference in the positions is caused by rounding error. The exact time and location of the crash is $11\frac{1}{9}$ seconds at position $55\frac{5}{9}$.