2.4 Start Thinking

Business A buys an item at a price of \$175 for 50 units. The business pays a shipping company \$0.49 per item to transport the items to its store. The retail price is \$4.99 per each unit.

If Business A needs to make at least a \$1500 profit to meet its goal, how could you set up an inequality to represent this situation?

2.4 Warm Up

Solve the equation.

1. $13v - 9v - 15 = 77$

2. $8c + 7 + 3c = -15$

3. $3(z - 6) = 30$

4. $8 - 4(2m - 2) = 24$

5. $-3(7g + 2) = 36$

6. $-5h - 3(10 + h) = -6$

2.4 Cumulative Review Warm Up

Solve the literal equation for *y*.

1. $2y + 2x = 14$

2. $y + 19x = -27$

3. $10x + y = 47$

4. $3x + 6 = 6 - 5y$

5. $1 - \frac{2}{5}y = 4x - 3$

6. $2y = 3x - 9x$

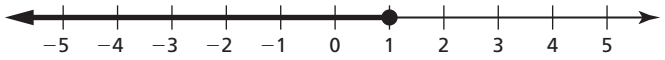
Name _____ Date _____

2.4 Practice A

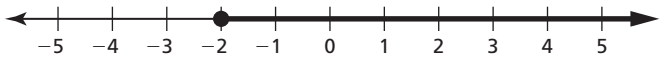
In Exercises 1–3, match the inequality with its graph.

1. $6y - 5 \geq 7$ **2.** $3m + 5 \leq 8$ **3.** $-4x + 3 \leq 11$

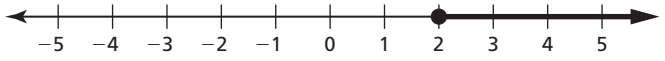
A.



B.



C.



In Exercises 4–9, solve the inequality. Graph the solution.

4. $3x - 4 < 2$ **5.** $4t + 11 \geq 7$ **6.** $-6 \geq 9 - 5y$

7. $5 < -2t - 3$ **8.** $\frac{k}{3} + 6 < 7$ **9.** $2 + \frac{p}{2} \geq 7$

In Exercises 10–17, solve the inequality.

10. $5 - 4n < 8 - 5n$ **11.** $5k - 7 \geq 5k + 8$

12. $-3n - 4 > 4n + 10$ **13.** $7 + 9y < 19 - 3y$

14. $9w - 4w + 6 \geq 1 + 5w$ **15.** $4k - 6 < 3k + k - 1$

16. $8(x - 3) > 4(2x - 6)$ **17.** $9(p + 2) \leq 3(3p - 5)$

18. The area of the rectangle shown is at most 140 square centimeters.

a. Write and solve an inequality to find the possible values of x.

b. Based on the answer in part (a), is it possible for the rectangle to have a length of 15 centimeters? Explain.

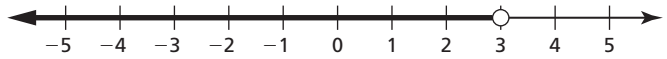
Name_____ Date _____

2.4 Practice B

In Exercises 1–3, match the inequality with its graph.

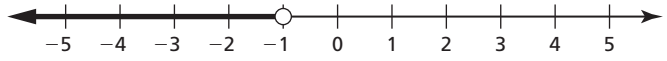
1. $5(4 - y) < 25$ **2.** $-9k + 5 > 14$ **3.** $2(x - 7) < -8$

A.



B.

C.



In Exercises 4–9, solve the inequality. Graph the solution.

4. $6 < -5t - 4$ **5.** $\frac{m}{4} + 2 < 3$ **6.** $5 + \frac{k}{-2} \geq 2$

7. $\frac{d}{-6} + 7 < 11$ **8.** $4 < -2(y + 3)$ **9.** $24 \geq 6(w - 2)$

In Exercises 10–15, solve the inequality.

10. $-5n - 4 > 7n + 20$ **11.** $4k - 6 < 3k + k - 1$

12. $10h - 3h + 6 \geq 11 + 7h$ **13.** $6(t - 1) \leq 2(3t - 5)$

14. $12(x - 2) > 3(4x - 8)$ **15.** $6\left(\frac{1}{3}d + 4\right) > 2(d + 12)$

16. You must maintain a minimum balance of \$50 in your checking account. You currently have a balance of \$280.

a. Write and solve an inequality that represents how many \$20 bills you can withdraw from the account without going below the minimum balance.

b. Your bank charges an ATM fee of \$2.50, which is charged each time you withdraw \$20. Write and solve an inequality that represents how many \$20 bills you can withdraw from the account without going below the minimum balance in this situation.

Name _____ Date _____

2.4 Enrichment and Extension

Methods of Describing Sets

Set-builder notation and *interval notation* are both mathematical shorthands that describe a set of numbers. They are frequently used in higher mathematics and are very useful. Set-builder notation is a quick way to state all the numbers and properties of a specific set, while interval notation is a representation of an interval as a set of numbers.

Example: Write the inequalities in interval notation and set-builder notation: $x < 0$ or $3 \leq x < 7$.

Set-builder notation	Interval notation
$\mathbb{R}$ stands for all real numbers. $\mathbb{Z}$ stands for integers. $\in$ stands for "is an element of." $\mid$ stands for "such that."	(Represents "not included" or "open." [Represents "included" or "closed." ∞ Is always expressed as "not included." $\cup$ Stand for "union" which replaces the word "or."
$x < 0$ or $3 \leq x < 7$ is written as $\{x \in \mathbb{R} \mid x < 0, 3 \leq x < 7\}$.	$x < 0$ or $3 \leq x < 7$ is written as $(-\infty, 0) \cup [3, 7)$.

Express the inequality or inequalities in both set-builder notation and interval notation. Then, if not graphed, graph each on a number line.

1. $-3 < x \leq 4$

2. $y \leq 1$ *or* $y > 13$

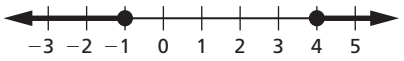
3. $x \leq -2$

4. $p > 5$

5. $-6 < x < 0$ *or* $0 < x \leq 5$

6. $y \leq 1$ *or* $3 \leq y < 4$

7.



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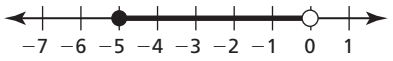

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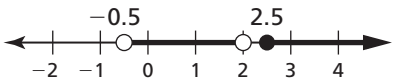
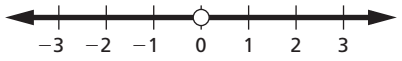


10.



Name_____ Date _____

2.4 Puzzle Time

Where Do Young Tigers Swim?

Write the letter of each answer in the box containing the exercise number.

Solve the inequality.

1. $4x - 7 < 9$

2. $-11 > 10 - 7x$

3. $\frac{x}{6} + 5 > 8$

4. $-\frac{x}{2} + 12 \geq 14$

5. $6x - 23 > 25$

6. $6 - \frac{x}{5} \geq -2$

7. $3 \geq -3(x - 13)$

8. $16 - 4x > 9 - 5x$

9. $2x + 7 \leq 2x + 8$

10. $-6(x - 1) < -14(x - 5)$

11. $12x + 4x - 11 \geq 16x + 17$

12. $3(1 - x) + 10x \leq 9(x - 2) + 7$

13. The students in charge of the class booth at a carnival would like to earn \$3 for every item they sell. They spent \$55 for the materials to make the items. Solve the inequality $3x - 55 \geq 65$, which represents how many items they need to sell to make a profit of at least \$65.

14. A triangle has a base of 14 centimeters and a height of $(3x - 4)$ centimeters. The area of the triangle is greater than 56 centimeters. Solve the inequality $\frac{1}{2}(14)(3x - 4) > 56$ to find the possible values of x.

Answers

N. all real numbers

K. $x \geq 7$

P. $x < 8$

E. $x > 3$

O. $x < 4$

I. $x > 8$

O. $x \geq 40$

Y. $x \leq -4$

T. $x > 4$

L. $x > -7$

T. no solution

H. $x \geq 12$

I. $x \leq 40$

T. $x > 18$

5	9		3	7	2		12	6	14	11	4		10	1	13	8