Find the equation of the line that passes through the following points:

Solve for x:

(x, y) and (x, y)

(10, –2) and (24, 5)

2 things we need:

Slope

y-intercept

$+14 < \begin{matrix} 10, -2 \\ 24, 5 \end{matrix} > +7$ $\quad \frac{\Delta y}{\Delta x} = \frac{7}{14} = \frac{1}{2}$ SLOPE

$y = mx + b$

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

$(24, 5)$ $\quad 5 = \frac{1}{2}(24) + b$

$5 = 12 + b$

$-12 \quad -12$

$-7 = b$

y-intercept

$$y = \frac{1}{2}x - 7$$

1.2 Recap

Problem 1.2

get y alone

A Four students tried to write $12x + 3y = 9$ in equivalent $y = mx + b$ form. Did each student get an equation equivalent to the original $Ax + By = C$ form? If so, explain the reasoning for each step. If not, tell what errors the student made.

✓

Jared

$12x + 3y = 9$
$3y = -12x + 9$ (1)
$y = -4x + 3$ (2)

✗

Molly

$12x + 3y = 9$
$3y = 9 - 12x$ (1)
$y = 3 - 12x$ (2)
$y = -12x + 3$ (3)

$\frac{3y}{3} = \frac{9}{3} - \frac{12x}{3}$

$y = 3 - 4x$

$y = -4x + 3$

✓

Mia

$12x + 3y = 9$
$4x + y = 3$ (1)
$y = 3 - 4x$ (2)
$y = -4x + 3$ (3)

✗

Ali

$12x + 3y = 9$
$3y = 9 - 12x$ (1)
$y = 3 - 4x$ (2)
$y = 4x - 3$ (3)

$y = 3 - 4x$

$y = -4x + 3$

This is called:

- Rearranging equations
- solving for y
- isolating y

} getting y alone on one side of the equal sign

B Write each equation in $y = mx + b$ form.

1. $x - y = 4$
2. $2x + y = 9$
3. $8x + 4y = -12$
4. $c = ax + dy$

Answers:

B. 1. $y = x - 4$

2. $y = -2x + 9$

3. $y = -2x - 3$

4. $y = -\frac{a}{d}x + \frac{c}{d}$

#4 Don't let "letters" throw you off!

$c = ax + dy$

$-ax \quad -ax$

$-ax + c = dy$

Is this in slope-intercept form? NO!

$\frac{dy}{d} = \frac{-ax}{d} + \frac{c}{d}$

$y = -\frac{a}{d}x + \frac{c}{d}$

also written as

$y = \frac{-ax}{d} + \frac{c}{d}$

C Write each equation in $Ax + By = C$ form.

1. $y = 5 - 3x$
2. $y = \frac{3}{4}x + \frac{1}{4}$
3. $x = 2y - 3$
4. $fy + 3 = gx - 15$

Answers:

1. $3x + y = 5$
2. $3x - 4y = -1$
3. $x - 2y = -3$
4. $gx - fy = 18$

#2

$4\left[y = \frac{3}{4}x + \frac{1}{4}\right]$ → get rid of fractions

$4y = 3x + 1$

$-4y \quad -4y$

$0 = 3x - 4y + 1$

$3x - 4y + 1 = 0$

$-1 \quad -1$

$3x - 4y = -1$

$-1\left[-\frac{3}{4}x + y = \frac{1}{4}\right]$

$4\left[\frac{3}{4}x - y = -\frac{1}{4}\right]$

$3x - 4y = -1$

#3

$x = 2y - 3$

$-2y \quad -2y$

$x - 2y = -3$

#4

$fy + 3 = gx - 15$

$-3 \quad -3$

$fy = gx - 18$

$-gx \quad -gx$

$-1\left[-gx + fy = -18\right]$

$gx - fy = 18$

How to find slope, y-intercept and x-intercept from an equation.

$$3x - 4y = 12$$

y-intercept? value of y when x = 0

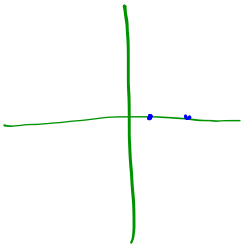
$3(0) - 4y = 12$

$\frac{-4y}{-4} = \frac{12}{-4}$

$y = -3$

$(0, -3)$

x-intercept? value of x when y = 0



$3x - 4y = 12$

$3x - 4(0) = 12$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

$(4, 0)$

Slope?

$-4 < \begin{matrix}(4,0)\\(0,-3)\end{matrix} > -3$

$\frac{\Delta y}{\Delta x} = \frac{-3}{-4} = \frac{3}{4}$

Use intercepts

Or

$3x - 4y = 12$

$+4y \quad +4y$

$3x = 4y + 12$

$-12 \quad -12$

$\frac{3}{4}x - \frac{12}{4} = \frac{4y}{4}$

$\frac{3}{4}x - 3 = y$

slope, y-int

Rearrange equation

Another way:

Today's assignment:

Classwork: Page 14, #'s 9-19 odd

Homework: Page 14, #'s 10-20 even

Write the equation in equivalent $Ax + By = C$ form. Then, identify the x-intercept, y-intercept, and slope.

9. $y = 4x - 2$ **10.** $y = -3x + 5$ **11.** $y = x - 7$

12. $y = 5x + 3$ **13.** $y = -8x - 12$ **14.** $y = -9x + 5$

Standard Form Refresher:

Ax + By = C

- **A, B,** and **C** are integers
- **A** must be positive

#9 $y = 4x - 2$

x-int: $0 = 4x - 2$

$+2 \quad +2$

$\frac{2}{4} = \frac{4x}{4}$

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

slope: 4

y-int: $(0, -2)$

x-int: $(\frac{1}{2}, 0)$

standard form

For Exercises 15–20, write the equation in $y = mx + b$ form. Identify the x-intercept, y-intercept, and slope.

15. $-2x - y = -5$

16. $6x + 3y = -9$

17. $x - y = 4$

18. $3x + 4y = 12$

19. $-7x + 2y = -16$

20. $x - 5y = 55$

Homework

Finish classwork