

50

$$\text{rate} = \$27.80 / \text{year}$$

$$\text{years} = 1981 \text{ to } 2001$$

$$\text{cost in 2001} = \$914$$

Slope =  
rate of change



$$y = \$$$

$$x = \# \text{ of years since 1981}$$

$$\frac{\text{rise}}{\text{run}} = \frac{27.80 \text{ dollars}}{1 \text{ year}} = m$$

$$y = 27.8x + b$$

$$914 = 27.8(20) + b$$

$$914 = 556 + b$$

$$-556 = -556$$

$$b = 358$$

$$y = 27.8(19) + 358$$

$$y = \$886.20$$

(52)

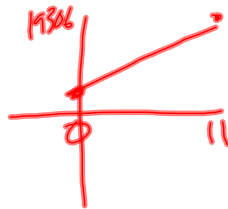
years = 1990 to 2001

 $x = 0$  to 11 (years since 1990)

$$\text{rate} = 175 \frac{\text{airports}}{\text{year}}$$

↑ slope

$$m = 175$$



year 2001  $\rightarrow$  19306  
 $\rightarrow$  when  $x = 11$ ,  $y = 19306$   
 $(11, 19306)$

$$y = 175x + b$$

$$y = 175x + 17381$$

$$19306 = 175(11) + b$$

$$19306 = 1925 + b$$

$$b = 17381$$

$$19200 = 175x + 17381$$

$$\frac{1819}{175} = \frac{175x}{175}$$

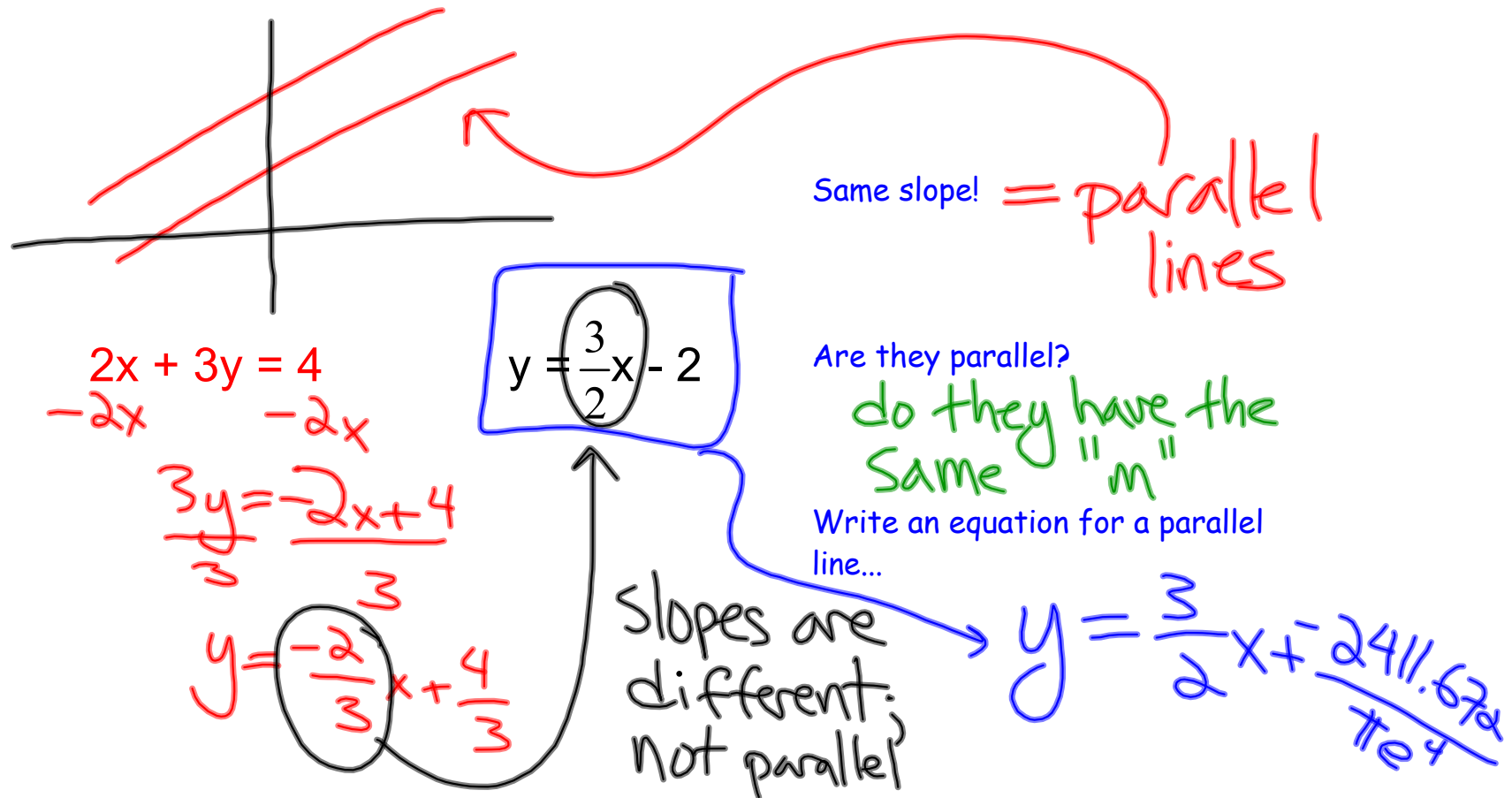
year  
2000

$\leftarrow x = 10$ . something

# Reminders:

- . Unit Test (Ch. 4 & 5 & 6.7) - Tuesday, 4/3
- . Last day of the quarter is Thursday, 4/12
- . Last day for make-up work (excused!) is Monday, 4/9

# Identifying parallel lines from an equation:



Identifying perpendicular lines from an equation: (intersect at a  $90^\circ$  angle!)

$$\frac{a}{b} \longrightarrow \frac{-b}{a}$$

$$\frac{2}{3} \longrightarrow -\frac{3}{2}$$

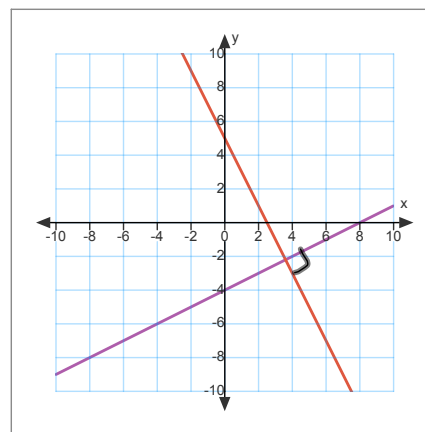
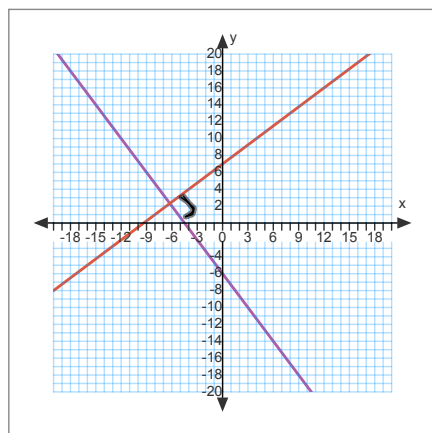
$$\frac{4}{1} \longrightarrow -\frac{1}{4}$$

$$-\frac{1}{3} \longrightarrow +\frac{3}{1} = 3$$

Slopes are negative reciprocals!

$$y = \frac{-4}{3}x - 6 \quad y = \frac{3}{4}x + 7$$

$$y = \frac{1}{2}x - 4 \quad y = (-2)x + 5$$



$$2 \quad \text{---} \quad 1 \longrightarrow -2$$

Write an equation of the line that passes through the given point and is parallel to the given line.

1.  $(4, 7), y = 5x - 3$

Slope = 5  
point = (4, 7)

$$y = mx + b$$

$$y = 5x + b$$

$$7 = 5(4) + b$$

$$7 = 20 + b$$

$$\begin{array}{r} -20 \\ -20 \end{array}$$

$$b = -13$$

$$y = 5x - 13$$

2.  $(3, -2), y = \left(\frac{2}{3}x\right) + 1$

① FIND THE SLOPE

② USE THE SLOPE + POINT GIVEN TO FIND THE EQ.

$$y = \left(\frac{2}{3}x\right) - 4$$

Verification:

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

$$-2 = \frac{6}{3} - 4$$

$$-2 = 2 - 4$$

$$-2 = -2 \checkmark$$

3.  $(-6, 1), 4x + y = 7$   
 $\quad \quad \quad -4x \quad \quad -4x$

$$y = -4x + 7$$

$$y = -4x - 23$$

Verification:

$$1 = -4(-6) - 23$$

$$1 = 24 - 23$$

$$1 = 1 \checkmark$$

Write an equation of the line that passes through the given point and is parallel to the given line.

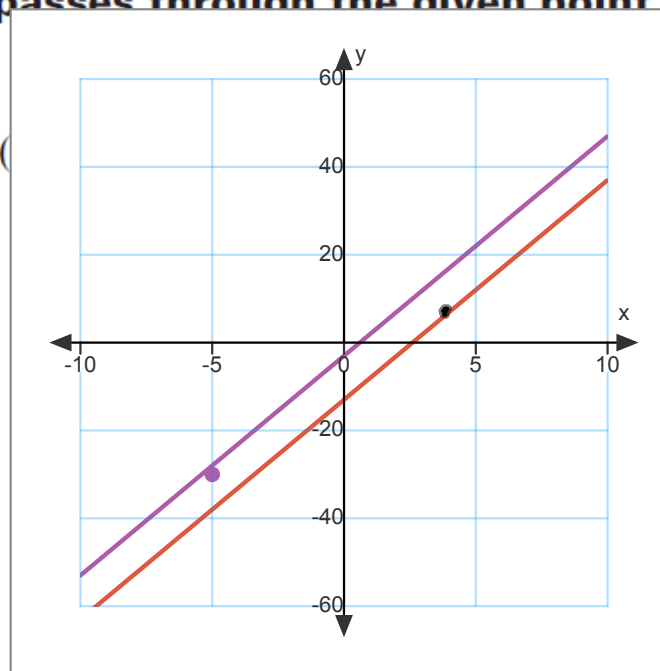
1.  $(4, 7), y = 5x - 3$

$$y = 5x - 3$$

$$y = 5x - 13$$

2. (

, 1),  $4x + y = 7$



Write an equation of the line that passes through the given point and is perpendicular to the given line.

7.  $(1, -1), y = 3x + 2$

$$m = -\frac{1}{3}$$

$$(1, -1)$$

$$y = mx + b$$

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

$$-1 = -\frac{1}{3}(1) + b$$

$$-1 = -\frac{1}{3} + b$$

$$+\frac{1}{3} \quad +\frac{1}{3}$$

$$-\frac{3}{3} + \frac{1}{3} = b$$

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

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

8.  $(5, 0), y = \frac{2}{3}x - 4$

① Find the slope (negative reciprocal!)

② Use slope + point to find equation

$$y = -\frac{3}{2}x + \frac{15}{2}$$

Verification:

$$0 = -\frac{3}{2}(5) + \frac{15}{2}$$

$$0 = -\frac{15}{2} + \frac{15}{2}$$

$$0 = 0 \checkmark$$

9.  $(3, -7), y = -\frac{1}{5}x + 1$

$$y = 5x - 22$$

$$y = 5x - 22$$

Verification:

$$-7 = 5(3) - 22$$

$$-7 = 15 - 22$$

$$-7 = -7 \checkmark$$



Verify?

~~$(3, -7), y = -\frac{1}{5}x + 1$~~

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{4}{5} \quad (2, 0) \quad (x, 5)$$

$$\frac{4}{5} = \frac{5 - 0}{x - 2}$$

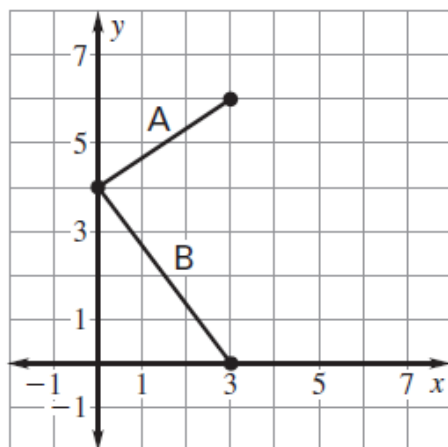
$$4(x - 2) = 5 \cdot 5$$

$$4x - 8 = 25$$

$$\frac{4x}{4} = \frac{33}{4}$$

$$x = \frac{33}{4}$$

**Kite Design** You are beginning to model a kite design on the coordinate plane, as shown.



- Write an equation that models part A of the kite.
- Write an equation that models part B of the kite.
- Do the kite parts form a right angle? *Justify* your answer.

# Homework: Section 5.5

p. 322, 3-27 by 3, 28, 32, 34, 36