

Fall 2014—Acc. Coordinate Alg.—Final Exam Study Guide

*** You must show all of your work. Circle or box all answers.***

2 - 1

1. The 2004 Tour de France was 3391.1 kilometers. Lance Armstrong won the race in a little over 83.5 hours. Find his average speed in meters per second.

$$\frac{3391.1 \text{ km}}{83.5 \text{ hrs}} \cdot \frac{1000 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = \frac{3391100}{300600} \approx \boxed{11.28 \text{ m/sec}}$$

2. A soft-serve ice cream machine makes 1200 gallons per hour.

Convert this rate to cups per minute.
(Hint: 1 gallon is equal to 16 cups.)

$$\frac{1200 \text{ gal}}{1 \text{ hr}} \cdot \frac{16 \text{ cups}}{1 \text{ gal}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} = \frac{19200}{60} = 320 \text{ cups/min}$$

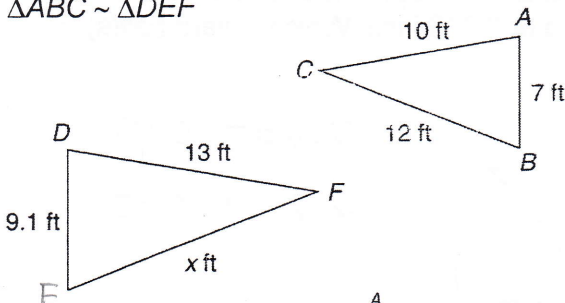
3. The 20 foot flagpole casts an 8 foot shadow. At the same time, the oak tree casts a 12 foot shadow. How tall is the oak tree?

$$\frac{20}{8} = \frac{x}{12} \quad 8x = 240 \quad \boxed{x = 30 \text{ ft}}$$

2 - 2

Find the value of x in each diagram.

1. $\triangle ABC \sim \triangle DEF$

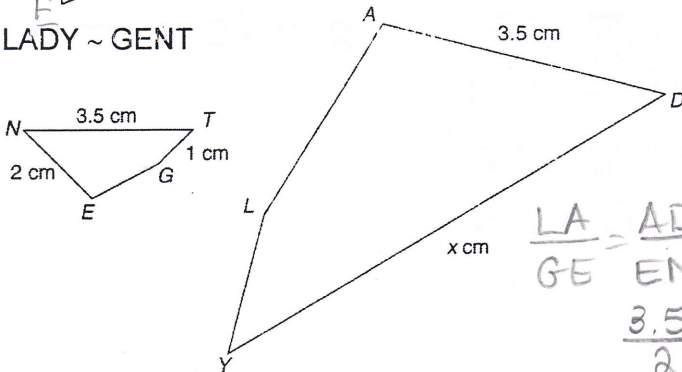


$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

$$\frac{7}{9.1} = \frac{12}{x} \quad 7x = 109.2$$

$x = \underline{15.6 \text{ ft}}$

2. $\triangle LAD \sim \triangle YEG$



$$\frac{LA}{YE} = \frac{AD}{EG} = \frac{LD}{YG}$$

$$\frac{3.5}{2} = \frac{x}{1} \quad 2x = 12.25 \quad x = \underline{6.125 \text{ cm}}$$

Complete the table by filling in the missing ratios.

	Scale Factor	Ratio of Perimeters	Ratio of Areas	Ratio of Volumes
3.	5	$\frac{1}{5}$	$(\frac{1}{5})^2 = \frac{1}{25}$	$(\frac{1}{5})^3 = \frac{1}{125}$
4.	$\frac{2}{3}$	$\frac{3}{2}$	$(\frac{3}{2})^2 = \frac{9}{4}$	$(\frac{3}{2})^3 = \frac{27}{8}$

2 - 3

1. An 45 pound object is weighed on three different scales. The results are shown in the table. Which scale is the most precise? Which scale is the most accurate?

Scale	Measurement (lb)
1	44.9
2	45.105
3	45.01

Scale 1 measures to the nearest tenth of a pound.

Scale 2 measures to the nearest thousandth of a pound.

Scale 3 measures to the nearest hundredth of a pound.

Scale 2 is the most precise. Scale 3 is the most accurate.

Given the specified tolerance, find the acceptable range for each of the following:

2. $25 \text{ L} \pm 5\%$ $25(0.05) = 1.25$
 $25 - 1.25$ $25 + 1.25$

3. $40 \text{ m} \pm 2\%$ $40(0.02) = 0.8$
 $40 - 0.8$ $40 + 0.8$

The range is 23.75 L - 26.25 L.

The range is 39.2 m - 40.8 m.

4. According to the Billiard Congress of America, BCA Equipment Specification, the diameter of a billiard ball is 2.25 inches with a tolerance of 0.005 inch. Which billiard ball(s) in the table below meet(s) this standard?

Ball	①	②	③	④	⑤
Diameter (in.)	2.255	2.249	2.251	2.250	2.2
Ball	⑥	7	8	⑨	⑩
Diameter (in.)	2.251	2.244	2.239	2.249	2.251
Ball	⑪	12	⑬	14	15
Diameter (in.)	2.250	2.219	2.247	2.257	2.288

$$2.25 - 0.005$$

$$2.25 + 0.005$$

$$2.245 \text{ in} - 2.255 \text{ in}$$

3 - 1

Solve each equation. Check your answers.

1. $8\left(\frac{x}{2} + \frac{3}{8}\right) = 1 \cdot 8$

$$4x + 3 = 8$$

$$4x = 5$$

$$x = \frac{5}{4}$$

2. $15\left(\frac{w}{3} + \frac{2}{5}\right) = \frac{1}{15} \cdot 15$

$$5w + 6 = 15$$

$$5w = 9$$

$$w = \frac{9}{5}$$

3 - 2

Solve each equation. Check your answers.

1. $3(t + 7) + 2 = 6t - 2 + 2t$

$$\begin{aligned} 3t + 21 + 2 &= 8t - 2 \\ 3t + 23 &= 8t - 2 \\ 25 &= 5t \end{aligned}$$

$$\boxed{t = 5}$$

2. $5 + 3g = 3g + 5$

$$\begin{aligned} -3g - 3g \\ 5 &= 5 \end{aligned}$$

All real numbers

3 - 3

Solve for the specified variable.

1. $\frac{P}{4} = \frac{4s}{4}$ for s

$$\frac{P}{4} = s$$

2. $a + b + c = 180$ for b

$$\begin{aligned} -a \quad -c \quad -a-c \\ \boxed{b = 180 - a - c} \end{aligned}$$

3. $V \cdot P = \frac{KT \cdot V}{V}$ for K

$$\frac{PV}{T} = \frac{KT}{T}$$

$$\boxed{\frac{PV}{T} = K}$$

The formula $V = \frac{1}{3}lwh$ relates the volume of a square pyramid to its base length l , base width w , and height h .

4. Solve the formula for w .

$$\begin{aligned} 3V &= \frac{1}{3}lwh \\ 3V &= \frac{lwh}{3} \\ \frac{3V}{lh} &= \frac{lwh}{lh} \\ \boxed{\frac{3V}{lh} = w} \end{aligned}$$

$$\frac{3V}{lh} = w$$

5. A square pyramid has a volume of 560 in³, a base length of 10 in., and a height of 14 in. What is its base width?

$$\frac{3V}{lh} = w \quad \frac{3(560)}{10(14)} = w \quad \frac{1680}{140}$$

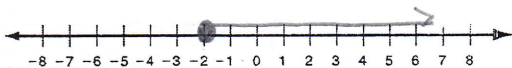
$$\underline{w = 12 \text{ in}}$$

5 - 1

Solve each inequality and graph the solutions.

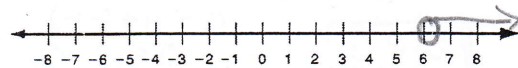
1. $-3e - 10 \leq -4$

$$\begin{aligned} +10 \quad +10 \\ -3e &\leq 6 \\ e &\geq -2 \end{aligned}$$



2. $\frac{c}{2} + 8 > 11$

$$\begin{aligned} -8 \quad -8 \\ \frac{c}{2} &> 3 \\ c &> 6 \end{aligned}$$



Solve each inequality.

3. $-\frac{5}{6}x + 3 < \frac{1}{2}$

$$\begin{aligned} -3 \quad -3 \\ -\frac{5}{6}x &< -\frac{5}{6} \\ \frac{6}{5} \cdot -\frac{5}{6}x &< \frac{6}{5} \cdot -\frac{5}{6} \\ \boxed{x > 3} \end{aligned}$$

4. $2(b - 7) + -4b \geq 30 - 18$

$$\begin{aligned} 2b - 14 - 4b &\geq 12 \\ -2b - 14 &\geq 12 \\ +14 \quad +14 \\ -2b &\geq 26 \\ -2 \quad -2 \\ \boxed{b < -13} \end{aligned}$$

5 - 2

Solve each inequality.

1. $8c + 4 > 4(c - 3)$

$$\begin{aligned} 8c + 4 &> 4c - 12 \\ -4c & \quad -4c \\ 4c + 4 &> -12 \\ -4 & \quad -4 \\ 4c &> -16 \\ c &> -4 \end{aligned}$$

2. $5(x - 1) < 3x + 10 - 8x$

$$\begin{aligned} 5x - 5 &< -5x + 10 \\ +5x & \quad +5x \\ 10x - 5 &< 10 \\ +5 & \quad +5 \\ \hline 10x &< 15 \\ \frac{10x}{10} & \quad \frac{15}{10} \\ x &< \frac{3}{2} \end{aligned}$$

3. $-8 + 4a - 12 > 2a + 10$

$$\begin{aligned} -20 + 4a &> 2a + 10 \\ -2a & \quad -2a \\ -20 + 2a &> 10 \\ +20 & \quad +20 \\ 2a &> 30 \\ a &> 15 \end{aligned}$$

Solve each inequality.

4. $t + 5 < t + 5$

$$\begin{aligned} -t & \quad -t \\ 5 &< 5 \end{aligned}$$

NO SOLUTION

5. $9x + 3 - 5x \geq 2(2x + 5)$

$$\begin{aligned} 4x + 3 &\geq 4x + 10 \\ -4x & \quad -4x \\ 3 &\geq 10 \end{aligned}$$

NO SOLUTION

5 - 3

Solve each compound inequality and graph the solutions.

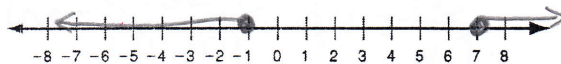
1. $-5 < k - 1 < 0$

$$\begin{aligned} +1 & \quad +1 & +1 \\ -4 &< k < 0 \end{aligned}$$



2. $6b \geq 42$ OR $3b \leq -3$

$$\begin{aligned} \frac{6b}{6} &\geq \frac{42}{6} & \frac{3b}{3} &\leq \frac{-3}{3} \\ b &\geq 7 & b &\leq -1 \end{aligned}$$



6 - 1

Tell whether the ordered pair is a solution of the given system.

1. $(0, -4)$; $\begin{cases} x + 2y = -8 \\ x = 4 + y \end{cases}$

YES

$$\begin{aligned} 0 + 2(-4) &= -8 \\ -8 &= -8 \checkmark \\ 0 &= 4 + (-4) \\ 0 &= 0 \checkmark \end{aligned}$$

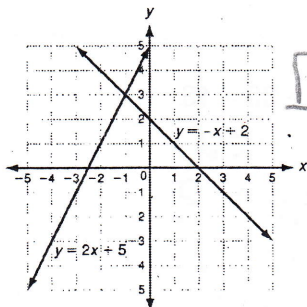
2. $(2, 5)$; $\begin{cases} x + y = 7 \\ 3x + y = 10 \end{cases}$

NO

$$\begin{aligned} 2 + 5 &= 7 \\ 7 &= 7 \checkmark \\ 3(2) + 5 &= 10 \\ 6 + 5 &= 10 \\ 11 &= 10 \times \end{aligned}$$

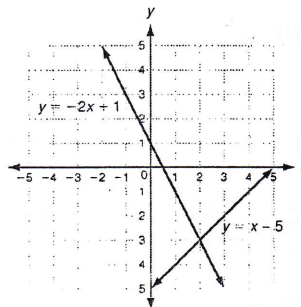
Find the solution of each system of equations graphed below.

3.



(-1, 3)

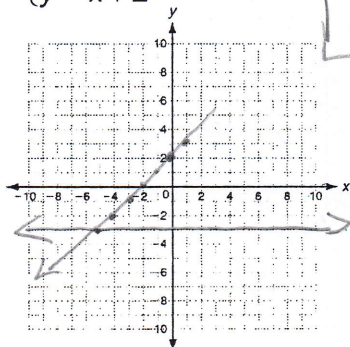
4.



(2, -3)

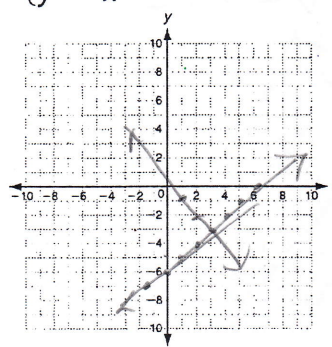
Solve each system by graphing.

5. $\begin{cases} y = -3 \\ y = x + 2 \end{cases}$



$(-5, -3)$

6. $\begin{cases} y = x - 6 \\ y = -x \end{cases}$



$(3, -3)$

6 - 2

Solve each system by substitution. Check your answer.

1. $\begin{cases} x = y - 1 \\ x + 2y = 8 \end{cases}$

$x = y - 1$
 $x + 2y = 8$
 $y - 1 + 2y = 8$
 $3y - 1 = 8$
 $+1 +1$
 $3y = 9$
 $y = 3$

$(2, 3)$

$x = 3 - 1$
 $x = 2$

3. $\begin{cases} x - y = -3 \\ 2x + y = 12 \end{cases}$

$(3, 6)$

$x = y - 3$
 $x = 6 - 3 = 3$
 $2(y - 3) + y = 12$
 $2y - 6 + y = 12$
 $3y - 6 = 12$
 $3y = 18$
 $y = 6$

6 - 3

Solve each system by elimination.

1. $\begin{cases} 2x - y = 20 \\ 3x + 2y = -19 \end{cases}$

$2(3) - y = 20$
 $6 - y = 20$
 $-6 -6$
 $-y = 14$
 $y = -14$

$4x - 2y = 40$
 $3x + 2y = -19$

$7x = 21$
 $x = 3$
 $(3, -14)$

2. $\begin{cases} 3x - y = 2 \\ -8x + 2y = 4 \end{cases}$

$3(-4) - y = 2$
 $-12 - y = 2$
 $+12 +12$
 $-y = 14$

$6x - 2y = 4$
 $-8x + 2y = 4$

$-2x = 8$
 $-2 -2$
 $x = -4$
 $y = -14$
 $(-4, -14)$

3. Solve. Wren and Jenni are reading the same book. Wren is on page 14 and reads 2 pages per night. Jenni is on page 6 and reads 3 pages per night.

$y = 14 + 2x$
 $y = 6 + 3x$

$14 + 2x = 6 + 3x$
 $-6 -2x -6 -2x$
 $8 = x$

$x = \text{night}$
 $y = \text{pages}$
 8

After how many nights will they have read the same number of pages? 8

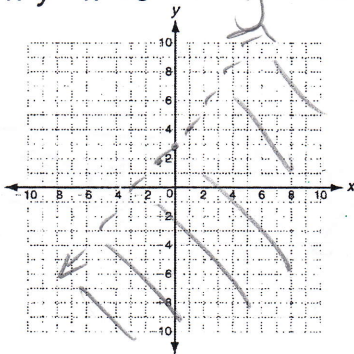
How many pages will they have read? 30

$y = 14 + 2(8)$
 $y = 14 + 16$

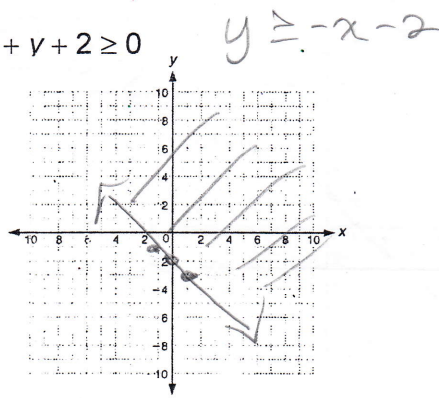
7 - 2

Graph the solutions of each linear inequality.

1. $y - x < 3$



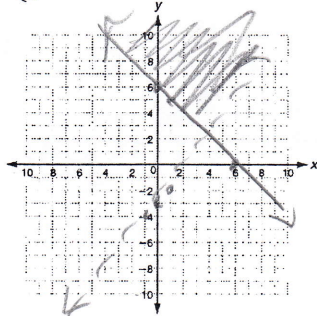
2. $x + y + 2 \geq 0$



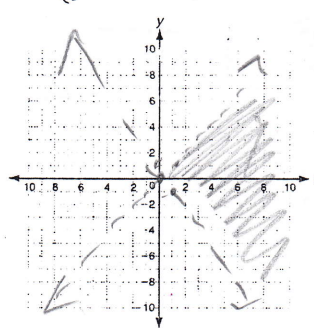
7 - 3

Graph each system of linear inequalities. Know where the solutions are located.

1. $\begin{cases} y > x - 3 \\ y \geq -x + 6 \end{cases}$



2. $\begin{cases} y < x \\ y > -2x + 1 \end{cases}$



8 - 2

Find the domain and range of each relation. Then tell whether each relation is a function.

1.

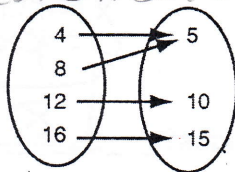
x	-2	-3	-3	-4
y	1	2	3	4

D: $\{-2, -3, -4\}$ R: $\{1, 2, 3, 4\}$

Function? NO, x-repeats

For a value of x there is more than one y value

3.



D: $\{4, 8, 12, 16\}$ R: $\{5, 10, 15\}$

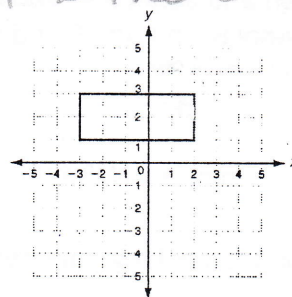
Function? Yes for each value of x there is only 1 y-value

2. $(4, 5)$ $(-2, 6)$ $(-5, 12)$

D: $\{5, -2, 4\}$ R: $\{5, 6, 12\}$

Function? Yes, for each value of x there is only one value for y

4.



D: $-3 \leq x \leq -1$ R: $1 \leq y \leq 3$

Function? NO, doesn't pass vertical line test