Part A: Writing Equations in Slope-Intercept Form

Practice 1

1.

$y + 9 = \frac{1}{2}x - \frac{3}{2}$

$y = \frac{1}{2}x - \frac{21}{2}$

2.

$y - 1 = -\frac{5}{3}x - \frac{10}{3}$

$y = -\frac{5}{3}x - \frac{7}{3}$

3.

$y - 2 = 4x + 12$

$y = 4x + 14$

4.

$y + \frac{3}{4} = 12x - 3$

$y = 12x - \frac{15}{4}$

5.

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

$y - 5 = -\frac{1}{2}x + 1$

$y = -\frac{1}{2}x + 6$

6.

$y - 0 = 3(x + 1)$

$y = 3(x + 1)$

$y = 3x + 3$

7.

$y - 7 = -\frac{4}{5}(x - 10)$

$y - 7 = -\frac{4}{5}x + 8$

$y = -\frac{4}{5}x + 15$

8.

4 mph; Sample: Every hour Reanne walks 4 miles.

9.

(1, 7)

10.
$m = 4$ and $(1, 7)$
$y - 7 = 4(x - 1)$
$y - 7 = 4x - 4$
$y = 4x + 3$

11.
$(2.5, y)$
$y = 4(2.5) + 3$
$y = 10 + 3$
$y = 13$
Reanne will be at mile marker 13 in 2.5 hours.

12.
$42 per month

13.
(month, money)

14.
(5, 259.50)

15.
$y - 259.50 = 42(x - 5)$
$y - 259.50 = 42x - 210$
$y = 42x + 49.50$

16.
$(x, 511.50)$
$511.50 = 42x + 49.50$
$561 = 42x$
$x = 11$
Joey had the internet service for 11 months.

17.
A.
$m = \frac{14 - 7}{4 - (-3)} = 1$

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

C.
$y = x + 10$

18.

$m = \frac{3-(-6)}{-4-(-2)} = -\frac{9}{2}$;

(The order of the points do not matter, but the slope should be the same.)

$y + 6 = -\frac{9}{2}(x + 2)$

$y + 6 = -\frac{9}{2}x - 9$

$y = -\frac{9}{2}x - 15$

19.

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

$y - 4 = \frac{1}{3}(x - 1)$

$y - 4 = \frac{1}{3}x - \frac{1}{3}$

$y = \frac{1}{3}x + \frac{11}{3}$

20.

$m = \frac{7-9}{-4-(-7)} = \frac{-2}{3}$

$y - 7 = \frac{-2}{3}(x + 4)$

$y - 7 = \frac{-2}{3}x - \frac{8}{3}$

$y = \frac{-2}{3}x + \frac{13}{3}$

21.

$(-3, 4)$ and $(1, 2)$

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

$y - 2 = -\frac{1}{2}(x - 1)$

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

$y = -\frac{1}{2}x + \frac{5}{2}$

$j(x) = -\frac{1}{2}x + \frac{5}{2}$

$(-3, -6)$ and $(1, -1)$

$m = \frac{-1-(-6)}{1-(-3)} = \frac{5}{4}$

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

$y = \frac{5}{4}x - \frac{9}{4}$

$v(x) = \frac{5}{4}x - \frac{9}{4}$

Practice 2

1.

$y + 2 = \frac{6}{5}x - \frac{3}{5}$

$y = \frac{6}{5}x + \frac{7}{5}$

2.

$y - 1 = -\frac{1}{3}x + \frac{5}{3}$

$y = -\frac{1}{3}x + \frac{8}{3}$

3.

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

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

4.

$y - 7 = -\frac{3}{4}x - \frac{15}{4}$

$y = -\frac{3}{4}x + \frac{13}{4}$

5.

$y - 0 = -7(x + \frac{1}{2})$

$y = -7x - \frac{7}{2}$

6.

$y - 2 = \frac{5}{7}(x + 14)$

$y - 2 = \frac{5}{7}x + 10$

$y = \frac{5}{7}x + 12$

7.

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

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

$y = \frac{2}{3}x$

8.

(2, 20)

9.

−3.25; Katrina is spending money. For every gallon she puts in her car, the amount on the gift card goes down.

10.

$y - 20 = -3.25(x - 2)$
$y - 20 = -3.25x + 6.50$
$y = -3.25x + 26.50$

11.

$(x, 0)$
$0 = -3.25x + 26.50$
$3.25x = 26.50$
$x = 8.15$ gallons

12.

$m = \frac{(-5 - 3)}{(-1 - 1)} = 4$
$y - 3 = 4(x - 1)$
$y - 3 = 4x - 4$
$y = 4x - 1$

13.

$m = \frac{(-1 - 2)}{(-4 - (-2))} = \frac{3}{2}$
$y - 2 = \frac{3}{2}(x + 2)$
$y - 2 = \frac{3}{2}x + 3$
$y = \frac{3}{2}x + 5$

14.

$m = \frac{(-5 - 7)}{(6 - (-3))} = -\frac{4}{3}$
$y - 7 = -\frac{4}{3}(x + 3)$
$y - 7 = -\frac{4}{3}x - 4$
$y = -\frac{4}{3}x + 3$

15.

$(-1, 0)$ and $(1, 3)$
$m = \frac{(3 - 0)}{(1 - (-1))} = \frac{3}{2}$
$y - 3 = \frac{3}{2}(x - 1)$
$y - 3 = \frac{3}{2}x - \frac{3}{2}$
$y = \frac{3}{2}x + \frac{3}{2}$
$f(x) = \frac{3}{2}x + \frac{3}{2}$

16.
$(-1, 4)$ and $(2, 4)$
$m = \frac{(4-4)}{(-1-2)} = 0$
$y = 4$

17.
$(2, 4)$ and $(-2, -1)$
$m = \frac{(-1-4)}{(-2-2)} = \frac{5}{4}$
$y - 4 = \frac{5}{4}(x - 2)$
$y - 4 = \frac{5}{4}x - \frac{5}{2}$
$y = \frac{5}{4}x + \frac{3}{2}$

18.
$(-1, 4)$ and $(-2, -1)$
$m = \frac{(-1-4)}{(-1-(-2))} = 5$
$y - 4 = 5(x + 1)$
$y - 4 = 5x + 5$
$y = 5x + 9$

Part B: Applications of Linear Equations in
Practice 1
1.
$m = 2$, (day, cm)
$(13, 27)$
$y - 27 = 2(x - 13)$
$y - 27 = 2x - 26$
$y = 2x + 1$

2.
(day, eggs remaining)
$(0, 60)$, $b = 60$
$(25, 10)$
$m = \frac{(10-60)}{(25-0)} = -2$
$y = -2x + 60$

3.
(yearbook, money)
$m = 35$
$b = 325$
$y = 35x + 325$

4.
$y = 35(100) + 325$
$y = 3{,}825$
It will cost \$3,825 for 100 yearbooks.

5.
(month, % full)
(0, 85) Students may pick any two of the three points. They may not realize the y-intercept is provided.
(1, 80)
(4, 65)
$m = \frac{(65 - 85)}{(4 - 0)} = -5$
$y = -5x + 85$

6.
(hours, miles)
(0, 0)
(5.5, 2,400)
$m = \frac{(2{,}400 - 0)}{(5.5 - 0)} = \frac{2{,}400}{5.5} = 436.3636 = 436$
$y = 436x$

7.
The speed of the plane was 436 mph.

8.
(drywall, cost)
$m = \frac{(247.86 - 219.90)}{(7 - 5)} = \frac{27.96}{2} = 13.98$
$y - 219.90 = 13.98(x - 5)$
$y - 219.90 = 13.98x - 69.90$
$y = 13.98x + 150$

9.
The y-intercept is 150. This means for 0 sheets of drywall, \$150 was already spent. It is greater than zero because Tarek likely needed supplies to complete his project in addition to the drywall.

10.
Since the ordered pair is (drywall, cost), this means that 11 sheets of drywall cost \$303.78, including the \$150 y-intercept.

11.
$13.98(3) = \$41.94$

12.
(songs, dollars) Amount spent depends on the number of songs purchased.
point: (3, 21) After purchasing 3 songs, he spent $21.
point: (6, 30) After purchasing 6 songs, he sprent $30.
$m = \frac{30 - 21}{6 - 3} = 3$
$d - 21 = 3(n - 3)$
$d - 21 = 3n - 9$
$d = 3n + 12$

13.
$45 = 3n + 12$
$33 = 3n$
$11 = n$
Garrison could purchase 11 songs and the music card for $45.

14.
The slope of 3 means that each song purchased costs an additional $3 (or $3 per song).

15.
The y-intercept of (0, 12) means that the music card initially costs $12 before any songs are purchased.

16.
(time, gallons) Gallons PER minute indicates gallons depend on the amount of time.
$m = -125$
$b = 10{,}000$
$y = -125x + 10{,}000$

17.
The slope of –125 represents the gallons of water removed each minute.
The y-intercept of 10,000 represents the number of gallons in the pool before any water was removed.

18.
$(x, 0)$
$0 = -125t + 10{,}000$
$125t = 10{,}000$
$t = 80$ minutes
It would take 80 minutes to empty the pool. When (80, 0), this means at 80 minutes, 0 gallons of water remain.

19.
(shirts sold, money earned)
(0, –225)
(10, –100)
$m = \frac{(-225 - (-100))}{(0 - 10)} = 12.50$
$y = 12.50x - 225$

20.
Since (shirts sold, money earned), when 10 shirts are sold at T-Shirts R Cool, the company still owes $100 to the bank.

21.
$(x, 0)$
$0 = 12.50x - 225$
$225 = 12.50x$
$x = 18$
(18, 0) This means when 18 shirts are sold, $0 have been earned.

22.
The points are marked to show each t-shirt sold. You cannot sell a fraction of a t-shirt, so it makes sense to mark the points to show individual sales.

Practice 2

1.
(hours, feet)
(0, 300) At hour 0 (start of the job), 300 feet remain.
(40, 0) At hour 40, 0 feet remain.

2.
$m = \frac{(0 - 300)}{(40 - 0)} = -7.5$ (−7.5 feet per hour)
$y = -7.5x + 300$ (the y-intercept was in the given information)

3.
(students, cost)
$m = \frac{(700 - 550)}{(30 - 15)} = 10$
$y - 550 = 10(x - 15)$
$y - 550 = 10x - 150$
$y = 10x + 400$

4.
The bus cost $400. The problem states that the school will pay the transportation fee, which is the cost no matter the number of students who attend the trip.

5.
$m = -55$ (withdraws will deduct money from the account)
(week, money) (6, 3,170)
$y - 3{,}170 = -55(x - 6)$
$y - 3{,}170 = -55x + 330$
$y = -55x + 3{,}500$

6.
$(x, 0)$
$0 = -55x + 3{,}500$
$55x = 3{,}500$
$x = 63.636$
During the 64th week, Devon will run out of money, but he cannot withdraw the full amount in week 64.

7.
(minutes, gallons)
(20, 2,200)
$m = 150$
$y - 2{,}200 = 150(x - 20)$
$y - 2{,}200 = 150x - 3{,}000$
$y = 150x - 800$

8.
$(86, y)$
$y = 150(86) - 800$
$y = 12{,}100$
The pool had 12,100 gallons of water when it was filled.

9.
$b = 0$
$m = \frac{6}{1} = 6$
$y = 6x$

10.
The rate of change is 6 miles per hour. This means the bike rider traveled 6 miles in their first hour of riding.

11.
(2, 6) and (4, 7)
$m = \frac{(7 - 6)}{(4 - 2)} = \frac{1}{2}$

12.
(4, 7) and (7, 12)
$m = \frac{(12 - 7)}{(7 - 4)} = \frac{5}{3}$

13.
Miles traveled: Part A = 6 miles, Part B = 0 miles, Part C = 1 mile, Part D = 5 miles, Part E = 0 miles.
Part A was the farthest distance traveled. This can be found by looking at the y-coordinate of the ordered pairs and finding the difference for each part.

14.
Parts B and E are horizontal line segments.
The ordered pair is (hours, distance). In both B and E, the time continues, but the distance does not change. This means that the bike rider is not moving from hour one to two or past hour seven. It is possible in part B, the rider stopped for a break, and in part E, the rider reached their destination.

15.
The intercept (0, 0) means that at hour 0, the rider had traveled 0 miles.

16.
(rooms, dollars) The amount to reserve depends on the number of rooms needed.
point: (6, 780)
point: (12, 1,500)
$m = \frac{1500 - 780}{12 - 6} = 120$
$y - 780 = 120(x - 6)$
$y - 780 = 120x - 720$
$y = 120x + 60$
$d(r) = 120r + 60$

17.
$d(15) = 120(15) + 60 = \$1{,}860$

18.
The slope of 120 means that it costs \$120 for each additional room reserved.

19.
The y-intercept of \$60 means that the parking space costs \$60 to purchase.

20.
(time, propane) The amount of propane that has leaked out of the tank depends on the amount of time.
$m = -2\frac{1}{2} = -\frac{5}{2}$
$b = 500$
$y = -\frac{5}{2}x + 500$

21.
The slope of $-\frac{5}{2}$ represents that five gallons of propane leaked out of the tank every two minutes.
The y-intercept of 500 represents the number of gallons in the tank before any propane leaked out.

22.

$0 = -\frac{5}{2}t + 500$

$\frac{5}{2}t = 500$

$t = 200$

It would take 200 minutes ($3\frac{1}{3}$ hours) for 500 gallons of propane to leak from the tank.

23.

(month, bill)

(1, 75) January is the 1st month of the year.

(2, 75)

$m = \frac{(75 - 75)}{(2 - 1)} = \frac{0}{1}$

$y - 75 = 0(x - 1)$

$y - 75 = 0$

$y = 75$

24.

Christina has unlimited data because the bill was the same for both months regardless of how much data she used.

25.

The value 2.9 GB was not needed to calculate the equation.

Targeted Review

Problem	1	2	3	4	5	6	7	8	9	10	11	12
Lesson Origin	8	7	9	8	9	7	7	3	4	PA	9	9

1.

x-intercept: $(\frac{3}{2}, 0)$

y-intercept: $(0, -\frac{1}{2})$

2.

Domain: $\{-3, 0, \frac{3}{2}, 3\}$

Range: $\{-\frac{3}{2}, -\frac{1}{2}, 0, \frac{1}{2}\}$

3. The slope between any two points on the table is $m = \frac{1}{3}$.

4.

x-intercept: $(-3, 0)$

y-intercept: $(0, 2)$

5.

$y - 15 = -\frac{5}{2}(x - (-1))$

$y - 15 = -\frac{5}{2}(x + 1)$

6.

(Let d = days; c = cards)
The number of cards depends on the number of days, so c is dependent and d is independent.
$c(d) = 2d$

7.

No, the ordered pair is not on the graph.

8.

Yes, the ordered pair is on the graph.

9.

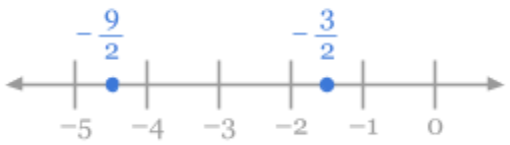
$|-2x - 6| = 3$

$-2x - 6 = 3$ OR $-(-2x - 6) = 3$

$-2x = 9$ OR $-2x - 6 = -3$

$x = -\frac{9}{2}$ OR $-2x = 3$

OR $x = -\frac{3}{2}$



10.

$|x - 2| > 0$

$x - 2 > 0$ OR $-(x - 2) > 0$

OR $x - 2 < 0$

$x > 2$ OR $x < 2$

11.

Sample: On a number line you only graph on the x-axis, or horizontally. The problems in Unit 2 are on the coordinate plane, so the graph can move left and right (x-values) as well as up and down (y-values).

12. B

A. -2

B. $-\frac{1}{2}$

C. $\frac{1}{2}$

D. 37

Distractor Rationale:

A. This occurs if your student divides $\frac{4}{-2}$ rather than $\frac{-2}{4}$.

C. This ignores the negative sign when solving for r.

D. This answer would occur if the problem was $\frac{x}{y}$ rather than $\frac{y}{x}$.

$$\frac{(12-2)}{(r-(-3))} = 4$$
$$\frac{10}{(r+3)} = 4$$
$$4(r+3) = 10$$
$$4r + 12 = 10$$
$$4r = -2$$
$$r = -\frac{1}{2}$$

13. C

A. $y = \frac{1}{3}x + 6$

B. $y - \frac{1}{3} = 6(x - 0)$

C. $y = 6x + \frac{1}{3}$

D. $y - 6 = \frac{1}{3}(x - 0)$

Distractor Rationale:
A and D have the slope and the y-intercept switched.
B and D are written in point-slope form.
$y = mx + b$
$y = 6x + \frac{1}{3}$