

5.6 Graphing Inequalities in Two Variables

$---$ $<$ less than

$---$ \leq less than or equal to

\uparrow
Boundary

$---$ $>$ greater than

$---$ \geq greater than or equal to

\uparrow
Boundary

1) Graph as Equality

2) Dotted or Solid

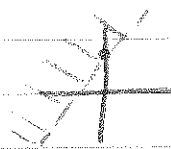
3) Shade

a) Pick pt usually (0,0)

yes solution shade to include

no shade away

Ex) $y > \frac{1}{2}x + 3$
dotted
 $0 > 3$



Ex) $x < 12y$
 $y < x - 1$
 $0 < -1$



WB CD p. 320 1-10

CW p. 320 12-19

HW 5.6 SP4P

4.1 Graphing in SI Form

$$y = mx + b \quad \text{Slope Intercept Form}$$

m = slope b = y-intercept

Write in SI Form

Ex)

$$m = 2, b = 6 \quad y = 2x + 6$$

$$m = 1/3, b = -4 \quad y = 1/3x - 4$$

$$m = 1, b = -2 \quad y = x - 2$$

$$m = -2/3, b = 6 \quad y = -2/3x + 6$$

To Graph

$$\text{SI } y = mx + b$$

$m =$

$b =$

1) Graph b

2) Use slope to get more pts

3) Graph

$$\text{Ex)} \quad y = 2x + 6$$

$$y = 1/3x - 4$$

$$y = x - 2$$

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

$$y = x$$

$$y = -x$$

$$x = 4$$

$$y = -2$$

Vertical line

Horizontal line

What if equation is not in SI form?

Rearrange!

EX $5x + 4y = 8$

$$\frac{4y}{4} = \frac{-5x + 8}{4}$$

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

Now Graph:

EX $2x + y = 4$

$$y = -2x + 4$$

Now Graph

EX $x - y = 8$

$$y = x - 8$$

Now Graph

CD, WB p 219, 1-16

CW p 220, 17-30

33-37

HW 4.1 SP 9A

4.2 SI form

Using SI form twice!

Given: Pt & Slope SI twice

Ex. $(2, -3)$ $m = 2$

$$y = mx + b$$

1) Identify

x, y

2) Substitute into $y = mx + b$ ①

3) Solve for b

4) Substitute m & b back into $y = mx + b$ ②

$(2, -3)$ $m = 2$

x y

$$y = mx + b \quad \text{①}$$

$$-3 = 2(2) + b$$

$$-3 = 4 + b$$

$$-7 = b$$

$$\boxed{y = 2x - 7} \quad \text{②}$$

Ex) $(2, -3)$ $m = 1/2$

x y

$$y = mx + b$$

$$-3 = \frac{1}{2}(2) + b \quad \text{①}$$

$$-3 = 1 + b$$

$$-4 = b$$

$$\boxed{y = \frac{1}{2}x - 4} \quad \text{②}$$

Given 2 pts!

1) Find slope \rightarrow 1) Name pts

2) Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

3) Plug it

4) Answer.

Same as above!

$$\text{Ex) } \begin{matrix} (-3, -4) & (-2, -8) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8 - (-4)}{-2 - (-3)} = \frac{-8 + 4}{-2 + 3} = \frac{-4}{1} = -4$$

$$y = mx + b \text{ (twice)}$$

$$-4 = -4(-3) + b$$

$$-4 = 12 + b$$

$$-16 = b$$

$$\boxed{y = -4x - 16}$$

$$-8 = -4(-2) + b$$

$$-8 = 8 + b$$

$$-16 = b$$

$$y = -4x - 16 \text{ Same Answer!}$$

$$\text{Ex) } \begin{matrix} (6, -2) & (3, 4) \\ x_1, y_1 & x_2, y_2 \end{matrix}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{3 - 6} = \frac{6}{-3} = -2$$

$$y = mx + b \text{ (twice)}$$

$$-2 = (-2)(6) + b$$

$$-2 = -12 + b$$

$$10 = b$$

$$\boxed{y = -2x + 10}$$

$$4 = -2(3) + b$$

$$4 = -6 + b$$

$$10 = b$$

CDP. 229, 1-9

CWP. 229, 10-21

NW 4.2 SPAP

4.3 Pt Slope Form PS

Pt Slope form $y - y_1 = m(x - x_1)$

- 1) Name pts
- 2) Put in formula

Ex) $(3, 6)$ $m = 4$
 x_1, y_1

$$y - y_1 = m(x - x_1)$$
$$\boxed{y - 6 = 4(x - 3)}$$

Ex $(2, 8)$ $m = 1/2$
 x_1, y_1

$$y - y_1 = m(x - x_1)$$
$$\boxed{y - 8 = 1/2(x - 2)}$$

Ex) $(2, 4)$ $(6, 8)$
 x_1, y_1 x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 4}{6 - 2} = \frac{4}{4} = 1$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 1(x - 2) \quad \text{or} \quad y - 8 = 1(x - 6)$$

CD p. 235, 1-3,

CW p. 236, 11-18

HW PS wk 11A (4.3a)

NO pt + slope

- 1) Name pts
- 2) Find slope
- 3) Put in formula
- 4) 2 answers!

4.3 Day 2 PS → SF

Ex) (2, 4) m = 6 PS → SF

x, y

$$Ax + By = C$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 6(x - 2) \quad \text{Dist. 1st}$$

$$\begin{array}{r} y - 4 = 6x - 12 \\ -y \quad -4 \\ \hline \end{array}$$

x → leave it!
y → move it!

$$\begin{array}{r} -4 = 6x - 4 - 12 \\ +12 \quad \quad +12 \\ \hline 8 = 6x - 4 \\ \boxed{6x - y = 8} \end{array}$$

Ex) (2, 4) m = 1/2

x, y

$$y - y_1 = m(x - x_1)$$

$$y - 4 = \frac{1}{2}(x - 2) \quad \text{can dist or clear fraction}$$

$$\begin{array}{r} 2y - 8 = x - 2 \\ -2y \quad -2y \\ \hline \end{array}$$

$$\begin{array}{r} -8 = x - 2y - 2 \\ +2 \quad \quad +2 \\ \hline -6 = x - 2y \\ \boxed{x - 2y = -6} \end{array}$$

Ex (2, 4) (6, 8) PS → SF

m = 1

$$\begin{array}{ll} y - 4 = 1(x - 2) & y - 8 = 1(x - 6) \\ y - 4 = x - 2 & y - 8 = x - 6 \\ -y \quad -y & -y \quad -y \\ -4 = x - 2 & -8 = x - 6 \\ -2 = x - y & -2 = x - y \\ \boxed{x - y = -2} & \boxed{x - y = -2} \end{array}$$

CDP 235 4-6

CWP 236 19-26 HW PS → SF Wkst B

4.3 Day 3 PS 3.5 I form

Q. 9) $m = 3$

x, y

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 3(x - 2)$$

$$y - 4 = 3x - 6$$

$$\boxed{y = 3x - 2}$$

Q. 9) $m = 1/2$

x, y

$$y - 4 = 1/2(x - 2)$$

$$y - 4 = 1/2x - 1$$

$$\boxed{y = 1/2x + 3}$$

$$\text{or } y - 4 = 1/2(x - 2)$$

$$2y - 8 = x - 2$$

$$+8 \quad +8$$

$$\frac{2y}{2} = \frac{x + 6}{2}$$

$$\boxed{y = \frac{1}{2}x + 3}$$

CDP. 235, 7-9

CW p. 236, 27-34

HW PS WRITING

Day 4

CD p. 236 37-48

CW 4.3 SP

HW 4.3 R

4.4 || & ⊥ lines.

Parallel & ⊥ lines investigation

Graph: $y=2x+4$ $y=2x-3$

$m=3$ || $m=3$
 ⊥ $m=-1/3$
 $m=-2/3$ || $m=-2/3$
 ⊥ $m=3/2$
 $m=1/4$ || $m=1/4$
 ⊥ $m=-4$
 DS ⇒ SI

$m=2$ || lines
 $y=2x+4$ $y=-1/2x-3$
 $m=2$ $m=-1/2$ ⊥ lines

|| to $y=2x+4$ thru $(1,8)$
 $x, y, m=2$

$y-y_1 = m(x-x_1)$ SI Form!
 $y-8 = 2(x-1)$
 $y-8 = 2x-2$
 $y = 2x+6$

⊥ to $y=2x+4$ thru $(1,8)$
 $m=2$ ⊥ $m=-1/2$ $x, y,$

$y-y_1 = m(x-x_1)$ SI Form!
 $y-8 = -1/2(x-1)$
 $2y-16 = -x+1$
 $2y = -x+17$
 $y = -1/2x + 17/2$

CDP. 242 1-10

Day 2 CW

CWP. 243, 11-25 finish for HW

SP
HWP

4.5 Scatter Plots & Lines of Best Fit

Data with two variables is called bivariate data

Scatter plot shows the data for the two variables



Line of Best Fit or Line of Fit shows the trend of the data

Equal # of data on each side of the line

Linear Extrapolation predicts values outside the range of data

Linear Interpolation predicts values inside the range of data

CDP 250, 1, 2, 4-7

CWP 251, 8-10

HW 4.5 SP4P

+ - no correlation
fit line

use fit line to find pts

use pts to find slope

use $y = mx + b$ twice to find b

use formula to predict future behavior.

4.7 Inverse Linear Functions

$A = (3, 6) (4, 3) (2, 8) (1, 7)$ set of ordered pairs

when you switch x & y that's called an inverse relation

so inverse of $A =$

$(6, 3) (3, 4) (8, 2) (7, 1)$

$f(x) = y$ the inverse is written as

$$f^{-1}(x)$$

$$f(x) = 2x + 1$$

$$f(x) = y$$

- 1) Replace $f(x)$ with y
- 2) Interchange x & y
- 3) Solve for new y
- 4) replace y with $f^{-1}(x)$

Ex) $f(x) = -3x + 27$

$$y = -3x + 27$$

$$x = -3y + 27$$

$$-27 = -27$$

$$\frac{-3y}{-3} = \frac{x-27}{-3}$$

$$y = -\frac{1}{3}x + 9$$

$$f^{-1}(x) = -\frac{1}{3}x + 9$$

Ex) $f(x) = \frac{5}{4}x - 8$

$$y = \frac{5}{4}x - 8$$

$$x = \frac{5}{4}y - 8$$

$$\frac{5}{4}y = x + 8$$

$$\frac{5}{4}y = 4x + 32$$

$$y = \frac{4}{5}x + \frac{32}{5}$$

$$f^{-1}(x) = \frac{4}{5}x + \frac{32}{5}$$

$$2x + y = 8$$

$$y = 2x + 8$$

$$x = \frac{y - 8}{2}$$

$$\frac{-2y}{-2} = \frac{x-8}{-2}$$

$$y = -\frac{1}{2}x + 4$$

CDP 265 8x3

$$f^{-1}(x) = -\frac{1}{2}x + 4$$

Ex $f(x) = 4x - 12$

$$y = 4x - 12$$

$$x = \frac{y + 12}{4}$$

$$4y = x + 12$$

$$y = \frac{1}{4}x + 3$$

$$f^{-1}(x) = \frac{1}{4}x + 3$$

So if in original problem

$$y = \text{cost}$$

$$x = \text{days}$$

Inverse function

$$y = \text{days}$$

$$x = \text{cost}$$


to graph inverse functions

Graph using both equations

Inverse functions graph of a reflection over $y=x$

Chart

x	0	1	2	3	4	5
y	a	b	c	d	e	f

or graph 1st 

Inverse

x	a	b	c	d	e	f
y	0	1	2	3	4	5

Graph $y=x$
Then Reflect Over it!

CDP 267 1-7

Day 2

CWP 267 8-19

CW 4.756

HW 4.7a

HW 4.7 SP4P

