UNIT 8 REVIEW - ANSWER KEY

1.

$$3x + 2y = 4$$
$$-1(-2x + 2y = 24)$$

$$3x + 2y = 4$$
$$\underline{2x - 2y = -24}$$
$$5x = -20$$
$$\mathbf{x = -4}$$

$$3x + 2y = 4$$
$$3(-4) + 2y = 4$$
$$-12 + 2y = 4$$
$$2y = 16$$
$$\mathbf{y = 8} \qquad \mathbf{(-4, 8)}$$

check:

$3x+2y=4$	$-2x+2y=24$
$3(-4)+2(8)=4$	$-2(-4)+2(8)=24$
$-12+16=4$	$8+16=24$
$4=4$ ✓	$24=24$ ✓

2.

$$-3(3x + 2y = 4)$$
$$2(4x + 3y = 7)$$

$$-9x - 6y = -12$$
$$\underline{8x + 6y = 14}$$
$$-x = 2$$
$$\mathbf{x = -2}$$

$$3x + 2y = 4$$
$$3(-2) + 2y = 4$$
$$-6 + 2y = 4$$
$$2y = 10$$
$$\mathbf{y = 5} \qquad \mathbf{(-2, 5)}$$

check:

$3x+2y=4$	$4x+3y=7$
$3(-2)+2(5)=4$	$4(-2)+3(5)=7$
$-6+10=4$	$-8+15=7$
$4=4$ ✓	$7=7$ ✓

3.

$$x + 2y = 7$$
$$x = y - 8$$

$$x + 2y = 7$$
$$y - 8 + 2y = 7$$
$$3y - 8 = 7$$
$$3y = 15$$
$$\mathbf{y = 5}$$

$$x = y - 8$$
$$x = 5 - 8$$
$$\mathbf{x = -3} \qquad \mathbf{(-3, 5)}$$

check:

$x+2y=7$	$x = y - 8$
$-3+2(5)=7$	$-3 = 5 - 8$
$-3+10=7$	$-3 = -3$
$7=7$ ✓	✓

4.

$$x + y = 7 \longrightarrow x = 7 - y$$
$$2x + 3y = 21$$

$$2x + 3y = 21$$
$$2(7 - y) + 3y = 21$$
$$14 - 2y + 3y = 21$$
$$14 + y = 21$$
$$\mathbf{y = 7}$$

$$x + y = 7$$
$$x + 7 = 7$$
$$\mathbf{x = 0} \qquad \mathbf{(0, 7)}$$

check:

$2x+3y=21$	$x + y = 7$
$2(0)+3(7)=21$	$0 + 7 = 7$
$0+21=21$	$7 = 7$ ✓
$21=21$ ✓	

5.

Let x = price of one cheese slice = **$1.50**
    y = price of one mushroom slice = **$2.00**

$$3x + 4y = 12.50 \longrightarrow 3x + 4y = 12.50$$
$$-1(3x + 2y = 8.50) \longrightarrow \underline{-3x - 2y = -8.50}$$
$$2y = 4.00$$
$$\mathbf{y = 2.00}$$

$$3x + 4y = 12.50$$
$$3x + 4(2) = 12.50$$
$$3x + 8 = 12.50$$
$$3x = 4.50$$
$$x = 1.50$$

6.

Let x = number of dimes   = **6 dimes**
    y = number of quarters = **14 quarters**

$$x + y = 20 \longrightarrow y = -x + 20$$
$$.10x + .25y = 4.10 \qquad .10x + .25(-x + 20) = 4.10$$
$$.10x - .25x + 5 = 4.10$$
$$-.15x + 5 = 4.10$$
$$-.15x = -.90$$
$$x = 6$$

$$x + y = 20$$
$$6 + y = 20$$
$$y = 14$$

7.

Let x = # of adult tickets = **570 adult tickets**
    y = # of child tickets = **215 child tickets**

$$5x + 2y = 3280 \longrightarrow 5x + 2y = 3280$$
$$-2(x + y = 785) \longrightarrow \underline{-2x - 2y = -1570}$$
$$3x = 1710$$
$$\mathbf{x = 570}$$

$$x + y = 785$$
$$570 + y = 785$$
$$y = 215$$

8.

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

$m = \dfrac{-1}{1}$ $m = \dfrac{2}{1}$

$b = 6$ $b = -6$

Solution (4,2)

x+y=6   y=2x-6

check:

$x + y = 6$ $y = 2x - 6$
$4 + 2 = 6$ $2 = 2(4) - 6$
$6 = 6$ ✓ $2 = 8 - 6$
   $2 = 2$ ✓

---

9. (a) **Alice: y = 2x + 9**   **Kate: y = 3x**

(b)
$3x = 2x + 9$
$x = 9$

$y = 3x$
$y = 3(9)$
$y = 27$

(c) After 9 weeks, Alice and Kate will have each read 27 books.

10.

1ˢᵗ: solve system #1

$-3(8x + 9y = 48) \longrightarrow -24x - 27y = -144$
$2(12x + 5y = 21) \longrightarrow \underline{24x + 10y = 42}$
$-17y = -102$
y = 6

$8x + 9y = 48$
$8x + 9(6) = 48$
$8x + 54 = 48$
$8x = -6$
$x = -0.75$ **Solution (-0.75, 6)**

check:
$8x + 9y = 48$
$8(-.75) + 9(6) = 48$
$-6 + 54 = 48$
$48 = 48$

$12x + 5y = 21$
$12(-.75) + 5(6) = 21$
$-9 + 30 = 21$
$21 = 21$

2ⁿᵈ: test the solution with system #2
Solution (-0.75, 6)
$8x + 9y = 48$ *already checked-it's the same equation from system #1*

Check solution with the second equation
$-8.5y = -51$
$-8.5(6) = -51$
$-51 = -51$ It checks!

I agree with Alan. The two systems of equations have the same solution set. See all work shown above.

11.

a) $3(4x + 2y = 18) \longrightarrow 12x + 6y = 54$
   $12x + 6y = 54$

If you multiply the first equation by 3, the equivalent equation is the same as the second equation.

The graphs of the lines are the same. The system has **infinitely many solutions**. This can also be seen if you put both equations in y = mx + b form.

$4x + 2y = 18 \longrightarrow y = -2x + 9$
$12x + 6y = 54 \longrightarrow y = -2x + 9$

b) $y = x - 1$
   $y - x = 10 \longrightarrow y = x + 10$

If you put the second equation in y = mx + b form, you will notice that both equations have the same slope (m = 1) and different y-intercepts. The graph will display parallel lines. This system has **no solution**.

c) $x + y = 1 \longrightarrow y = -x + 1$
   $5x - 4y = -7 \longrightarrow y = 1.25x + 1.75$
The equations have different slopes and different y-intercepts. The system has **one solution**. The graph will show two intersecting lines.