

### 3.1 Linear Equations + Arithmetic Sequences

Arithmetic Sequences  
are Linear

$$U_0 = 4$$
$$U_n = U_{n-1} - 5$$

Identify  
Slope:  
y-int:

Explicit Formula:

$$U_n = b + mn$$

(slope-int form)

Eqn. of a line:  $y = mx + b$

Given:

$$U_1 = 7$$

$$U_2 = 11$$

$$U_3 = 15$$

$$U_4 = 19$$

m:

y-int:

$$U_0 =$$

$$U_n =$$

eqn of line:  $y =$

For each seq. find  $n$  so that  $U_n$  has the specified value.

$$U_n = 6 - 3n$$

$$U_n = -162$$

$$U_0 = -10$$

$$U_n = U_{n-1} - 3.7$$

$$U_n = -183.9$$

## 3.2 Revisiting Slope

What's the slope?

a)  $y = \frac{3}{8}x - 9$   $m =$

b)  $x = 3$   $m =$

c)  $y = 25$   $m =$

d)  $y = \frac{1}{6} - \frac{2}{3}x$   $m =$

### 3.3 Fitting a Line to Data

Slope-int form:  $y = mx + b$

Ex | Write the equation in slope-int form given  $m = -4/5$  &  $b = 6$

Ex | Find the slope of the line containing  $(-3, -2)$  and  $(7, -4)$

Identify the slope,  $m$ , and y-int,  $b$  for each line.

Ex |  $-1/8x + y = 2$     Ex |  $y = -2$     Ex |  $x = 4$

Write the eqn. of the line containing  
Ex |  $(8, 1/3)$   $(10, 1)$

ex |  $(2, -5)$  parallel to  $y = x + 4$

ex |  $(-3, -6)$  perpendicular to  $4x - y = 3$

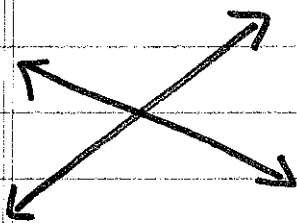
## 3.7 Solve by Substitution

- ① Solve one/both eqns for either  $x$  or  $y$
- ② Substitute: should only have one variable then solve
- ③ Substitute into original to find remaining variable.
- ④ Write as an ordered pair.

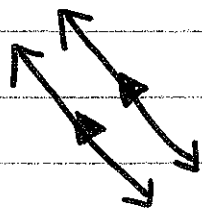
Ex1  $x + y = 8$   
 $3x + 2y = -6$

Ex1  $x - 2y = 10$   
 $3x + 4y = -25$

# Solve Systems by Graphing



independent  
consistent  
(x, y)



independent  
inconsistent  
 $\emptyset$



dependent  
consistent  
IMS  
(infinitely many solns)

## Solve by Graphing

- ① Solve for y
- ② graph
- ③ 2<sup>nd</sup> Calc - intersect  
enter 4-times

Ex)  $6x - 2y = -34$   
 $2x + 5y = 17$

Ex)  $2x - y = 6$   
 $y = 2x - 7$

### 3.7 cont. Solve by Elimination

- ① Move both variables to one side, line them up alphabetically.
- ② If needed, find a multiplier so the sum of the same variable "cancels" out.
- ③ Add the two eqns together, then solve for the non-eliminated variable.
- ④ Substitute into one of the original equations, solve for the other variable.
- ⑤ Write as an ordered pair.

ex | 
$$\begin{array}{r} 2x + 5y = 10 \\ -2x + 6y = 12 \end{array}$$

ex | 
$$\begin{array}{r} 5.5x + 2.5y = 4 \\ 2.0x + 7.5y = -1 \end{array}$$

# Solve Systems by matrices

- ① move all variables to one side, line up alphabetically.
- ② Set up both matrices using coefficients.
- ③ Type into calculator, solve.
- ④ Write answers as an ordered pair.

Ex |  $x + y + z = 6$   
 $2x - y + 3z = 9$   
 $-x + 2y + 2z = 9$

Row x Column

$3 \times 3$        $3 \times 1$

$$[A]^{-1} [B] = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$$

Ex |  $2x - y + z = 10$   
 $4x + 2y - 3z = 10$   
 $x - 3y + 2z = 8$



### 3.4 Median-Median Line

\* Split into 3 "even" groups

14 items  $\rightarrow$

99 items  $\rightarrow$

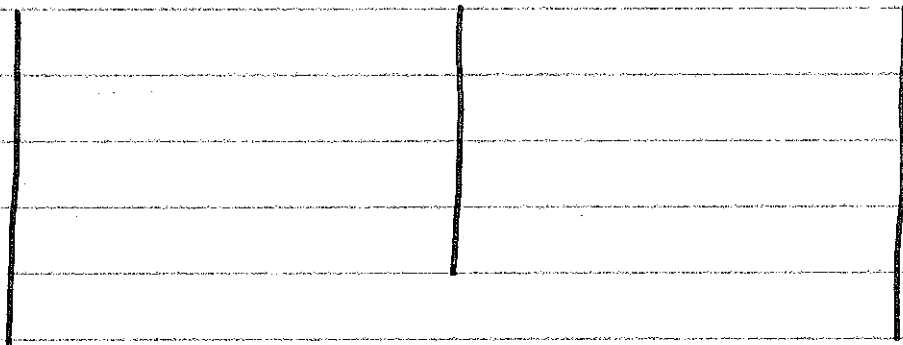
100 items  $\rightarrow$

Step 1 Group data and find  $m_1$ ,  $m_2$ , and  $m_3$

- sort by  $x$ 's first (ascending)

- split into the 3 groups.

- sort  $y$ 's within groups (ascending)



$m_1 = ( \quad )$     $m_2 = ( \quad )$     $m_3 = ( \quad )$

Step 2 Find slope through  $m_1$  and  $m_3$

Step 3 Find equation of line containing  $m_1, m_3$   
 $y = mx + b$

Step 4 Find parallel line using slope from  
Step 2 and point  $m_2$ .

Step 5 Find the mean of the  $m_1, m_2, m_3$  lines  
of their  $y$ -intercepts.

Final answer \*