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

Problem	13	14	15	16	17	18	19	20	21	22	23	24	25
Lesson Origin	1	4, 5	3	4	6	2	5	4	5	6	2, 3, 5	6	3, 4

1.

A.

$|2n + 3| \geq 6$

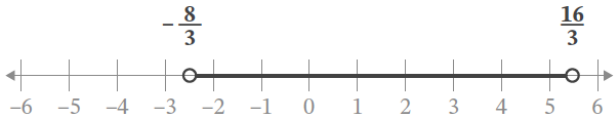
B.

Case 1	Case 2	
$2n + 3 \geq 6$	$-(2n + 3) \geq 6$	Definition of absolute value inequalities
	$2n + 3 \leq -6$	Multiplication Property of Equality, inverse
$2n \geq 3$	$2n \leq -9$	Addition Property of Equality, inverse
$n \geq \frac{3}{2}$	$n \leq \frac{-9}{2}$	Multiplication Property of Equality, inverse

$n \geq \frac{3}{2}$ OR $n \leq \frac{-9}{2}$

If your student has part A incorrect but solves the inequality they wrote in part B, they should receive full credit for part B.

C.



D.

The solutions are the numbers {0, 1, 2, 3, 4, 5}.

Sample: Since you cannot drive a fraction of a car or a negative number of cars, only whole numbers can be used for the solution.

2. B

$9k - 2 = 3k - 8$

$6k - 2 = -8$

$6k = -6$

$k = -1$

Distractor rationale:

A. Incorrectly combined constants.

C. Incorrectly combined variables (added rather than subtracted).

D. Ignored the signs of the terms.

3. C
The sum of a rational number and an irrational number is *always* ***irrational***.
Distractor rationale:
A. This is a true statement.
B. This is a true statement.
D. This is a true statement.

4. D
$-4x + 6(x - 1) = -7x + 9(x + 1) - 15$
$-4x + 6x - 6 = -7x + 9x + 9 - 15$
$2x - 6 = 2x - 6$
$-6 = -6$
All real numbers
Distractor rationale:
A. Incorrectly distributing and incorrectly combining constants.
B. Incorrectly distributing and changing subtraction to addition.
C. Correctly combining variables but incorrectly combining constants.

5. B
The additive inverse of $2x$ is $-2x$.
$2x - 3 = 6x + 5$ (adding $-2x$ to both expressions)
$-3 = 4x + 5$ (adding -5 to both expressions)
$-8 = 4x$ (multiplying both expressions by $\frac{1}{4}$)
$-2 = x$
Distractor rationale:
A. This would correctly move all constants to the left side of the equation.
C. This would correctly move all variables to the right side of the equation.
D. This would correctly isolate the variable after combining like terms.

6. A
$\left(\frac{512\ mi}{1\ hr}\right)\left(\frac{5{,}280\ ft}{1\ mi}\right)\left(\frac{1\ hr}{60\ min}\right)\left(\frac{1\ min}{60\ sec}\right)$

Distractor rationale:
B. This is the reciprocal of the correct numerator and denominator.
C. This incorrectly places the conversion for miles in the denominator.
D. This incorrectly places all unit multipliers.

7. C
definition of absolute value
Distractor rationale:
A. This would be true if the constant was a negative.
B. This would be the answer if the equation were equal to zero or your student forgets absolute value has two cases.
D. This is not possible given the equation because the variable does not simplify out.

8. C

$2x + 4y = C$

$4y = C - 2x$

$y = \frac{C}{4} - \frac{1}{2}x$

Distractor rationale:

A. This does not divide all terms by 4.

B. This does not subtract $2x$ from both sides or divide all terms by 4.

D. This does not subtract $2x$ from both sides before dividing by 4.

9. D

$|x - 4| < 6$

$x - 4 < 6$ AND $-(x - 4) < 6$

$x - 4 > -6$

$x < 10$ AND $x > -2$

$-2 < x < 10$

Distractor rationale:

A. This represents an OR inequality with open points.

B. This represents an OR inequality with closed points.

C. This correctly represents an AND graph but has closed points.

10. A

$(x) + (x + 2) + (x + 4) = -57$

$3x + 6 = -57$

$3x = -63$

$x = -21$

$-21, -19, -17$ OR $-17, -19, -21$

Distractor rationale:

B. This equation and solution do not represent odd numbers.

C. This equation does not represent the statement and the solution is not all odd numbers.

D. This equation does not represent consecutive numbers.

11. D

{19, 19, 20, 21, 23, 25, 27}

Q2: 21

Q1: 19

Q3: 25

IQR = Q3 – Q1 = 25 – 19 = 6

Distractor rationale:

A. This is the mean.

B. This is the median.

C. This is the range.

12. C

$-\frac{1}{2}p - 3 > 5$

$-\frac{1}{2}p > 8$

$p < -16$

Distractor rationale:
A. This does not change the direction of the inequality symbol when the problem multiplies by a negative number.
B. This has closed points instead of open points.
D. This has closed points instead of open points.

13. B

definition of rational and irrational numbers numbers
Distractor rationale:
A. A rational number divided by an irrational number is ALWAYS irrational.
C. Both rational and irrational numbers are real so the value will be a real number.
D. This may be chosen if your student does not know the math vocabulary in this question.

14. C

1 gallon = 128 oz
Within 1: less than or equal to 1
Distractor rationale:
A. This inequality does not convert 1 gallon into 128 oz.
B. This inequality will have a range of –127 to 129. It is not possible to sell a negative amount of juice.
D. The inequality symbol represents an OR inequality.

15. B

$|b - 7|$ must be greater than or equal to 0 by the definition of absolute value

$2p - 4 \geq 0$

$2p \geq 4$

$p \geq 2$

Distractor rationale:
A. $p = 2, 5$. Therefore, $p \geq 2$ is a true statement.
C. This is one of the two possible solutions.
D. This is one of the two possible solutions.

16. B

No more than 15.50: ≤ 15.50, slope is 1.50 (1.50 per song)
Distractor rationale:
A. This uses the wrong inequality symbol and represents a cost of $3.50 per song.
C. This uses the wrong inequality symbol and represents a cost of $3.50 per song.
D. This uses the wrong inequality symbol and represents a cost of $4.50 per song.

17. A
{19, 19, 20, 21, 23, 25, 27}
Q2: 21
Q1: 19
Q3: 25
Whisker at 27
Distractor rationale:
B. This has an incorrect median.
C. This has an incorrect median.
D. This has an incorrect median.

18. D
$\frac{2}{3} - \frac{1}{6}x = \frac{3}{4}(x + 2)$ LCD: 12
$12(\frac{2}{3} - \frac{1}{6}x) = 12(\frac{3}{4}(x + 2))$
$8 - 2x = 9(x + 2)$
Distractor rationale:
A. Removed denominator without multiplying terms by the LCD: 12.
B. Multiplied numerator only by LCD but did not simplify.
C. Incorrectly multiples terms inside the parentheses by the LCD.

19. A
$\frac{wind}{string}$
$\frac{2}{5} = \frac{(n-3)}{n}$
Distractor rationale:
B. Incorrectly matches $n - 3$ with string players.
C. This is not a proportion.
D. Incorrectly matches $n - 3$ with string players.

20. B
$7x - 4 \leq 10$ OR $-\frac{x}{3} < -2$
$7x \leq 14$ OR $x > 6$
$x \leq 2$ OR $x > -6$
Distractor rationale:
A. This has a closed point at 6 when the point should be open.
C. This represents an AND solution rather than OR.
D. This represents an AND solution and has a closed point at 6.

21. C
48 teaspoons = 1 cup
Distractor rationale:
A. Sixteen is the number of Tablespoons. 48 tsp = 16 Tbsp
B. There are 4 Tbsp in $\frac{1}{4}$ cup.
D. This would happen if an extra unit multiplier was included.

22. D
See lesson 6 for more on standard deviation and the bell curve.
Distractor rationale:
A. This uses 15 as the mean and 25 as the standard deviation.
B. This uses 10 as the standard deviation rather than 15.
C. This uses 15 as the mean 65 as the standard deviation.

23.
☐ $-|2x| = 12$
☑ $\frac{x-3}{x} = \frac{1}{2}$
☑ $\frac{2}{3}(12 - x) = x - 2$
☑ $|x - 6| = 0$

$-\|2x\| = 12$	$\frac{x-3}{x} = \frac{1}{2}$	$\frac{2}{3}(12 - x) = x - 2$	$\|x - 6\| = 0$
$-\|2x\| = 12$ $\|2x\| = -12$ (no solution)	$\frac{(x-3)}{x} = \frac{1}{2}$ $2(x - 3) = x$ $2x - 6 = x$ $-6 = -x$ $6 = x$	$\frac{2}{3}(12 - x) = x - 2$ $8 - \frac{2}{3}x = x - 2$ $3(8 - \frac{2}{3}x) = 3(x - 2)$ $24 - 2x = 3x - 6$ $30 = 5x$ $6 = x$	$\|x - 6\| = 0$ $x - 6 = 0$ OR $-(x - 6) = 0$ $x = 6$

Distractor rationale:
The equation $-|2x| = 12$ has no solution. All other equations have a solution of $x = 6$. Your student could use substitution to determine the correct answer to the question.

24.
☐ 12
☐ 15
☐ 54
☑ 60
Q2: 34
Q1: 27
Q3: 39
IQR: 12
Q1 – 1.5(12) = 27 – 18 = 9
Q3 + 1.5(12) = 39 + 18 = 57
Distractor rationale:
The formula for finding outliers is Q1 – 1.5(IQR) and Q3 + 1.5(IQR). Twelve and 15 are not below 9 (the lower boundary for outliers). Fifty-four is not above 57 (the upper boundary for outliers).

25.
☐ −5
☑ −1
☐ 0
☑ 5

$|2x - 4| = 6$
$2x - 4 = 6$ OR $-(2x - 4) = 6$
$2x - 4 = -6$
$2x = 10$ OR $2x = -2$
$x = 5$ OR $x = -1$
(The only possible numbers they may have in common are 5 and −1.)
Distractor rationale:
The value −5 is not a solution for either of the given problems.
The value 0 is a solution to the inequality but not the equation.