

Day 15: Comparing Standard Form and Slope Intercept Form

	Standard Form $Ax + By = C$	Slope Intercept Form $y = mx + b$
Form	$a, b,$ and c are constants	$m =$ slope $b =$ y-intercept
Information	Gives <u>x-intercept</u> (when substituting 0 for y) Gives <u>y-intercept</u> (when substituting 0 for x)	Gives <u>slope</u> and <u>y-intercept</u>
Advantages	Easy to calculate x and y intercepts Helpful when we solve systems of equations (Unit 3) using elimination	Easily determine <u>slope</u> and <u>y-intercept</u> Easiest and fastest to graph the line Only form you can put in the graphing calculator
Disadvantages	Do not know the slope unless you convert to slope intercept form (solve for y) A, B, and C do not stand for anything obvious (like slope or y-intercept) Harder to graph a line	Finding the x-intercept takes a little more work Not every linear equation can be written in slope intercept form (like $x = 5$)
Context Word Problem	$Ax + By = C$ Adding or subtracting two amounts and setting equal to a total Example: Tickets for the school play cost \$5.00 for students and \$8.00 for adults. On opening night \$1600 was collected in ticket sales. $5x + 8y = 1600$	$y = mx + b$ rate Multiplying a constant to a changing amount and then adding or subtracting a starting amount Example: Carl has \$200 in his bank account and each week he withdraws \$25 dollars. $y = 200 - 25x$

Practice with Standard and Slope Intercept Form in a Context

Practice: For each scenario, create an equation and solve for the missing variable.

a. A bookstore has mystery novels on sale for \$2 each and sci-fi novels on sale for \$3 each. Bailey has \$30 to spend on books. How many mystery novels can she buy if she buys 6 sci-fi novels?

* Standard form because "two items" (novels)

$$Ax + By = C$$

$x =$ # mystery novels

$y =$ # sci-fi novels

$$2x + 3y = 30 \quad ; y = 6$$

$$2x + 3(6) = 30$$

$$2x + 18 = 30$$

$$-18 \quad -18$$

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

She can buy 6 mystery novels.

Start fee rate

b. Your little brother is having a party at the local zoo. The zoo charges a party fee of \$50 plus \$5 for each guest. How many guests did he invite if the total cost was \$115?

$y = mx + b$
 $x = \# \text{ of guests}$
 $y = 5x + 50$; $y = 115$
 $115 = 5x + 50$
 $\begin{array}{r} 115 \\ - 50 \\ \hline 65 = 5x \\ \frac{5}{5} = \frac{5x}{5} \\ 13 = x \end{array}$
 My little brother invited 13 guests.

c. Alex's goal is to sell \$100 worth of tickets to the school play. The tickets are \$4 for students and \$10 for adults. How many student tickets does he need to sell if he sells 6 adult tickets?

$Ax + By = C$ total
 $x = \# \text{ student tickets}$
 $y = \# \text{ adult tickets}$
 $4x + 10y = 100$
 $4x + 10(6) = 100$
 $4x + 60 = 100$
 $\begin{array}{r} 4x + 60 = 100 \\ - 60 \quad - 60 \\ \hline 4x = 40 \\ \frac{4x}{4} = \frac{40}{4} \end{array}$
 $x = 10 \text{ student tickets}$

d. It costs \$4 to order a chicken sandwich and \$3 to order a cheeseburger from the local fast food restaurant down the street for dinner for the math team before their competition. They have \$60 to spend on food. Calculate the x and y intercepts of this problem and interpret your answers in terms of the problem.

$x = \# \text{ of chicken sandwiches}$
 $y = \# \text{ of cheeseburgers}$
 $4x + 3y = 60$

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<p><u>x-intercept</u> $(x, 0)$ $4x + 3y = 60$ $4x + 3(0) = 60$ $\frac{4x}{4} = \frac{60}{4}$ $x = 15$ $(15, 0)$ chix cheese If you buy 15 chicken sandwiches, you buy 0 cheeseburgers.</p>	<p><u>y-intercept</u> $(0, y)$ $4x + 3y = 60$ $4(0) + 3y = 60$ $\frac{3y}{3} = \frac{60}{3}$ $y = 20$ $(0, 20)$ chix cheese If you buy 0 chicken sandwiches, I can buy 20 cheeseburgers.</p>
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