Study Guide Review

MODULE 6 Expressions and Equations

? ESSENTIAL QUESTION

How can you use equations to solve real-world problems?

EXAMPLE 1

Huang and Belita both repair computers. Huang makes $50 a day plus $25 per repair. Belita makes $20 a day plus $35 per repair. Write an expression for Huang and Belita's total daily earnings if they make the same number of repairs r.

Huang: $50 + $25r

Belita: $20 + $35r

Together: $(50 + 25r) + (20 + 35r) = 50 + 20 + 25r + 35r$

$$= 70 + 60r$$

Huang and Belita earn $70 + $60r together.

EXAMPLE 2

A skydiver's parachute opens at a height of 2,790 feet. He then falls at a rate of $-15\frac{1}{2}$ feet per second. How long will it take the skydiver to reach the ground?

Let x represent the number of seconds it takes to reach the ground.

$-15\frac{1}{2}x = -2{,}790$

$-\frac{31}{2}x = -2{,}790$ Write as a fraction.

$\left(-\frac{2}{31}\right)\left(-\frac{31}{2}x\right) = \left(-\frac{2}{31}\right)(-2{,}790)$ Multiply both sides by the reciprocal.

$x = 180$

It takes 180 seconds for the skydiver to reach the ground.

EXAMPLE 3

A clothing store sells clothing for 2 times the wholesale cost plus $10. The store sells a pair of pants for $48. How much did the store pay for the pants? Represent the solution on a number line.

Let w represent the wholesale cost of the pants, or the price paid by the store.

$2w + 10 = 48$

$2w = 38$ Subtract 10 from both sides.

$w = 19$ Divide both sides by 2.
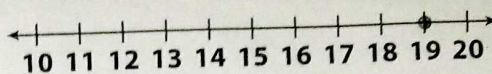
The store paid $19 for the pants.

(number line: 10 11 12 13 14 15 16 17 18 19 20, point at 19)

EXERCISES

Simplify each expression. (Lesson 6.1)

1. $(2x + 3\frac{2}{5}) + (5x - \frac{4}{5})$ _____

2. $(-0.5x - 4) - (1.5x + 2.3)$ _____

3. $9(3t + 4b)$ _____

4. $0.7(5a - 13p)$ _____

Factor each expression. (Lesson 6.1)

5. $8x + 56$ _____

6. $3x + 57$ _____

**Use inverse operations to solve each equation.** (Lesson 6.2)

7. $1.6 + y = -7.3$ _____

8. $-\frac{2}{3}n = 12$ _____

9. The cost of a ticket to an amusement park is $42 per person. For groups of up to 8 people, the cost per ticket decreases by $3 for each person in the group. Marcos's ticket cost $30. Write and solve an equation to find the number of people in Marcos's group. (Lesson 6.3, 6.4)

_____

Solve each equation. Graph the solution on a number line. (Lesson 6.4)

10. $8x - 28 = 44$

(number line: -12 -8 -4 0 4 8 12)

_____

11. $-5z + 4 = 34$

(number line: -12 -8 -4 0 4 8 12)

_____
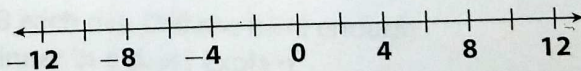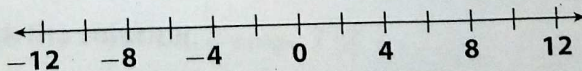
Inequalities

? ESSENTIAL QUESTION

How can you use inequalities to solve real-world problems?

EXAMPLE 1

Amy is having her birthday party at a roller skating rink. The rink charges a fee of $50 plus $8 per person. If Amy wants to spend at most $170 for the party at the rink, how many people can she invite to her party?

Let p represent the number of people skating at the party.

$50 + 8p \leq 170$

$8p \leq 120$	Subtract 50 from both sides.
$\dfrac{8p}{8} \leq \dfrac{120}{8}$	Divide both sides by 8.
$p \leq 15$	

Up to 15 people can skate, so Amy can invite up to 14 people to her party.

EXAMPLE 2

Determine which, if any, of these values makes the inequality $-7x + 42 \leq 28$ true: $x = -1, x = 2, x = 5$.

$-7(-1) + 42 \leq 28 \qquad -7(2) + 42 \leq 28 \qquad -7(5) + 42 \leq 28$

$x = 2$ and $x = 5$

Substitute each value for x in the inequality and evaluate the expression to see if a true inequality results.

EXERCISES

1. Prudie needs $90 or more to be able to take her family out to dinner. She has already saved $30 and wants to take her family out to eat in 4 days. (Lesson 7.2)
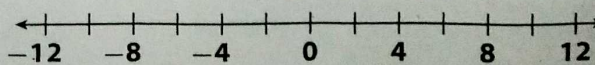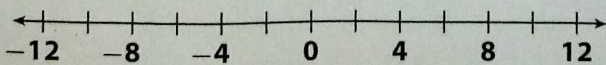
   a. Suppose that Prudie earns the same each day. Write an inequality to find how much she needs to earn each day.

   _____

   b. Suppose that Prudie earns $18 each day. Will she have enough money to take her family to dinner in 4 days? Explain.

   _____

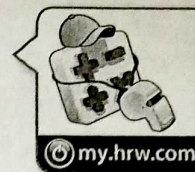**Solve each inequality. Graph and check the solution.** (Lesson 7.3)

2. $11 - 5y < -19$

3. $7x - 2 \leq 61$

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UNIT 3 MIXED REVIEW

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Selected Response

1. Which expression is equivalent to $(9x - 3\frac{1}{8}) - (7x + 1\frac{3}{8})$?

Ⓐ $2x - 4\frac{1}{2}$

Ⓒ $2x - 1\frac{3}{4}$

Ⓑ $16x - 4\frac{1}{2}$

Ⓓ $16x - 1\frac{3}{4}$

2. Timothy began the week with $35. He bought lunch at school, paying $2.25 for each meal. Let x be the number of meals he bought at school and y be the amount of money he had left at the end of the week. Which equation represents the relationship in the situation?

Ⓐ $y = 2.25x + 35$

Ⓑ $y = 35 - 2.25x$

Ⓒ $x = 35 - 2.25y$

Ⓓ $y = 2.25x - 35$

3. Which expression factors to $8(x + 2)$?

Ⓐ $8x + 2$

Ⓒ $16x$

Ⓑ $8x + 10$

Ⓓ $8x + 16$

4. Ramón's toll pass account has a value of $32. Each time he uses the toll road, $1.25 is deducted from the account. When the value drops below $10, he must add value to the toll pass. Which inequality represents how many times Ramón can use the toll road without having to add value to the toll pass?

Ⓐ $10 - 1.25t \geq 0$

Ⓑ $-1.25t + 32 < 10$

Ⓒ $32 - 1.25t \geq 10$

Ⓓ $32 - 10t \geq 1.25$

5. A taxi costs $1.65 for the first mile and $0.85 for each additional mile. Which equation could be solved to find the number x of additional miles traveled in a taxi given that the total cost of the trip is $20?

Ⓐ $1.65x + 0.85 = 20$

Ⓑ $0.85x + 1.65 = 20$

Ⓒ $1.65x - 0.85 = 20$

Ⓓ $0.85x - 1.65 = 20$

6. A sales tax of 6% is added to the price of an item. If Marisa buys an item, which expression indicates how much she will pay in all?

Ⓐ $n + 0.06$

Ⓒ $n + 0.06n$

Ⓑ $0.06n$

Ⓓ $0.06 + 0.06n$

7. Which equation has the solution $x = 12$?

Ⓐ $4x + 3 = 45$

Ⓑ $3x + 6 = 42$

Ⓒ $2x - 5 = 29$

Ⓓ $5x - 8 = 68$

8. The 23 members of the school jazz band are trying to raise at least $1,800 to cover the cost of traveling to a competition. The members have already raised $750. Which inequality could you solve to find the amount that each member should raise to meet the goal?

Ⓐ $23x + 750 > 1,800$

Ⓑ $23x + 750 \geq 1,800$

Ⓒ $23x + 750 < 1,800$

Ⓓ $23x + 750 \leq 1,800$