Unit 4
Day 3

Write Equations in Point-Slope Form

key

Slope Intercept Form: $y = mx + b$

Point Slope Form: $y - y_1 = m(x - x_1)$

Ex 1:

a. Write the equation of the line through (4, -3) with a slope of 2 in **point-slope form**.

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

b. Rewrite the equation in **slope-intercept form**

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

$y + 3 = 2x - 8$

$-3 \quad -3$

$y = 2x - 11$

Ex 2:

Write an equation in **point-slope form** of the line that passes through (2,3) and (4,4)

need

$m = \frac{4-3}{4-2} = \frac{1}{2}$

$y - 3 = \frac{1}{2}(x - 2)$

OR

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

b. Find the y intercept of the line.

→ sub 0 in for x

METHOD 1

$y - 3 = \frac{1}{2}(0 - 2)$

$y - 3 = \frac{1}{2}(-2)$

$y - 3 = -1$

$y = 2$

y-int

METHOD 2 change to slope-int form

$y - 3 = \frac{1}{2}(x - 2)$

$y - 3 = \frac{1}{2}x - 1$

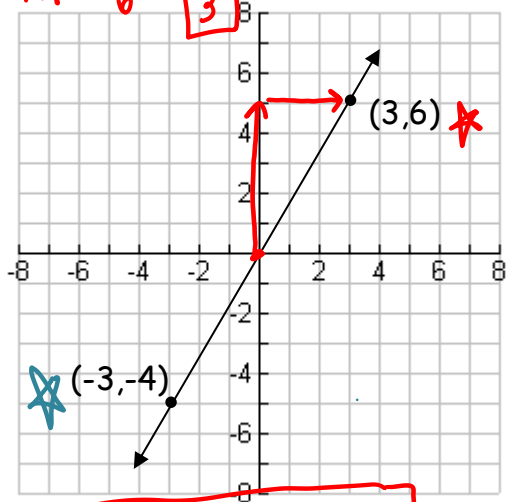
$y = \frac{1}{2}x + 2$

↑ y-int

Ex 3: Given a graph and the points marked below, write **2 equations** of the line in **point-slope form**

a)

$m = \frac{10}{6} = \frac{5}{3}$



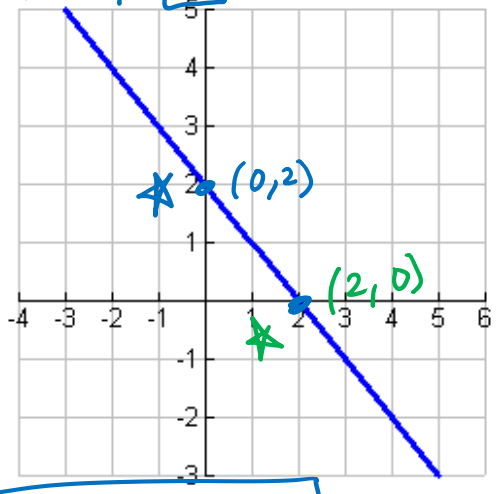
$y - 6 = \frac{5}{3}(x - 3)$

OR

$y + 4 = \frac{5}{3}(x + 3)$

b)

$m = \frac{-1}{1} = -1$



$y - 2 = -1(x - 0)$

OR

$y - 0 = -1(x - 2)$

Example 4: $y-5=\frac{1}{3}(x+2)$

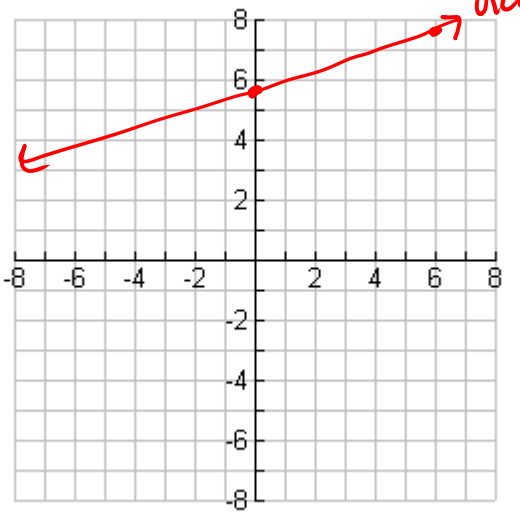
Graph the equation using **Slope-Intercept Form**

$y-5=\frac{1}{3}(x+2)$

$y-5=\frac{1}{3}x+\frac{2}{3}$

$+5 \quad +5$

$y=\frac{1}{3}x+5\frac{2}{3}$ hard to graph accurately

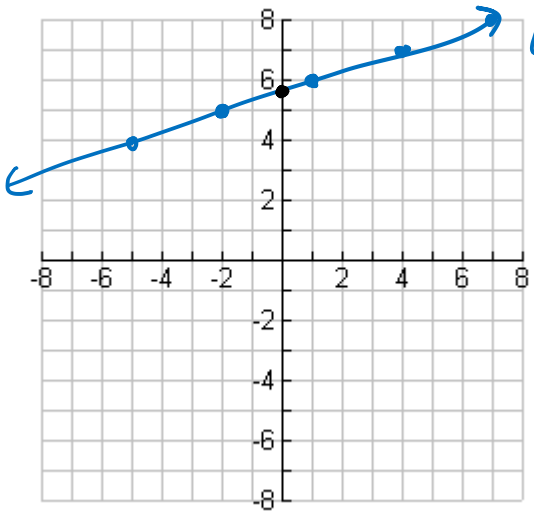


Graph the equation using **Point-Slope Form**

$y-5=\frac{1}{3}(x+2)$

pt: $(-2,5)$

$m=\frac{1}{3}$



Example 5:

The table to the right shows the cost of visiting Six Flags one day for different numbers of people.

x **#of People**	4	6	8	10
y **Cost**	250	350	450	550

+2 +2 +2

+100 +100 +100

a. Can the situation be modeled by a linear equation? Why or why not?

RATE (SLOPE)

$\frac{\Delta y}{\Delta x}=\frac{\$100}{2 \text{ people}}=\$50/\text{person}$

Increases at a constant rate = LINEAR

b. If so, write an equation of the scenario in point slope form, then rearrange into slope intercept

$m=\frac{50}{1}$ (4, 250)

$y-250=50(x-4)$

$y-250=50x-200$

$y=50x+50$

Example 6

You are an avid coin collector and decide to start keeping better track of your prized possessions. After 15 days you count and find out you have 155 coins. BUT you keep collecting … and after 22 days you have a total of 218 coins

A) Write an equation in the form that makes the MOST sense for this specific situation based on the information provided. (Define your variables). point-slope

* (15, 155)
(22, 218)

$\frac{218-155}{22-15} = \frac{63}{7} = \boxed{9}$ m

$y - 155 = 9(x - 15)$

B) Convert your equation to Slope-Intercept form

$y - 155 = 9x - 135$

$y = 9x + 20$

C) What does your Slope represent?

9 coins / day

D) How many coins did you start with? (y-int)

20 coins

E) After how many days would you have 425 coins? $y = 425$, solve for x

$425 = 9x + 20$

$405 = 9x$

$x = 45$ days

Example 7

A zoo keeper thinks there is a problem with the Naked Mole-Rat population at the zoo. He starts keeping track of the animals in the tunnels. 4 days into his monitoring he counts 134 mole rats, 14 days in he counts 119.

A) Write an equation in the form that makes the MOST sense for this specific situation based on the information provided. (Define your variables).

* (4, 134)
(14, 119)

$\frac{119-134}{14-4} = \frac{-15}{10} = \boxed{\frac{-3}{2}}$ m

$y - 134 = \frac{-3}{2}(x - 4)$

B) Convert your equation to Slope-Intercept form

$y - 134 = \frac{-3}{2}x + 6$

$y = \frac{-3}{2}x + 140$

C) What does your Slope represent?

Decrease of 3 mole rats every 2 days

D) If nothing changes, how many days will go by before the mole-rats are gone? (x-int)

$y = 0$

$0 = \frac{-3}{2}x + 140$

$-140 = \frac{-3}{2}x$

$x = 93\frac{1}{3}$ days

E) How many Mole-Rats where there when he started monitoring? (y-int)

140 mole rats

Example 8

You figured out that you could make $50 per pool to clean pools during the summer. You did, however, need to purchase some equipment to get started. After cleaning 3 pools you still were down a total of 15 dollars.

$m = \$50/\text{pool}$ $(3, -15)$

A) Write an equation in POINT SLOPE form that represents this situation

x = # of pools
y = $ earned

$y + 15 = 50(x - 3)$

B) Convert your equation into SLOPE INTERCEPT form:

$y + 15 = 50x - 150$

$y = 50x - 165$

C) What does the y-intercept represent?

y-int = $165 "in the hole" at the beginning – need $165 to break even

D) How much money will you have made after cleaning 12 pools? $x = 12$

$y = 50(12) - 165$

$y = \$435$

WRAPPING IT UP!

When should we use each form?

BIG PICTURE! either form will work everytime if used correctly!

BUT! Sometimes one form makes things easier!

Slope-Intercept

If you are given the y-intercept (0, #)

Point-Slope

when you only know points