Announcement:

Quiz on Friday: 7.1, 7.2, 7.3, 7.4 (solving linear systems) 11/4/11

- graphing
- substitution
- adding/subtracting (elimination)

Homework review (7.2):

16 $20x - 30y = -50$

$x + 2y = 1$

$-2y \quad -2y$

$x = (-2y + 1)$

$20(-2y+1) - 30y = -50$

$-40y + 20 + -30y = -50$

$-70y + 20 = -50$

$-20 \quad -20$

$\frac{-70y}{-70} = \frac{-70}{-70}$

$y = 1$

$x = -2(1) + 1$

$x = -2 + 1$

$x = -1$

$(-1, 1)$

$20(-1) + -30(1) = -50$

$-20 + -30 = -50$

$\checkmark \; -50 = -50$

(31) $2.50 per bag of popcorn
$2 per pretzel
$336 total
x → bags of popcorn
y → pretzels

$2.50x + 2y = 336$ $x = 2y$

$2.50(2y) + 2y = 336$

$5y + 2y = 336$

$\frac{7y}{7} = \frac{336}{7}$

$y = 48$

$x = 2y$

$x = 2 \cdot 48$

$x = 96$

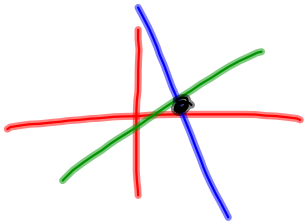
$(96, 48)$

96 bags of pop.
48 pretzels

$x = 2y$

x (pop)	y (pret)
2	1
4	2
6	3
2y	y

Ways to Solve Linear Systems:



easy - but not very accurate

Graphing and estimating...

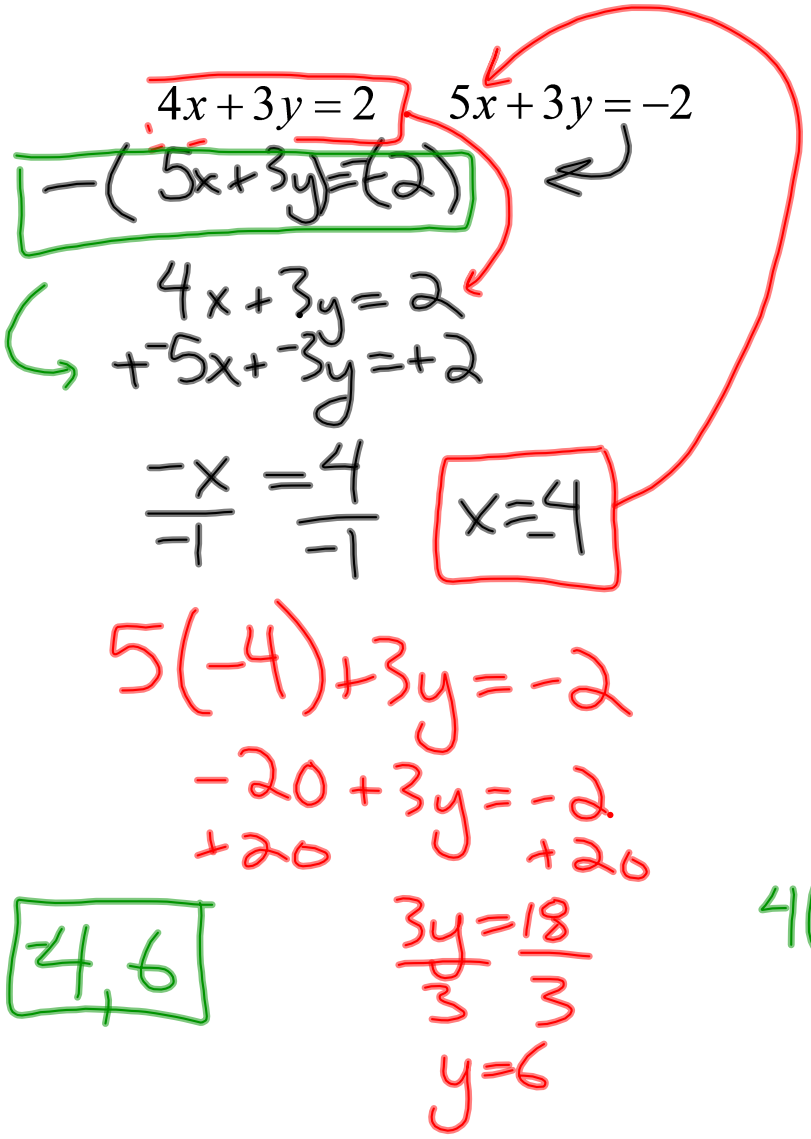
accurate - but it's difficult and lengthy

Substitution...

Moderate difficulty - but not always worth it

Adding/subtracting... (elimination)

Adding or subtracting to solve linear systems:



Step 1: Rewrite equations to line up variable terms, constant, and equals sign (not necessary if both equations are already in the exact same form...)

Step 2: Add or subtract the equations to eliminate one variable

Step 3: Solve the resulting equation for the isolated variable

Step 4: Substitute the value you just found into either original equation to find the value of the other variable

Step 5: Verify your work!

4(−4) + 3(6) = 2
−16 + 18 = 2
2 = 2 ✓

When can you add different expressions to both sides of an equation?

$x + 5 = 7$

$+a = +b$

$+z = +2$

$+y = +3x + 7$

When you know the expressions are equal

$x + 5 = 7$
$+2 \quad +2$
$4(x + 7) = (9)4$
$\frac{4x + 28}{2} = \frac{36}{2}$
$2x + 14 = 18$
$-6 \quad -6$
$2x + 8 = 12$
$-8 \quad -2$
~~$2x = 10$~~ No!

ADD:

$$7x + 2y = 4$$
$$+\ 5x + 6y = 10$$
$$2x + 8y = 14$$

$$4y = 2x + 3$$
$$-y = 3x + 9$$
$$3y = 5x + 12$$

SUBTRACT:

$$4y = 2x + 3$$
$$+5y = -x + -6$$
$$9y = x + -3$$

$$-x = 5y + 6$$
$$-5y \quad -5y$$
$$-5y + -x = 6$$
$$+x \quad +x$$
$$-5y = x + 6$$

$$-x = 2y + 62$$
$$2x = -2y + -4$$
$$X = 58$$

$$2x = -2y - 4$$

Solve a Linear System:

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

$+3x+3y=3$ $+3y+3y$

$-3x+3y=3$

$\frac{5x}{5}=\frac{4}{5}$

$x=\frac{4}{5}$

$2\left(\frac{4}{5}\right)+3y=7$

$\frac{8}{5}+3y=7$

$-\frac{8}{5}\quad -\frac{8}{5}$

$3y=7-\frac{8}{5}$

$\frac{3y}{3}=\frac{27}{5}\div 3$

$y=\frac{27}{15}\div 3$

$y=\frac{9}{5}$

$\left(\frac{4}{5},\frac{9}{5}\right)$

$\frac{5\cdot 7}{5\cdot 1}-\frac{8}{5}$

$\frac{35}{5}-\frac{8}{5}=\frac{27}{5}$

$\frac{27}{5}\div\frac{3}{1}$

$\frac{27}{5}\cdot\frac{1}{3}=\frac{27}{15}$

Step 1... line up equations- terms & = should be in columns

Step 2... add or subtract (do whatever will eliminat one variable)

Step 3... Solve for the isolated variable

Step 4... Plug that value back into an original equation

Solve the linear system by using elimination.

10. $x + 5y = 28$

$-x - 2y = -13$

$0 + 3y = 15$ add

$\frac{3y}{3} = \frac{15}{3}$

$y = 5$

$x + 5(5) = 28$

$x + 25 = 28$

$-25 \quad -25$

$x = 3$

$(3, 5)$

11. $7x - 4y = -30$

$3x + 4y = 10$

$10x + 0 = -20$ add

$\frac{10x}{10} = \frac{-20}{10}$

$x = -2$

$7(-2) - 4y = -30$

$-14 - 4y = -30$

$+14 \quad +14$

$\frac{-4y}{-4} = \frac{-16}{-4}$

$y = 4$

$(-2, 4)$

12. $6x + y = 39$

$-2x + y = 17$

$8x + 0 = 56$ sub.

$\frac{8x}{8} = \frac{56}{8}$

$x = 7$

$(7, -3)$

1. line up!
2. add/subtract
3. solve for 1 variable
4. substitute & solve for 2nd variable
5. verify!

Floor Sander Rental A rental company charges a flat fee of x dollars for a floor sander rental plus y dollars per hour of the rental. One customer rents a floor sander for 4 hours and pays \$63. Another customer rents a floor sander for 6 hours and pays \$87.

\$15 \$12

a. Find the flat fee and the cost per hour for the rental.

b. How much would it cost someone to rent a sander for 11 hours?

cost = 15 + 12(11)
cost = 15 + 132
cost = \$147

#'s you know: 4 hrs = \$63 floor sander; 6 hrs = \$87 floor sander

x, y? x = flat fee; y = rental rate

cost of rental = flat fee + rental fee
$= x + y \cdot h$

eqns?

$63 = x + 4y$
$-87 = -x + -6y$

$-24 = 0 + -2y$

$\frac{-24}{-2} = \frac{-2y}{-2}$

$y = 12$

$63 = x + 4(12)$
$63 = x + 48$
$-48 \quad -48$
$15 = x$

rental rate = \$12/hr
flat fee = \$15

Homework:

p. 447: 3-30 (every 3rd), 40