Warm-Up

Use the substitution method to solve the following system of equations:

$2x + y = 11$

$y = 4x + 17$

$2x + (4x + 17) = 11$

$6x + 17 = 11$

$6x = -6$

$x = -1$

$y = 4x + 17$

$y = 4(-1) + 17$

$y = -4 + 17$

$y = 13$

$(-1, 13)$

Questions From Homework

⑤ $\div 10$ $-80x - 60y = -20$

$\div 8$ $-64x - 48y = -16$

$-8x - 6y = -2$

$\Leftrightarrow -8x - 6y = -2$

$0 = 0$ → Infinite # of Solutions

⑪ $-y = 3 + 2x$

$y = -3 - 2x$

$y = -2x - 3$

$m = -2$

$b = -3$

$x + \frac{1}{2}y = -1$

$2 \cdot \frac{1}{2}y = 2 \cdot -x - 2 \cdot 1$

$y = -2x - 2$

$m = -2$

$b = -2$

Since the lines have the same slope we know they are parallel and therefore will not intersect.

No Solution

Solving Word Problems

Applications

Step 1: Read the problem (multiple times!)

Step 2: Define the two variables in the problem

Step 3: Set up the equations from the problem
(# equations = # unknowns)

Step 4: Solve the system of equations

Step 5: State your conclusion

A landscaping company placed two orders with a nursery. The first order was for 13 shrubs 4 trees and totaled $487. The second order was for 6 shrubs and 2 trees and it totaled $232. Determine the cost of each.

Let x = shrub ($)

Let y = tree ($)

$13x+4y=487$

(2) $6x+2y=232$

$13x+4y=487$

$\hookleftarrow \underline{12x+4y=464}$

$x=23$

$6(23)+2y=232$

$138+2y=232$

$2y=94$

$y=47$

∴ A shrub costs $23 and a tree will set you back $47.

The admission to the fair is $2 for children and $4 for adults. On Saturday one thousand people attended and $2800 was collected. How many children and how many adults attended the fair?

Let x = # of children

Let y = # of adults

$$2x+4y=2800$$

$$x+y=1000$$

$$2x+4y=2800$$

$$(-)\ 2x+2y=2000$$

$$2y=800$$

$$y=400$$

$$x+y=1000$$

$$x+400=1000$$

$$x=600$$

∴ 600 children + 400 adults attended.

A pizza costs $10 more than a donair. If two pizzas and three donairs cost $40, find the cost of each item.

Let x = pizza ($)
Let y = donair ($)

$2x + 3y = 40$

$x = y + 10$

$2(y+10)+3y=40$

$2y+20+3y=40$

$5y=20$

$y=\$4$

$x=y+10$

$x=4+10$

$x=\$14$

A total of $12,000 is invested in two funds paying 9% and 11% simple interest. If the yearly interest is $1,180, how much of the $12,000 is invested at each rate?

Let x = investment @ 9%

Let y = " @ 11%

$$x + y = 12000$$

$$0.09x + 0.11y = 1180$$

$$9x + 9y = 108000$$

$$(\times -1) \quad 9x + 11y = 118000$$

$$-2y = -10000$$

$$y = \$5000$$

$$x + y = 12000$$

$$x + 5000 = 12000$$

$$x = \$7000$$

$\therefore$ \$5000 is invested @ 11%

\$7000 " " @ 9%

Homework

Elimination:

$4x+2y=6$
$x-y=-6$

$4x+2y=6$
$(+)\ 2x-2y=-12$
$6x=-6$
$x=-1$

$x-y=-6$
$(-1)-y=-6$
$-y=-5$
$y=5$

$(-1,5)$

Substitution:

$4x+2y=6$
$x-y=-6$

$4x+2y=6$
$x=y-6$

$4x+2y=6$
$4(y-6)+2y=6$
$4y-24+2y=6$
$6y=30$
$y=5$

$x=y-6$
$x=5-6$
$x=-1$

Comparison:

$y=mx+b$

$4x+2y=6$
$x-y=-6$

$2y=-4x+6$
$-y=-x-6$

$y=-2x+3$
$y=x+6$

$-2x+3=x+6$
$-3x=3$
$x=-1$

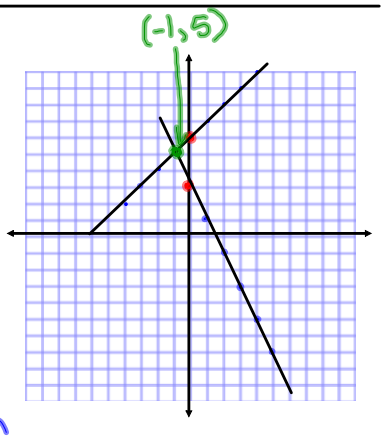
$y=x+6$
$y=(-1)+6$
$y=5$

$(-1,5)$

Graphing:

$4x+2y=6$
$x-y=-6$

$y=-2x+3$ | $y=x+6$
$b=3$ | $b=6$
$m=\frac{-2}{1}$ $\frac{\text{rise}}{\text{run}}$ | $m=\frac{1}{1}$ $\frac{\text{rise}}{\text{run}}$



③ Two children have a total of 115 marbles. The girl has 4 times as many as the boy. How many marbles does each child have.

Let b = boy's marbles
Let g = girl's marbles

$b+g=115$
$g=4b$

$b+(4b)=115$
$5b=115$
$b=23$

$g=4b$
$g=4(23)$
$g=92$

⑧ A total of $\$9{,}500$ is invested in two funds paying 7% and 11% simple interest. If the yearly interest is $\$845$, how much of the $\$9500$ is invested at each rate?

Let x = investment @7% ($)
Let y = " @11% ($)

$x+y=9500$
$0.07x+0.11y=845$

$0.07x+0.07y=665$
$(-)\ 0.07x+0.11y=845$
$-0.04y=-180$
$y=\$4500$

$x+y=9500$
$x+(4500)=9500$
$x=\$5000$