Systems of Linear Equations Packet
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8
   DOK: DOK 2
2. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8
   DOK: DOK 2
3. ANS: D PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8
   DOK: DOK 3
4. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8
   DOK: DOK 3
5. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b
   DOK: DOK 3
6. ANS: C PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b
   KEY: system of linear equations DOK: DOK 2
7. ANS: B PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b
   KEY: system of linear equations DOK: DOK 2
8. ANS: D PTS: 1 REF: A2.Pre.EN.07
   NAT: NT.CCSS.MTH.10.8.8.EE.8.b | NT.CCSS.MTH.10.9-12.A.REI.6
   DOK: DOK 2
9. ANS: C

	Feedback
A	The ordered pair is not a solution of either linear equation.
B	The ordered pair is only a solution of the equation of the line that passes through the point.
C	That's correct!
D	Remember that the coordinates of any point on a line must satisfy the line's equation.

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of linear equations | solution of a system DOK: DOK 1

10. ANS: D

	Feedback
A	For an ordered pair to be a solution of a system of two equations, it must satisfy both equations.
B	For an ordered pair to be a solution of a system of two equations, it must satisfy both equations.
C	For an ordered pair to be a solution of a system of two equations, it must satisfy both equations.
D	That's correct!

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of equations | solution of a system DOK: DOK 1

11. ANS: C
The ordered pair (–5, 3) does not satisfy the system of equations because the solution satisfies only the equation $y = -\frac{3}{5}x$. The ordered pair has to satisfy both equations to be a solution of the system.

	Feedback
A	At least one of the equations is not satisfied by the ordered pair (–5, 3).
B	The ordered pair (–5, 3) does not satisfy the equation $y = -2x - 1$.
C	That's correct!
D	At least one of the equations is satisfied by the ordered pair (–5, 3).

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of equations | solution of a system DOK: DOK 1

12. ANS: A
The lines intersect at the point (–4, – 2), so the solution of the system is the ordered pair (–4, – 2).

	Feedback
A	That's correct!
B	Neither line passes through the point (–4, – 2).
C	Remember that the first number in an ordered pair is the x-coordinate and the second number is the y-coordinate.
D	Only one of the lines passes through the point (2, 4).

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of equations | solution of a system DOK: DOK 1

13. ANS: A
Dividing each term of $-4x + 10y = 20$ by 2 results in $-2x + 5y = 10$, which is the same as the first equation. So, there are infinitely many solutions.

	Feedback
A	That's correct!
B	While (5, 4) is a solution of the system, there are other solutions as well.
C	While (10, 6) is a solution of the system, there are other solutions as well.
D	The system of equations has at least one solution.

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b KEY: system of equations
DOK: DOK 1

14. ANS: B

Solve for y in the equation $4x + y = -12$.

$4x - 4x + y = -4x - 12$

$y = -4x - 12$

	Feedback
A	Do not solve for x in the equation $4x + y = -12$.
B	That's correct!
C	Do not solve for y in the equation $5x + 2y = 25$.
D	Do not solve for x in the equation $5x + 2y = 25$.

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b

KEY: system of equations | solving a system algebraically DOK: DOK 1

15. ANS: A

Substitute $40t + 50$ for s in the equation $s = 35t + 100$.

$40t + 50 = 35t + 100$

$40t - 35t + 50 = 35t - 35t + 100$

$5t + 50 - 50 = 100 - 50$

$$\frac{5t}{5} = \frac{50}{5}$$

$t = 10$

Substitute 10 for t in the equation $s = 40t + 50$.

$s = 40(10) + 50$

$= 400 + 50$

$= 450$

Trudy and Xander both have \$450 saved after 10 weeks of working on their newspaper routes.

	Feedback
A	That's correct!
B	The variable s is not the number of weeks they worked, and the variable t is not how much money they have earned.
C	This solution satisfies Xander's equation, but it doesn't satisfy Trudy's equation.
D	This solution satisfies Trudy's equation, but it doesn't satisfy Xander's equation.

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.b

KEY: system of equations | interpreting a solution of a system DOK: DOK 2

16. ANS: C

The equation $n + q = 25$ represents the total number of nickels and quarters in the container. Each nickel is worth \$0.05, each quarter is worth \$0.25, and the total value of the coins is \$4.05. The equation $0.05n + 0.25q = 4.05$ represents the value of the coins. The system of equations that represents this situation is:

$$\begin{cases} n + q = 25 \\ 0.05n + 0.25q = 4.05 \end{cases}.$$

	Feedback
A	The number of nickels is not 25 more than the number of quarters.
B	The total number of nickels and quarters is not 4.05, and the value of the coins is not \$25.
C	That's correct!
D	Remember that 4.05 represents the total value of the coins in dollars, not cents.

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.c
KEY: system of equations | writing a system DOK: DOK 2

17. ANS: D
The equation of the line that passes through the points $(-5, -6)$ and $(-3, 2)$ is $y = 4x + 14$. Solve the system of equations $\begin{cases} y = 4x + 14 \\ y = x - 4 \end{cases}$ by substituting $x - 4$ for y in the equation $y = 4x + 14$.

$$\begin{aligned} x - 4 &= 4x + 14 \\ x - x - 4 &= 4x - x + 14 \\ -4 - 14 &= 3x \\ -\frac{18}{3} &= \frac{3x}{3} \\ -6 &= x \end{aligned}$$

Substitute -6 for x in the equation $y = x - 4$.
$y = -6 - 4$
$= -10$

The lines intersect at the point $(-6, -10)$.

	Feedback
A	The line $y = x + 4$ does not pass through the point $(-5, -6)$.
B	The line that passes through the points $(-5, -6)$ and $(-3, 2)$ does not pass through the point $(2, -2)$.
C	The line $y = x + 4$ does not pass through the point $(-3, 2)$.
D	That's correct!

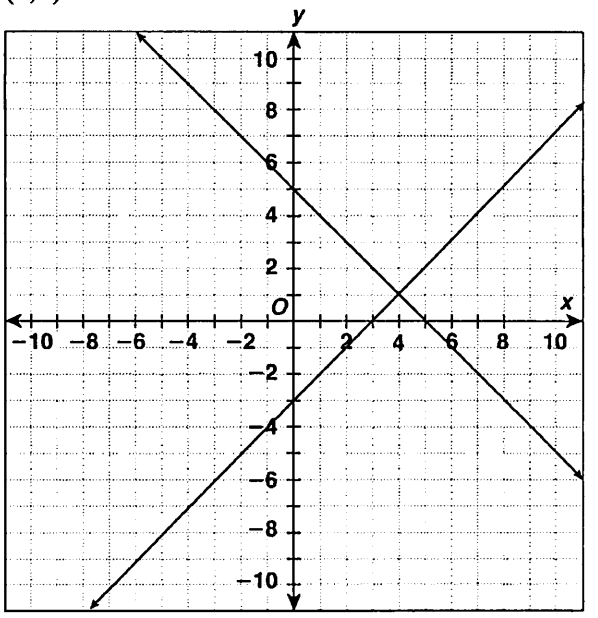
PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8.c
KEY: system of equations | intersection of lines DOK: DOK 1

SHORT ANSWER

1. ANS:
No solution

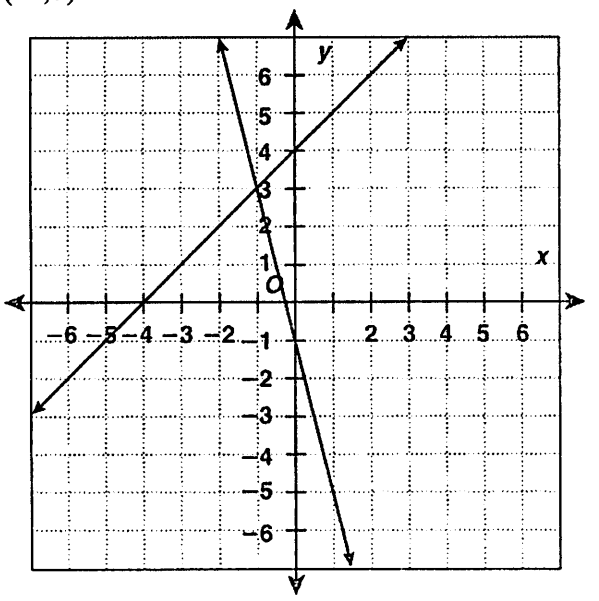
PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8 | NT.CCSS.MTH.10.8.8.EE.8.a
DOK: DOK 1

2. ANS:
(4, 1)



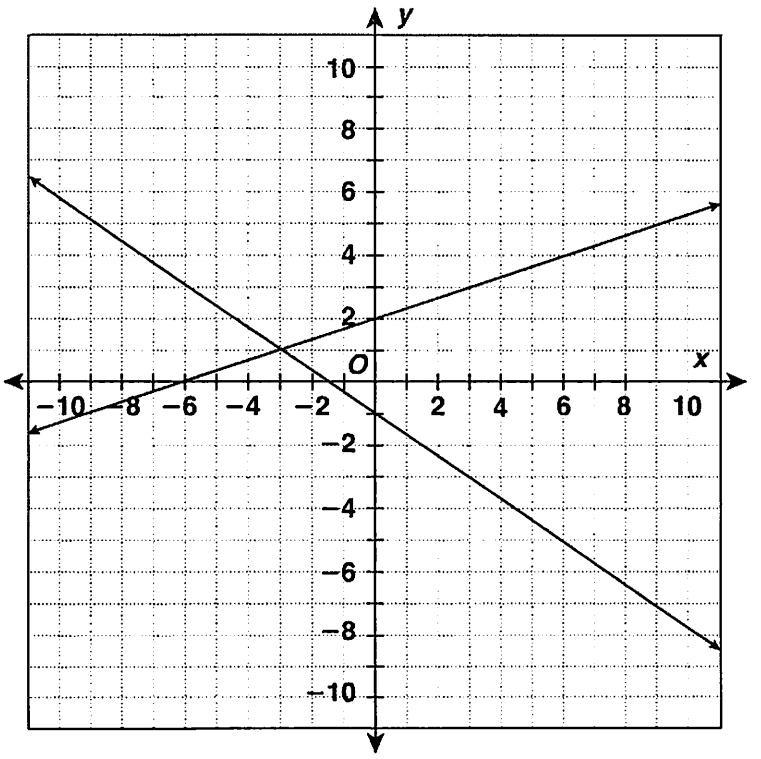
PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8 | NT.CCSS.MTH.10.8.8.EE.8.a
DOK: DOK 2

3. ANS:
(−1, 3)



PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8 | NT.CCSS.MTH.10.8.8.EE.8.a
DOK: DOK 2

4. ANS:
(−3,1)



PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8 | NT.CCSS.MTH.10.8.8.EE.8.a
DOK: DOK 2

5. ANS:
(1,7)

PTS: 1 NAT: NT.CCSS.MTH.10.8.8.EE.8 DOK: DOK 2

6. ANS:
$(3,8)$

PTS: 1 REF: A2.MF.1_6.Eng.16
NAT: NT.CCSS.MTH.10.8.8.EE.8.b | NT.CCSS.MTH.10.9-12.A.REI.6
DOK: DOK 2

7. ANS:
The solution of the system is (2, 8).

$2+8 \stackrel{?}{=} 10$

$10 = 10$

$-2(2)+8 \stackrel{?}{=} 4$

$-4+8 \stackrel{?}{=} 4$

$4 = 4$

The solution (2, 8) is verified because the ordered pair (2, 8) satisfies both equations.

Rubric
1 point for solution; 1 point for verifying solution

PTS: 2 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of linear equations | solution of a system DOK: DOK 2

8. ANS:
No, because only one line passes through the point $(-5, -4)$.

Rubric
1 point for answer; 1 point for explanation

PTS: 2 NAT: NT.CCSS.MTH.10.8.8.EE.8.a
KEY: system of linear equations | solution of a system DOK: DOK 2

9. ANS:
Matt is not correct even though the lines do not intersect within the boundaries of the grid. The lines are not parallel and will intersect each at some point in Quadrant III.

Rubric
1 point for answer; 1 point for explanation

PTS: 2 NAT: NT.CCSS.MTH.10.8.8.EE.8.a | NT.CCSS.MTH.10.K-12.MP.3
KEY: system of linear equations | solution of a system DOK: DOK 3

10. ANS:
There is no solution because the expression $-2x+4y$ cannot equal both 5 and 6 for any values of x and y at the same time.

Rubric
1 point for answer; 1 point for explanation

PTS: 2 NAT: NT.CCSS.MTH.10.8.8.EE.8.b
KEY: system of equations | solving a system by inspection DOK: DOK 2

11. ANS:

The equation of the line that has a slope of $-\frac{1}{3}$ and a y-intercept of 8 is $y = -\frac{1}{3}x + 8$. Use the slope equation to find the slope of the line that passes through the points $(-3, -5)$ and $(1, 3)$.

$$\frac{3-(-5)}{1-(-3)} = \frac{8}{4} = 2$$

Substitute 1 for x, 2 for m, and 3 for y in the equation $y = mx + b$.

$$3 = 2(1) + b$$
$$3 - 2 = 2 - 2 + b$$
$$1 = b$$

The equation of the line that passes through $(-3, -5)$ and $(1, 3)$ is $y = 2x + 1$.

Substitute $-\frac{1}{3}x + 8$ for y in $y = 2x + 1$.

$$-\frac{1}{3}x + 8 = 2x + 1$$
$$-\frac{1}{3}x + \frac{1}{3}x + 8 = 2x + \frac{1}{3}x + 1$$
$$8 = \frac{7}{3}x + 1$$
$$8 - 1 = \frac{7}{3}x + 1 - 1$$
$$7 = \frac{7}{3}x$$
$$\left(\frac{3}{7}\right)7 = \left(\frac{3}{7}\right)\frac{7}{3}x$$
$$3 = x$$

Substitute 3 for x in $y = 2x + 1$.

$$y = 2(3) + 1$$
$$= 6 + 1$$
$$= 7$$

The lines intersect at the point (3, 7).

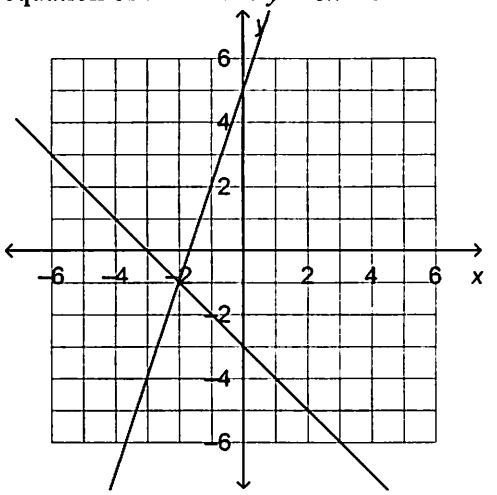
Rubric
0.5 point for each equation; 1 point for solution

PTS: 2 NAT: NT.CCSS.MTH.10.8.8.EE.8.c
KEY: system of equations | intersection of lines DOK: DOK 2

PROBLEM

1. ANS:
   a. The error is that Chandler thought that the lines intersect at the point $(-2, -1)$. However, the lines intersect at the point $(-1, -2)$.
   b. The graph of $y = -x - 3$ already passes through the point $(-2, -1)$. By translating the graph of $y = 3x + 1$ to the left $1\frac{1}{3}$ units as shown below, you will have a line that passes through the point $(-2, -1)$ as well.

      The translated graph has the same slope as the original line, but the y-intercept is 5 instead of 3. So, an equation of the line is $y = 3x + 5$.



Rubric

a. 1 point for identifying the error; 1 point for correcting the error
b. 1 point for describing translation; 1 point for graph; 1 point for equation

PTS: 5
NAT: NT.CCSS.MTH.10.8.8.EE.8.a | NT.CCSS.MTH.10.8.8.G.1.c | NT.CCSS.MTH.10.8.8.EE.6 | NT.CCSS.MTH.10.K-12.MP.3
KEY: system of equations | solution of a system | identifying an error
DOK: DOK 3