*Review 2.1-2.3(****Key****)*

1. Solve the following systems by graphing and identify each system as consistent or

inconsistent, and dependent or independent. Round any noninteger answers to 4 decimal places.

a. 2*y* = *x* – 6 b. *y* = 1.3 + 6.2*x*

7*x* – 14*y* = 28 12*y* + 20.36 = 50.4*x*

**a.**

**  No solution; inconsistent and independent**

**b.**

**  (0.0381, 1.5365); consistent and independent**

2. Two groups of high school students decide to start their own sport clinics. They plan on

teaching elementary students the basics of baseball and basketball. The baseball group charges

a registration fee of $55 in addition to $20 per hour for basics on baseball. The basketball

group charges $35 for registration in addition to $25 per hour for basics on basketball. Let

x represent hours and y represent the total cost for the sport clinics.

a. Write an equation for the total cost of the baseball clinic.

b. Write an equation for the total cost of the basketball clinic.

c. Solve the system of equations graphically and interpret the solution.

d. Which sports clinic would be the least expensive if the child plans to receive 3 hours of basics?

**a. *y* = 55 + 20*x***

**b. *y* = 35 + 25*x***

**c. *x* = 4, *y* = 135 The cost for each clinic would be $135 for 4 hours.**

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**d. The basketball would be $110, whereas the baseball clinic would be $115. Notice the**

**basketball graph is below the baseball graph, which shows that the basketball clinic will be**

**more cost-effective for 3 hours.**

3. Solve the given system by elimination or substitution:

2*x* + *y* = 12

8*x* + 4*y =* 32

***Elimination:***

**First,** **we can multiply the first equation by , to help us eliminate the *y*-terms; then, add**

**both equations and solve for *x*.**

**Finally, back-substitute for *x* (into any of the equations) and simplify to find *y*:**

**Solution:**

***Substitution:***

**First, we can solve the first equation for *y*:**

**Now we replace the *y* of the second equation by the equivalent value of *y* from the first**

**equation; then, simplify and solve for *x*.**

**8*x* + 4)**

**8*x* 8)**

**16*x***

***x***

**Finally, back-substitute for *x* (into any of the equations) and simplify to find *y*:**

**Solution:**

4. Yoga is an ancient physical and spiritual discipline and branch of philosophy that originated in India. Yoga began to grow in popularity in the United States in the 1960s and is now considered part of the mainstream of American culture. Meditation Studio charges $12 per drop-in session, plus a one-time fee of $17 for a special microfiber towel to place on top of the floor mats for absorbing perspiration. Yoga Retreat Studio charges $8 per drop-in session plus $33 for the microfiber towel. Let *x* represent the number of sessions and *y* be the total cost for yoga lessons.

a. Write an equation for the total cost of membership to the Meditation Studio.

***y* = 12*x* + 17**

b. Write an equation for the total cost of membership to the Yoga Retreat Studio.

***y* = 8*x* + 33**

c. Solve the system of equations algebraically and interpret the solution. Answer in a complete

sentence.

**We know *y* = 12*x* + 17 and *y* = 8*x* + 33, therefore**

**12*x* + 17 = 8*x* + 33**

**12*x*  – 8*x* = 33 – 17**

**4*x* = 16**

***x* = 4**

**Replace *x* = 4 into any of the 2 equations:**

***y* = 12(4) + 17 = 65**

**The solution is (4, 65). This means that a total cost of $65 will be the same in both studios**

**for 4 yoga sessions.**

d. If you wanted to take 9 yoga lessons in one of these two studios, which will be more

cost-effective?

***Algebraically:***

**Meditation Studio: *y* = 12(9) + 17 = 125 dollars**

**Yoga Retreat Studio:  *y* = 8(9) + 33 = 105 dollars**

**When *x* = 9, the Yoga Retreat Studio will be more cost-effective.**

***Graphically:***

**Note: Must choose an appropriate viewing window; we are using [0, 10, 1] by [0, 150, 20]**

**Meditation Studio: *Y1* = 12*x* + 17**

**Yoga Retreat Studio: *Y2* = 8*x* + 33 (bolded line)**

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**Observe that fo**r ***x* = 9, the Yoga Retreat Studio line is below the Meditation Studio line,**

**which shows that Yoga Retreat Studio will be more cost-effective for 9 sessions.**

5. Graph the linear inequality to find the solution set:

**Steps:**

**(1) Graph the corresponding linear equation ("boundary line"): if the inequality symbol is ≥ or ≤, draw a *solid line* to include the line in the solution; if the inequality symbol is > or <, draw a *dashed line* to exclude the line from the solution.**

**(2) Select any point that does not lie on the line to determine the region whose points will satisfy the inequality (test point). Note: If the point (0, 0) is not on the line, use it as a test point because it provides for easier calculations.**

**(3) If the test point satisfies the inequality (yields a “true” result), shade the region that contains the point; if it does not satisfy the inequality, then shade the opposite region.**

