

# Systems of Equations Practice TEST

January 9, 2022 6:08 PM

## Systems of Equations Practice TEST

Math 10 **Total /36 = %** Name: \_\_\_\_\_  
**Practice Test – Systems of Equations**

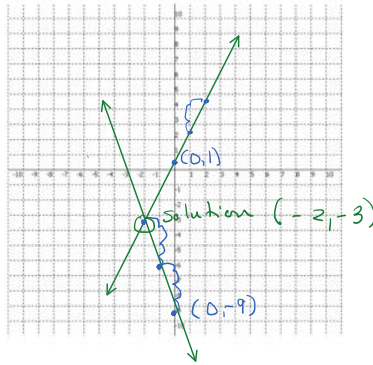
**Learning Target 1:** I can locate a solution to a system of equations graphically

Solve by graphing. Label the solution point on the graph. 3 marks each

(a)  $3x + y = -9$   
 $y = 2x + 1$

$y = -3x - 9$   
 $m = -\frac{3}{1} (0, -9)$

$m = \frac{2}{1} (0, 1)$

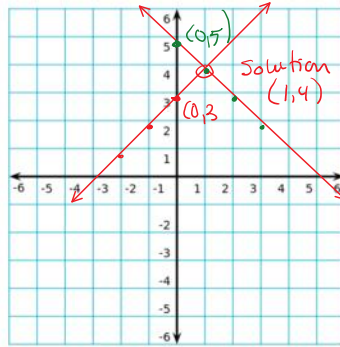


$y = 2x + 1$

(b)  $x + y = 5$   
 $y = x + 3$

$y = -x + 5$   
 $m = -\frac{1}{1} (0, 5)$

$y = x + 3$   
 $m = \frac{1}{1} (0, 3)$



<b>Learning Target 1:</b> I can locate a solution to a system of equations graphically /6	Beginning	Developing	Competent	Mastery
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Learning Target 2:** I can solve a system of equations using elimination

Solve by elimination (adding/subtracting). 3 marks each

(a)  $\begin{cases} 2x - 3y = 3 \\ 5x - 2y = -9 \end{cases}$

$\begin{array}{r} 10x - 15y = 15 \\ -10x + 4y = 18 \\ \hline \end{array}$  (elim. term) (1)

(0.5)  $\begin{array}{r} -11y = 33 \\ \hline -11 \end{array}$

$y = -3$

Substitute

$2x - 3(-3) = 3$

(1)  $\begin{array}{r} 2x + 9 = 3 \\ -9 \end{array}$

$2x = -6$   $x = -3$

(0.5) Solution (-3, -3)

(1) eliminate a term!

(b)  $\begin{cases} \frac{x}{3} - y = \frac{2}{5} \\ x + 6y = 4 \end{cases}$   $\begin{array}{r} 5x - 15y = 9 \\ -5x - 30y = -20 \\ \hline \end{array}$

$\begin{array}{r} -45y = -11 \\ \hline -45 \end{array}$  (0.5)

$y = \frac{11}{45}$

(1) sub in

$45 \left[ \frac{x}{3} - \left( \frac{11}{45} \right) = \frac{2}{5} \right]$

$\begin{array}{r} 15x - 11 = 27 \\ +11 \end{array}$

Solution (0.5)  $\left( \frac{38}{15}, \frac{11}{45} \right)$

**Learning Target 2:** I can solve a system of equations using elimination /6

Beginning	Developing	Competent	Mastery
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

$\frac{15x}{15} = \frac{38}{15}$

$x = \frac{38}{15}$

**Learning Target 3:** I can determine the number of solutions to a linear system.

1. From the list of equations:

2 marks

(0.5) work

$\frac{0}{3} = \frac{9x - 3y + 6}{3}$

I  $0 = 3x - y + 2$

II  $0 = 6x - 2y - 4$

III  $0 = 6x - 3y + 6$

IV  $0 = 9x - 3y + 6$

$\rightarrow 0 = \frac{6x - 2y - 4}{2} \rightarrow 0 = 3x - y - 2$

$\rightarrow 0 = \frac{6x - 3y + 6}{3} \rightarrow 0 = 2x - y + 2$

$0 = 3x - y + 2$

Which pair of equations forms a system that has infinitely many solutions? How do you know? must be the same equations  $\rightarrow$  coincident lines (1)

- a) I and IV    b) I and II    c) II and III    d) II and IV    e) III and IV

(0.5)

$$-x/y = \frac{-2x+4}{5} = \frac{-2x}{5} + \frac{4}{5}$$

2. Given the equation  $2x - 5y = 4$ , a second equation that forms a system with no solution from the list below is: \_\_\_\_\_ /2

- a)  $6x + 5y = 4$   
 b)  $x - 2.5y = 2$   
 c)  $5x - 2y = 8$   
 d)  $4x - 10y = 16$   
 e)  $2x + 5y = 4$

$m = 2/5$   
 $4x - 10y = 16$   
 (0.5)

$4y = \frac{-2x+4}{5}$

$m = -4/10 = -2/5$   
 $-10y = -4x + 16$   
 $y = \frac{2}{5}x - \frac{8}{5}$

What must be "true" for any system of equations to have no solution?

(1) The lines must be parallel and have the same slope but different y-intercepts

3. Which of the following systems is/are inconsistent? Explain how you know? 2 marks

NO solution i.e. parallel lines Show work below!

I.  $2x - 5y = 1$   
 $4x - 10y = 2$

$2x - 5y = 1$  infinite solutions coincident lines

II.  $7x + 3y = 5$   
 $3x + 7y = 5$

$m = -7/3$  one solution. (1) work

III.  $3x + 4y = 2$   
 $3x + 4y = 8$

$m = -3/4$  parallel.  $m = -3/4$  dif y intercept

IV.  $5x + 2y = 3$   
 $5x - 2y = 0$

$m = -5/2$   $m = -5/2 = 5/2$  one solution

- a) I      b) II      c) I and II      d) I and IV      (e) III

Explanation: System III is parallel same slope dif y intercept so no solution all other lines have at least one solution. (1) Explain.

4. Is  $(2, -7)$  a solution to the following system of equations? Show your work and explain your answer. 2 marks

LS explain your answer  
 $x + 2y = -12$   
 $2 + 2(-7) = 2 - 14 = -12 \leq -12$   
 $(2, -7)$  works in this eqn

$x + 2y = -12$   
 $3x - 7y = 11$

(1) work response

RS  
 $3(2) - 5(-7) = 6 + 35 = 41 \neq 11$   
 $(2, -7)$  works in this eqn

Learning Target 3: I can determine the number of solutions to a linear system. /8	Beginning	Developing	Competent	Mastery
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$\therefore (2, -7)$  is a solution to (1) explanation for system.

as when substituted into each eqn  
 LS = RS

**Learning Target 4:** I can solve a system using substitution.

Solve each system **by substitution**. 3 marks each

(a)  $y = 2x + 6$   
 $3x + y = 26$

① Sub in  
 eqn.  $3x + (2x + 6) = 26$   
 ①  $5x + 6 = 26$

walk  
to  
find  
x

①  $5x = 20$   
 $x = 4$

walk to  
find  
y

$y = 2(4) + 6$   
 $y = 8 + 6$   
 $y = 14$

Solution (4, 14) (0.5)

(b)  $6y + x = 3$   
 $3y - x = 6$  →  $x = -6y + 3$

① Sub into  
 eqn  $3y - (-6y + 3) = 6$   
 $3y + 6y - 3 = 6$

① →  $9y - 3 = 6$   
 $+3 +3$

$9y = 9$

$y = 1$

find  
x

$x = -6(1) + 3$

①  $x = -6 + 3$   
 $x = -3$

Solution (-3, 1) (0.5)

<b>Learning Target 4:</b> I can solve a system using substitution. /6	Beginning <input type="checkbox"/>	Developing <input type="checkbox"/>	Competent <input type="checkbox"/>	Mastery <input type="checkbox"/>
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Learning Target 5: I can model a situation using a system of equations and determine the solution

let  $x$  be amt invested at 8% and  $y$  be amt invested at 9.5%

1. Mrs. Garcia invested a total of \$9090 in two savings accounts. One account yielded 8% simple interest and the other yielded 9.5% simple interest. What amount was placed in each account if a total of \$839.85 in interest was received after one year? 2 marks

Write a system of equations that could be used to solve this problem.

Total invested  $X + Y = 9090$  ①

Interest amount ②  
 $0.08x + 0.095y = 839.85$

$\frac{8\%}{100\%} = 0.08$   
 $\frac{9.5\%}{100\%} = 0.095$

2. For a school play, one adult ticket costs \$5.00 and one student ticket costs \$3.00. Twice as many student tickets as adult tickets were sold. The total receipts were \$1650. How many of each kind of ticket were sold? 4 marks

① let  $a$  be # of adult tickets sold; let  $s$  be # of student tickets sold

①  $5a + 3s = 1650$

$2a = s$

solve system  $\rightarrow$  use either method ①

$5a + 3(2a) = 1650$   
 $5a + 6a = 1650$

so  $s = 2(150)$   
 $s = 300$

3. The cost of renting a car depends on the number of days for which it is rented and the distance it is driven. The cost for one day and 240 km is \$39. The cost for three days and 800 km is \$125.

What is the cost per day and the cost per kilometre? 4 marks

let  $d$  be cost per day; let  $c$  = cost/km

$-3(1d + 240c = 39)$  ①  
 $3d + 800c = 125$

$-3d - 720c = -117$   
 $+3d + 800c = 125$

There were 300 student tickets & 150 adult tickets sold ①

Learning Target 5: I can model a situation using a system of equations and determine the solution. /10	Beginning <input type="checkbox"/>	Developing <input type="checkbox"/>	Competent <input type="checkbox"/>	Mastery <input type="checkbox"/>
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$\frac{80c}{80} = \frac{8}{80}$  ①  
 $c = \frac{1}{10}$  or \$0.10 ] work

The cost / km is \$0.10

and the cost/day is \$15. ①

$d + 240(\frac{1}{10}) = 39$

① work  $\left[ \begin{array}{r} d + 240 = 39 \\ -240 \quad -240 \\ \hline d = 15 \end{array} \right.$