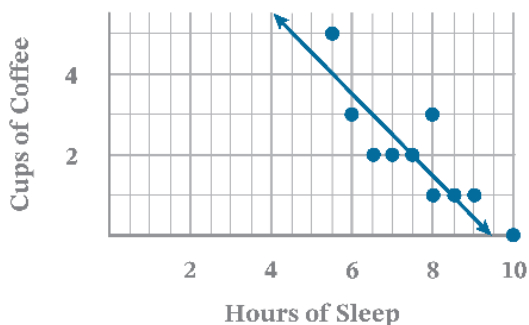


Problem	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Lesson Origin	07, 10, 13, 14	05, 17, 18	09	03	04	09	06	17	07	01	01	07, 10	12, 15	17	05	15	05b

Problem	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Lesson Origin	04	10	17, 18	11	09, 11	03	14	18	14	06	05	07	11	06a	15	07, 08, 14	03	01

1.
A.



- B.
The graph shows a negative correlation. The more cups of coffee you drink, the fewer hours of sleep you get. This is a discrete data set because the graph represents whole cups of coffee and half hour increments of sleep.
(Note: This data set shows only whole-number of cups of coffee and time in half-hour intervals. This is why the function is discrete. Your student may have answered continuous if they consider drinking a sip, or part of a cup of coffee.)

- C.
(Note: The solution is a sample based on the points (7.5, 2) and (8.5, 1). The slope should be approximately -1 for your student’s response.)

Using technology: $y = -0.862x + 8.551$

(7.5, 2) and (8.5, 1)

$$m = \frac{(1 - 2)}{(8.5 - 7.5)} = -1$$

$$y - 1 = -1(x - 8.5)$$

$$y = -1x + 8.5 + 1$$

$$y = -1x + 9.5$$

D.

$$y = -1x + 9.5$$

(hours, cups)

(x, 4)

$$4 = -1x + 9.5$$

$$-5.5 = -1x$$

$$x = 5.5$$

If you drink 4 cups of coffee, you will sleep 5.5 hours. This is interpolation because you can use your line to find the information *between* the given data points.

(Note: the student work is optional because they can interpolate using their line of best fit.

With technology equation: $4 = 0.862x + 8.551$; $x = 5.103$)

E.

(hours slept, cups of coffee) $m = -1$, $b = 9.5$

With a slope of -1 , for each cup of coffee you drink after 12 pm, you will lose 1 hour of sleep.

The y -intercept of $(0, 9.5)$ means that when you sleep 0 hours, you have consumed 9.5 cups of coffee after 12 pm.

2.

A.

L : length, w : width

$$44 = 2L + 2w$$

$$L = w + 2$$

B.

$$L = w + 2$$

$$44 = 2L + 2w$$

$$44 = 2(w + 2) + 2w$$

$$44 = 2w + 4 + 2w$$

$$40 = 4w$$

$$w = 10$$

$$L = (10) + 2 = 12$$

The dimensions of Garrett's yard are 10 yards by 12 yards.

C.

$$1 \text{ yd} = 3 \text{ ft}$$

$$(10 \text{ yd})\left(\frac{3 \text{ ft}}{1 \text{ yd}}\right) = 30 \text{ feet}$$

$$(12 \text{ yd})\left(\frac{3 \text{ ft}}{1 \text{ yd}}\right) = 36 \text{ feet}$$

The garden's dimensions are 30 feet by 36 feet.

D.

If the perimeter needs to be less than 44 yd, the equal symbol will be replaced by an inequality.

$$2L + 2w < 44, \text{ or } 44 > 2L + 2w$$

3. B

Slope: 16, point: (3, 4,700)

Using point-slope form: $y - 4,700 = 16(x - 3)$

Distractor Rationale:

A. This equation is written in slope-intercept form when the directions say point-slope form.

C. This uses the point (4,700, 3) instead of (3, 4,700).

D. This equation is not in point-slope form.

4. C

$$3|x - 8| = 15$$

$$|x - 8| = 5$$

$$x - 8 = 5 \quad \text{or} \quad -(x - 8) = 5$$

$$x - 8 = -5$$

$$x = 13 \quad \text{or} \quad x = 3$$

Distractor Rationale:

A. This is not the complete answer for the absolute value equation.

B. This is the answer if the 3 outside the absolute value bars is ignored.

D. This is the answer if case 2 is solved without the negative sign.

5. C

$$-3x < x - 16 \quad \text{or} \quad 2x + 1 \leq -3$$

$$-4x < -16 \quad \text{or} \quad 2x \leq -4$$

$$x > 4 \quad \text{or} \quad x \leq -2$$

Distractor Rationale:

A and B both represent an AND compound inequality.

D. This does not have the open and closed points correctly marked.

6. A

$$\frac{(11 - 7)}{(r - (-9))} = \frac{2}{3}$$

$$\frac{4}{(r + 9)} = \frac{2}{3}$$

$$2(r + 9) = 12$$

$$r + 9 = 6$$

$$r = -3$$

Distractor Rationale:

B. This is the answer if the last step, dividing both sides by two, is skipped.

C. This is the answer when the ordered pair are subtracted $(-9 - 7)$ and $(r - 11)$ rather than using the slope formula.D. This is the answer when $(r - 9)$ is in the denominator rather than $(r + 9)$.

7. D

$Q1 = 70$. There are $\frac{3}{4}$ of the students scored above $Q1$.

$$\frac{3}{4} \text{ of } 24 \text{ students} = 18 \text{ students}$$

Distractor Rationale:

A and B represent percentages, not the *number* of students.

C represents the number of students below 70%.

8. B

There is no work for the problem.

Distractor Rationale:

A. This system does not have the total stamps with $r + p$.

C. This system mixes up the cost of letter stamps and postcard stamps.

D. This system adds prices to the bottom equation.

9. A

The domain element of 5 has several outputs. A is not a function.

Distractor Rationale:

B, C, and D all represent functions because the domain is a set of unique values.

10. C

A. $8 + \sqrt{16} = 8 + 4 = 12$ Rational

B. $\frac{7}{8} - \frac{2}{3} = \frac{5}{24}$ Rational

D. $\sqrt{\frac{25}{2}} + \sqrt{1} = \frac{5}{2} + 1 = \frac{7}{2}$ Rational

Distractor Rationale:

A, B, and D are all rational answers when simplified. A square root can simplify to a rational number.

11. B

There is no work for this problem.

Distractor Rationale:

A and C are not properties (or listed on the formula sheet)

D. This additive inverse is only true for addition.

12. D

Function notation is slope intercept form:

$$m = \frac{(2 - (-5))}{(3 - (-2))} = \frac{7}{5}$$

Using the point $(-2, -5)$

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

$$y + 5 = \frac{7}{5}x + \frac{14}{5}$$

$$y = \frac{7}{5}x + \frac{14}{5} - \frac{25}{5}$$

$$y = \frac{7}{5}x - \frac{11}{5}$$

Distractor Rationale:

- A. This has a negative slope, which also results in the incorrect y -intercept.
- B. This is the reciprocal of the slope and incorrect y -intercept.
- C. This slope is correct, but there was an error when solving for the y -intercept.

13. D

There is no work for this problem.

Distractor Rationale:

- A. Lines with the same slope and different y -intercepts cannot intersect.
- B. This represents equations with equal slope and equal y -intercepts.
- C. Perpendicular lines have opposite, reciprocal slopes.

14. C

Let $j =$ Jesse, $a =$ Ariel.

$$j = 6a - 1$$

$$j - a = 14$$

Use Substitution

$$(6a - 1) - a = 14$$

$$5a - 1 = 14$$

$$5a = 15$$

$$a = 3$$

$$j = 6(3) - 1$$

$$j = 18 - 1$$

$$j = 17$$

Distractor Rationale:

- A. This does not make the first sentence true $6(14) - 1 \neq 6$
- B. This does not make either statement true for the given problem.
- D. This does not make the first statement true because the ages are reversed.

15. A

$$1.5 \text{ gallons} \left(\frac{4 \text{ quarts}}{1 \text{ gallon}} \right) = 6 \text{ quarts}$$

This is 3 times the amount of quarts given.

$$6.5 \text{ Tbsp} (3) = 19.5 \text{ Tbsp}$$

Distractor Rationale:

B. This adds all of the given numbers instead of converting 1.5 gallons to quarts.

C. This multiplies 6.5 and 1.5 without converting gallons to quarts.

D. This is the amount needed for one gallon.

16. B

$$x - y < -3 \text{ dotted line,}$$

$$-y < -x - 3$$

$$y > x + 3 \text{ shade above } (0, 3)$$

$$5x - y \geq 2 \text{ solid line,}$$

$$-y \geq -5x + 2$$

$$y \leq 5x - 2 \text{ shade below } (0, -2)$$

Shading will intersect in Quadrant II

Distractor Rationale:

A. This is a system of equations not inequalities

C. This represents the system where both inequalities are less than (or equal to) the y -intercepts

D. This has the correct lines but does not include shading.

17. D

$$\frac{n+3}{8} = \frac{2n}{5}$$

$$5(n+3) = 16n$$

$$5n + 15 = 16n$$

$$15 = 11n$$

$$\frac{15}{11} = n$$

Distractor Rationale:

A. This is the answer when $5(n+3)$ is not distributed correctly.

B. This is the reciprocal of the correct answer.

C. This is the answer when the variables are added instead of subtracted from one another.

18. C

$$\frac{1}{2}|3a + 7| - 8 > -1$$

$$\frac{1}{2}|3a + 7| > 7$$

$$|3a + 7| > 14$$

$$3a + 7 > 14 \quad \text{or} \quad -(3a + 7) > 14$$

$$3a > 7 \quad \quad \quad 3a + 7 < -14$$

$$3a < -21$$

$$a > \frac{7}{3} \quad \text{or} \quad a < -7$$

Distractor Rationale:

A. This uses the word AND for an OR problem and changes the inequality symbol for case 2 but not the sign of the number before solving.

B. This changes the inequality symbol for case 2 but not the sign of the number before solving

D. This uses the word AND for an OR problem.

19. C

–3 represents the amount of money Kaia spent each day.

To find the number of days, $y = 0$

$$0 = -3x + 100$$

$$3x = 100$$

$$x = 33\frac{1}{3}$$

33 total days. She does not have enough money for day 34.

Distractor Rationale:

A. This does not explain what –3 means in the equation.

B and D both have the incorrect number of days Kaia can buy lunch due to rounding error.

20. A

Let u = unit digit

Let t = tens digit

$$t + u = 1$$

$$t - u = 1$$

Elimination

$$2t = 2 \quad \quad \quad 1 + u = 1$$

$$t = 1 \quad \quad \quad u = 0$$

Jing is 10 years old.

Distractor Rationale:

B. The sum of $1 + 1 = 2$, not 1.

C. This is not a two digit age.

D. This is not a two digit age and does not have a sum or difference of 1.

21. C

There is no work for this problem.

Distractor Rationale:

A. and B. These equations do not represent BOTH a vertical and horizontal line.

D. This uses the point (y, x) .

22. D

$$m = -\frac{1}{2}, b = 2$$

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

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

$$x + 2y = 4$$

Distractor Rationale:

A and B are not equations written in standard form, but do match the graph.

C. This equation has a y intercept of 4, rather than the graphed x-intercept at 4.

23. B

There is no work for this problem.

Distractor Rationale: LO3

A and D confuse the distance with the midpoint.

C and D equations use addition, when the formula is subtraction for the midpoint and distance of an absolute value equation.

24. A

$$a_1 = 5, d = -2, n = 55$$

$$a_{55} = 5 - 2(n - 1)$$

$$a_{55} = 5 - 2(55 - 1)$$

$$a_{55} = 5 - 2(54)$$

$$a_{55} = 5 - 108$$

$$a_{55} = -103$$

Distractor Rationale:

B. This does not represent the correct a_1 value.

C. This does not represent the common difference, -2 .

D. This uses $(n + 1)$ instead of $(n - 1)$.

25. B

There is no work for this problem.

Distractor Rationale:

A. No more than is “less than or equal to” not a less than symbol.

C. Both inequalities should have the equal to bar underneath the inequality symbols.

D. The totals for the inequalities are reversed.

26. A

There is no work for this problem.

Distractor Rationale:

B. This does not use the correct square brackets in the domain and range.

C and D both name the function as discrete, when every point that makes the graph cannot be determined.

27. C

There is no work for this problem.

Distractor Rationale:

A. This begins with the correct value, but moves two vertical lines rather than two deviations.

B. This represents one standard deviation, 68% plus 13.5%

D. This represents one standard deviation, 68%.

28. A

$$\left(\frac{25 \text{ beats}}{1 \text{ minute}}\right)\left(\frac{60 \text{ minutes}}{1 \text{ hour}}\right)\left(\frac{24 \text{ hours}}{1 \text{ day}}\right)\left(\frac{365 \text{ days}}{1 \text{ year}}\right)(50 \text{ years}) = 657,000,000 \text{ beats}$$

Distractor Rationale:

B. This is the correct number for beats for one year.

C. This is the correct number for beats per day.

D. This adds numbers rather than multiplying them together.

29. B

$$g(5) = \frac{1}{5}(5) - 13 = 1 - 13 = -12$$

Distractor Rationale:

A. This adds $\frac{1}{5}(10) + 13$, when the equation is subtraction.

C. This ignores the negative sign in -5 . When evaluated correctly, $g(-5) = -14$

D. This ignores the negative sign in -10 . When evaluated correctly, $g(-10) = -15$

30. D

$$4x + 11y = 23$$

$$m = -\left(\frac{A}{B}\right) = -\left(\frac{4}{11}\right) = -\frac{4}{11}$$

Distractor Rationale:

A. This is $A = 4$. The slope is $-\left(\frac{A}{B}\right)$ from standard form.

B. This is $B = 11$. The slope is $-\left(\frac{A}{B}\right)$ from standard form.

C. This forgets that $m = -\left(\frac{A}{B}\right)$.

31. C

There is no work for this problem.

Distractor Rationale:

A and B label the graph as skewed but the graph is close to a bell shaped curve making it symmetric.

D. This is not uniform because it does not have the same frequency across the distribution.

32. A

$$y = 2x - 5; m = 2, b = (0, -5)$$

$$2x - y = 3$$

$$-y = -2x + 3$$

$$y = 2x - 3; m = 2, b = (0, -3)$$

No solution, the graphs have the same slope and different y -intercepts

Distractor Rationale:

B. This graphs the bottom line with a slope of $m = -2$ when the slope is $m = 2$. This also graphs $b = 3$, when $b = -3$.

C. This graphs the y -intercept correctly but uses $m = -2$ for the slope.

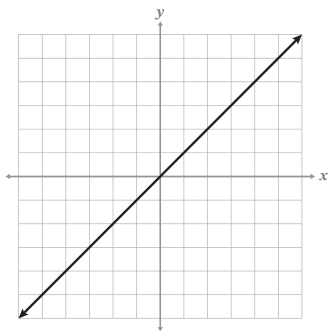
D. This shows coincident lines but is not possible when the y -intercepts are not equal.

33.

The linear parent function is $f(x) = x$

domain: $(-\infty, \infty)$, range: $(-\infty, \infty)$

$f(x) = 3x$



$\{(-2, -2), (-1, -1), (0, 0), \dots\}$

$y = x - 1$

Distractor Rationale:

The second and fourth equation do not represent the parent function $f(x) = x$. The second has a coefficient and the fourth has a constant in the equation.

34.

There is no work for this problem.

- one solution
- two solutions
- no solutions
- infinite solutions

Distractor Rationale:

All answers are correct depending on the equation given.

35.

- $Q + I$
- $I + I$
- $Q * Q$
- $I * I$

There is no work for this problem.

Distractor Rationale:

When adding an irrational number to another value, the result is always irrational.

The fourth choice is sometime true (i.e., $\sqrt{2} \cdot \sqrt{2} = \sqrt{4} = 2$).