

Name: Answer Key
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Course: Math - Worksheet 2.1
Review

Review: Linear Relations

1) Determine the equation of the line (in the form $y = ax + b$) that passes through each pair of points.

a) $A(3, 5)$ and $B(-5, -3)$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-3) - (5)}{(-5) - (3)}$$

$$a = \frac{-8}{-8}$$

$$a = 1$$

$$y = ax + b$$

$$5 = 1(3) + b$$

$$5 = 3 + b$$

$$5 - 3 = b$$

$$2 = b$$

$$y = 1x + 2$$

b) $A(-5, 8)$ and $B(20, 3)$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(3) - (8)}{(20) - (-5)}$$

$$a = \frac{-5}{25}$$

$$a = -\frac{1}{5}$$

$$y = ax + b$$

$$8 = -\frac{1}{5}(-5) + b$$

$$8 = 1 + b$$

$$8 - 1 = b$$

$$7 = b$$

$$y = -\frac{1}{5}x + 7$$

c) $A(6, -2)$ and $B(2, -2)$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-2) - (-2)}{(2) - (6)}$$

$$a = \frac{0}{-4}$$

$$a = 0$$

$$y = ax + b$$

$$y = 0x + b$$

$$y = b$$

$$y = -2$$

$$y = -2$$

d) $A(-8, 14)$ and $B(5, 5)$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(5) - (14)}{(5) - (-8)}$$

$$a = \frac{-9}{13}$$

$$y = ax + b$$

$$14 = -\frac{9}{13}(-8) + b$$

$$14 = \frac{72}{13} + b$$

$$\frac{182}{13} - \frac{72}{13} = b$$

$$\frac{110}{13} = b$$

$$y = -\frac{9}{13}x + \frac{110}{13}$$

e) $A(7, 4)$ and $B(3, -36)$

$$a = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-36) - (4)}{(3) - (7)}$$

$$a = \frac{40}{-4}$$

$$a = -10$$

$$y = ax + b$$

$$4 = 10(7) + b$$

$$4 = 70 + b$$

$$4 - 70 = b$$

$$-66 = b$$

$$y = -10x - 66$$

Determine the solution to the following linear systems. (Do not use decimal notation in replacement of fractions)

a) $6x + 3y = 9$ and $6x = 2y + 4$
 $\frac{3y}{3} = \frac{-6x+9}{3}$ $\frac{-2y}{-2} = \frac{-6x+4}{-2}$
 $y = -2x + 3$ $y = 3x - 2$

$y_1 = y_2$
 $-2x + 3 = 3x - 2$
 $-2x - 3x = -2 - 3$
 $-5x = -5$

$y_1 = y_2$
 $-2x + 3 = 3x - 2$
 $-2x - 3x = -2 - 3$
 $\frac{-5x}{-5} = \frac{-5}{-5}$
 $x = 1$
 $y = -2x + 3$
 $y = -2(1) + 3$
 $y = -2 + 3$
 $y = 1$
 $y = 3x - 2$
 $y = 3(1) - 2$
 $y = 3 - 2$
 $y = 1$
 Solution (1, 1)

b) $2y - 4x = 16$ and $21 - 6x = 3y$
 $\frac{2y}{2} = \frac{4x+16}{2}$ $\frac{3y}{3} = \frac{-6x+21}{3}$
 $y = 2x + 8$ $y = -2x + 7$

$y_1 = y_2$
 $2x + 8 = -2x + 7$
 $2x + 2x = 7 - 8$
 $\frac{4x}{4} = \frac{-1}{4}$
 $x = -0.25$
 $y = 2x + 8$
 $y = 2(-0.25) + 8$
 $y = -0.5 + 8$
 $y = 7.5$
 $y = -2x + 7$
 $y = -2(-0.25) + 7$
 $y = 0.5 + 7$
 $y = 7.5$
 Solution (-0.25, 7.5)

c) $7x - 4 = 3y$ and $6x - 4y = 12$
 $\frac{3y}{3} = \frac{7x-4}{3}$ $\frac{-4y}{-4} = \frac{-6x+12}{-4}$
 $y = \frac{7x-4}{3}$ $y = \frac{3x-3}{2}$

$y_1 = y_2$
 $\frac{7x}{3} - \frac{4}{3} = \frac{3x}{2} - 3$
 $\frac{7x}{3} - \frac{3x}{2} = -3 + \frac{4}{3}$
 $\frac{14x}{6} - \frac{9x}{6} = \frac{-9}{3} + \frac{4}{3}$
 $\frac{5x}{6} = \frac{-5}{3}$
 $\frac{15x}{15} = \frac{-30}{15}$
 $x = -2$
 $y = \frac{7}{3}(-2) - \frac{4}{3}$
 $y = \frac{-14}{3} - \frac{4}{3}$
 $y = \frac{-18}{3}$
 $y = -6$
 $y = \frac{3}{2}(-2) - 3$
 $y = \frac{-6}{2} - 3$
 $y = -3 - 3$
 $y = -6$
 Solution (-2, -6)

d) $4x + 9y + 4 = x + 2$ and $3x + 2y + 5 = 1 + 13x$
 $9y = x - 4x + 2 - 4$ $2y = 13x - 3x + 1 - 5$
 $\frac{9y}{9} = \frac{-3x-2}{9}$ $\frac{2y}{2} = \frac{10x-4}{2}$
 $y = \frac{-1x-2}{9}$ $y = 5x - 2$

$y_1 = y_2$
 $\frac{-1x}{9} - \frac{2}{9} = 5x - 2$
 $\frac{-1x}{9} - \frac{15x}{9} = \frac{-18}{9} + \frac{2}{9}$
 $\frac{-16x}{9} = \frac{-16}{9}$
 $x = \frac{1}{3}$

$y = \frac{1}{3}(\frac{1}{3}) - \frac{2}{9}$ $y = 5(\frac{1}{3}) - 2$
 $y = \frac{1}{9} - \frac{2}{9}$ $y = \frac{5}{3} - \frac{6}{3}$
 $y = \frac{-3}{9}$ $y = \frac{-1}{3}$
 $y = \frac{-1}{3}$
 Solution ($\frac{1}{3}, -\frac{1}{3}$)