MATH 1010 ~ Intermediate Algebra   Chapter 3: GRAPHS AND FUNCTIONS

Section 3.4: Equations of Lines

Objectives:

❋ Write equations of lines using point-slope form.
❋ Write equations of horizontal, vertical, parallel and perpendicular lines.
❋ Graph a linear equation without changing the form of the equation.
❋ Use linear models to solve application problems.

Point-slope form of an equation of a line: $y - y_1 = m(x - x_1)$

(x_1, y_1) is a point on the line, m is the slope of the line.

Slope-intercept form of an equation is $y = mx + b$
m is the slope and (0,b) is the y-intercept.

General form of an equation of a line: $Ax + By + C = 0$
A, B, and C are integers.

Write the equation of a line with slope m = 3/5 which goes through the point (-1,2)
and put it in each of the three forms.

① EXAMPLE

Write the equation in slope-intercept form for the lines containing these pairs of points.

a) (-3,2) and (5,2)

b) (-3,2) and (-3,5)

c) (-3/2, -1/2) and (5/8,1/2)

② EXAMPLE

Write the equation of a line through (3,2) and (5,-4).

State the equation in point-slope form $(y-y_1) = m(x-x_1)$
slope-intercept form $(y = mx+b)$ and
general form $(Ax + By + C = 0)$

Horizontal and Vertical lines
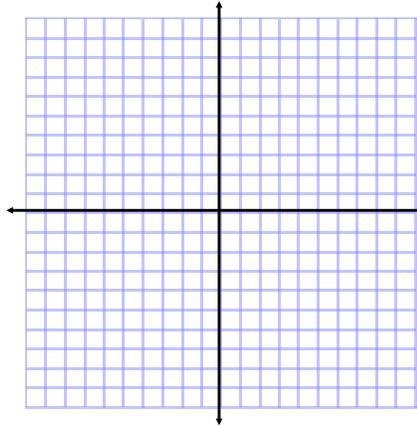
A horizontal line has an equation in the form: y = a

A vertical line has an equation in the form: x = b

③ Example

Graph these equations and write the coordinates of three points on each line.

x = -2

y = 3

④ EXAMPLE

a) Write an equation of a vertical line through (5,8)

b) Write an equation of a horizontal line through (-1, 7)

⑤ EXAMPLE

Find the equation of a line perpendicular to $3x - 4y = 12$ which passes through the point $(-3,6)$

How to sketch a linear equation without changing the form of the equation.

$y = -2$	$3x - 2y = 6$	$y = -2/3\ x$
$x = 3$	$y - 3 = -2(x+1)$	$y = 3/2\ x - 2$

⑥ EXAMPLE

Applications:

a) The total sales for a new sportswear store were $150,000 for the third year and $250,000 for the fifth year. Find a linear model to represent the data. Estimate the total sales for the sixth year.

b) A business purchases a van for $27,500. After 5 years the depreciated value will be $12,000.
   Assuming a straight-line depreciation, write an equation of the line giving the value V of the van in terms of the time t in years.

   Use that equation to find the value of the van after 2 years.