

Algebra 2

Goal: Write Linear Equations

Slope - Intercept : $y = mx + b$ $(-4, -2)$

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

Standard : $Ax + By = C$ A = positive
No fractions allowed

SI	PS	St.
$y = \frac{1}{2}x + 4$	$y - 5 = \frac{1}{2}(x - 2)$	$x - 2y = -8$

Write an equation given a slope and a y-intercept. Write your final answer in standard form.

1. $m = -4$ $b = -2$

$y = -4x - 2$

$(0, -2) + 4x$

$4x + y = -2$

2. $m = \frac{1}{3}$ $(0, 4)$

$b = 4$

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

$-\frac{1}{3}x$

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

$x - 3y = -12$

Try this: Write in standard form

$m = -\frac{3}{4}$ $b = \frac{7}{2}$

$y = -\frac{3}{4}x + \frac{7}{2}$

$+\frac{3}{4}x$

$4(\frac{3}{4}x + y = \frac{7}{2})$

$3x + 4y = 14$

Write an equation in slope-intercept form given slope and a point.

2 methods

1. $y = mx + b$

ex) 1. $m = -3$ $(5, 4)$

Solve for b Eq.

$4 = -3 \cdot 5 + b$

$4 = -15 + b$

$+15$ $+15$

$19 = b$

$y = -3x + 19$

ex 2) $m = -\frac{1}{4}$ $(4, -8)$

Solve for b Eq.

$y = mx + b$

$-8 = -\frac{1}{4} \cdot 4 + b$

$-8 = -1 + b$

$+1$ $+1$

$-7 = b$

$y = -\frac{1}{4}x - 7$

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

$y - 4 = -3(x - 5)$

Solve for y

$y - 4 = -3x + 15$

$+4$ $+4$

$y = -3x + 19$

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

$y + 8 = -\frac{1}{4}(x - 4)$

Solve for y

$y + 8 = -\frac{1}{4}x + 1$

-8 -8

$y = -\frac{1}{4}x - 7$

Write an equation given two points. Put your final answer in standard form.

slope formula = $\frac{y_2 - y_1}{x_2 - x_1}$

1. $(-4, 3) + (2, -3)$

x_1, y_1 x_2, y_2

$m = \frac{-3 - 3}{2 - (-4)} = \frac{-6}{6} = -1$

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

$y - 3 = -1(x + 4)$

$y - 3 = -x - 4$

$+3$ $+3$

$x + y = -1$

$+$ $y = -x - 1$

$Ax + By = C$

2. $(-1, -2) + (4, 4)$

x_1, y_1 x_2, y_2

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{4 - (-1)} = \frac{6}{5}$

$y = mx + b$ $y = \frac{6}{5}x - \frac{4}{5}$

$4 = \frac{6}{5} \cdot 4 + b$ $-\frac{6}{5}x$ $-\frac{6}{5}x$

$4 = \frac{24}{5} + b$ $Ax + By = C$

$-\frac{24}{5}$ $-\frac{24}{5}$

$-\frac{4}{5} = b$

$-5(\frac{6}{5}x + y = -\frac{4}{5})$

$6x - 5y = 4$

Write Equations of Parallel and Perpendicular Lines

Parallel Lines = Same Slope
 Perpendicular Lines = Opposite Reciprocal Slope

$\frac{3}{4} \rightarrow -\frac{4}{3}$ change sign & flip it
 $-2 \rightarrow +\frac{1}{2}$

Ex: Are the lines given parallel, perpendicular or neither?

1. $x+6=y$
 $y-x=-2$

$y=1x+6$

$m=1$

$y-x=-2$
 solve for y
 $+x \quad +x$

$y=1x-2$
 $m=1$

Parallel
 same slope

2. $y=4x-5$
 $4y=8-x$

$y=4x-5$

$m=4$

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

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

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

Perpendicular

Write an equation of a line that is parallel to $y=-4x+2$ and goes through the point $(-6, -1)$

$m=-4 \quad (-6, -1)$

$y=mx+b$

$-1=-4 \cdot -6 + b$

$-1=24 + b$

$-24 \quad -24$

$-25=b$

$y=-4x-25$

Write an equation of a line that is perpendicular to $y=5$ and goes through the point $(4, 5)$

$x=4$

4
 horiz.

Try this:

5. Write an equation of the line that passes through $(4, -2)$ and is (a) parallel to, and (b) perpendicular to, the line $y=3x-1$.

a) $m=3 \quad (4, -2)$ b) $m=-\frac{1}{3} \quad (4, -2)$

$-2=3 \cdot 4 + b$

$-2=12 + b$

$-12 \quad -12$

$-14=b$

$y=3x-14$

$-2=-\frac{1}{3} \cdot 4 + b$

$-2=-\frac{4}{3} + b$

$+\frac{4}{3} \quad +\frac{4}{3}$

$-\frac{2}{3}=b$

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

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

$y+2=-\frac{1}{3}x+\frac{4}{3}$

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

Write an equation of a line that is perpendicular to $y=3x-7$ and goes through the point $(4, 5)$

$m=-\frac{1}{3} \quad (4, 5)$

$y=mx+b$

$5=-\frac{1}{3} \cdot 4 + b$

$5=-\frac{4}{3} + b$

$+\frac{4}{3} \quad +\frac{4}{3}$

$5\frac{4}{3}=b$

$\frac{19}{3}=b$

$y=-\frac{1}{3}x+\frac{19}{3}$

Practice Problems

Worksheet