Unit 5 & 6 Review

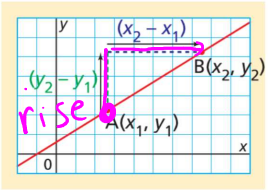
Thursday, January 18, 2024 8:51 AM

Unit 5 & 6 – Exam Review
Linear Functions and Systems of Linear Equaitons

Unit 5 – Linear Functions

Slope of a line

run

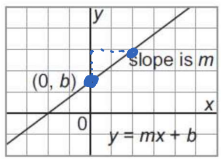


$$m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y\text{'s}}{\text{change in } x\text{'s}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Equation of a line in slope-intercept form

$y = mx + b$

Slope, y-intercept

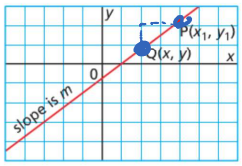


Equation of a line in point slope form

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

slope

point (x_1, y_1)



Equation of a line in general form

$Ax + By + C = 0$

A is positive

No Fractions

Mrs. Shaw F & PC 10

Example 1: a line passes through the point $P(-2,4)$ and has a slope of $\frac{4}{5}$. x_1, y_1 $= m$

a) Write the equation in point slope form.

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

$y - 4 = \frac{4}{5}(x - (-2))$

$y - 4 = \frac{4}{5}(x + 2)$

b) Write the equation in slope intercept form.

$y - 4 = \frac{4}{5}(x + 2)$

$y - 4 = \frac{4}{5}x + \frac{8}{5}$ $+\frac{4}{1}\times\frac{5}{5}$

$+4$

$y = \frac{4}{5}x + \frac{8}{5} + \frac{20}{5}$

$y = \frac{4}{5}x + \frac{28}{5}$

Example 2: Write the equation in **general form:** $y - 1 = \frac{3}{5}(x + 2)$

$y - 1 = \frac{3}{5}x + \frac{6}{5}$

$(5)y - (5)1 = (5)\left(\frac{3}{5}x\right) + (5)\left(\frac{6}{5}\right)$

$5y - 5 = 3x + 6$

$+5 \quad +5$

$5y = 3x + 11$

$-5y \quad -5y$

$0 = 3x - 5y + 11$

$0 = Ax + By + C$

or

$Ax + By + C = 0$

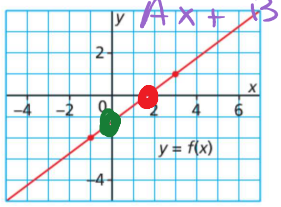
Intercepts: X-Intercept and Y-Intercept

x-intercept

- The value of x when $y = 0$ $(x, 0)$
- The point where the graph crosses the horizontal axis

y-intercept

- The value of y when $x = 0$ $(0, y)$
- The point where the graph crosses the vertical axis



Example 3: Determine the coordinates of the x and y intercepts: $3x - 5y + 12 = 0$

x-int

$3x - 5(0) + 12 = 0$

$3x + 12 = 0$ $\quad x = -4$

$\frac{3x}{3} = \frac{-12}{3}$ $\quad (-4, 0)$

y-int

$3(0) - 5y + 12 = 0$

$-5y + 12 = 0$

$-5y = -12$

$\frac{-5y}{-5} = \frac{-12}{-5}$

$y = \frac{12}{5}$

$(0, 12/5)$

Slopes of Parallel and Perpendicular Lines

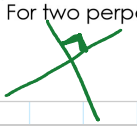
Parallel Lines

- Parallel lines have the same slope, different y-intercepts.
- Parallel lines never cross.

$m_1 = \frac{2}{3}$ $\quad m_2 = \frac{2}{3}$

Perpendicular Lines

- For two perpendicular lines, the slope of one is the negative reciprocal of the other.



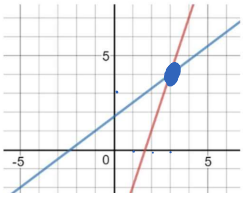
$m_1 = \frac{2}{3}$ $\quad m_2 = -\frac{3}{2}$ or $m_1 = -2$ $\quad m_2 = \frac{1}{2}$

Unit 6 – Systems of Linear Equations

Solving a system of linear equations

A: Graphing

Rewite the equations as $y = mx + b$

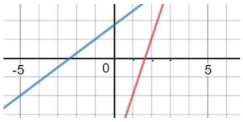


Find the intersection point

$(3, 4)$

$x \quad y$

J



(3, 4)
x, y

B. Substitution ① $2x + y = 4$ ② $-3x - 4y = 6$

Rewrite as y=

① $2x + y = 4$

$y = -2x + 4$

Sub into the other equation

② $-3x - 4(-2x + 4) = 6$

$-3x + 8x - 16 = 6$

$5x - 16 = 6$

$+16 \quad +16$

$5x = 22$

$x = 22/5$

Find y

$y = -2\left(\frac{22}{5}\right) + 4$ (×5 / 1×5)

$y = -\frac{44}{5} + \frac{20}{5}$

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

$\left(\frac{22}{5}, -\frac{24}{5}\right)$

C. Elimination ① $4x + 2y = 7$ ② $-2x + 5y = 13$

① $4x + 2y = 7$

(2) ② $-4x + 10y = 26$

$\frac{12y}{12} = \frac{33}{12}$

$y = \frac{33 \div 3}{12 \div 3} = \frac{11}{4}$

$4x + 2\left(\frac{11}{4}\right) = 7$

$4x + \frac{22}{4} = 7$

$4x = 7 - \frac{22}{4}$

$4x = \frac{7^{\times 2}}{1^{\times 2}} - \frac{11}{2}$

$4x = \frac{14}{2} - \frac{11}{2}$

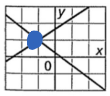
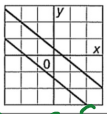
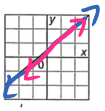
$\frac{4x}{4} = \frac{3}{2} \div 4$

$x = \frac{3}{2} \cdot \frac{1}{4}$

$x = 3/8$

$\left(\frac{3}{8}, \frac{11}{4}\right)$

Possible Solutions of a Linear System

Intersecting lines	Parallel lines	Coincident Lines
one solution	no solution	Infinite number of solutions
		

Same line

different slopes
y-int same or different

same slope
different
y-int

same slope
same y-int