

Systems of linear equations are inconsistent when their slope is the same y-intercept is different.

Method one:

rewrite each equation in slope-intercept form: $y = mx + b$

$$\begin{array}{r} 2x + 2y = 3 \\ -2x \qquad \qquad -2x \\ \hline 2y = \frac{-2x+3}{2} \\ y = -x + \frac{3}{2} \end{array} \qquad \begin{array}{r} x + y = 5 \\ -x \qquad \qquad -x \quad m = -1 \\ \hline y = -x + 5 \quad b = 5 \end{array}$$

$m = -1$ $b = \frac{3}{2}$

inconsistent equations

think: the slope is the same, but the y-intercept is different, therefore these lines are parallel.

Method two:

compare the coefficients and constants:

$$2x + 2y = 3 \qquad x + y = 5$$

	Coefficient of x	Coefficient of y	constant
equation 1	2	2	3
equation 2	1	1	5
ratio	$\frac{1}{2}$ 1:2	$\frac{1}{2}$ 1:2	$\frac{5}{3}$ 5:3

think: The coefficients in equation 1 are twice that of equation 2, but the constant in equation 1 is NOT twice equation 2, therefore this is inconsistent.