

Reteaching 2-1 Properties of Numbers

Properties of numbers help make mental computations easier.

Use mental math to simplify $\$1.84 + \$0.76 + \$0.16$.

Since $0.84 + 0.16 = 1$, it is easier to add $\$1.84$ and $\$0.16$ first.

$$\begin{aligned}
 &1.84 + 0.76 + 0.16 \\
 &= 1.84 + (0.16 + 0.76) && \text{Use the commutative property of addition.} \\
 &= (1.84 + 0.16) + 0.76 && \text{Use the associative property of addition.} \\
 &= 2.00 + 0.76 && \text{Add within parentheses.} \\
 &= \$2.76 && \text{Add.}
 \end{aligned}$$

Use mental math to simplify $5 \cdot 13 \cdot 20 \cdot 2$.

Since $5 \cdot 20 = 100$, it is easier to multiply 5 and 20 first.

$$\begin{aligned}
 &5 \cdot 13 \cdot 20 \cdot 2 \\
 &= 5 \cdot (20 \cdot 13) \cdot 2 && \text{Use the commutative property of multiplication.} \\
 &= (5 \cdot 20) \cdot (13 \cdot 2) && \text{Use the associative property of multiplication.} \\
 &= 100 \cdot 26 && \text{Multiply within parentheses.} \\
 &= 2,600 && \text{Multiply.}
 \end{aligned}$$

Use mental math to simplify each expression.

1. $198 + 15 + 302$

2. $16 + 27 + (-16)$

3. $4 \cdot 7 \cdot 25$

4. $2 \cdot 6 \cdot 5$

5. $18 + (-8) + 11$

6. $5 \cdot 9 \cdot 8$

7. $21 + 4 + (-1)$

8. $1,242 + 125 + 58$

9. $50 \cdot 13 \cdot 2$

10. $(-209) + 576 + (-91)$

11. $17 + 9 + 13 + 6$

12. $125 \cdot 353 \cdot 8$

Practice 2-1 Properties of Numbers

Simplify each expression using mental math.

1. $4 \cdot 13 \cdot 25$

2. $700 + 127 + 300$

3. $68 + 85 + 32$

4. $2 \cdot 3 \cdot 4 \cdot 5$

5. $-14 + 71 + 29 + (-86)$

6. $125 \cdot 9 \cdot 8$

7. $20 \cdot 7 \cdot 5$

8. $217 + 545 - 17$

9. $39 + 27 + 11$

10. $4 \cdot 12 \cdot 250$

11. $19 + 0 + (-9)$

12. $-6 \cdot 1 \cdot 30$

Write the letter of the property shown.

13. $14(mn) = (14m)n$ _____

14. $19 + 11 = 11 + 19$ _____

15. $k \cdot 1 = k$ _____

16. $(x + y) + z = x + (y + z)$ _____

17. $65t = t(65)$ _____

18. $p = 0 + p$ _____

19. $n = 1 \cdot n$ _____

20. $(x + p) + (r + t) = (r + t) + (x + p)$ _____

21. $(h + 0) + 4 = h + 4$ _____

22. $x + yz = x + zy$ _____

Evaluate each expression using mental math.

23. $x(yz)$, for $x = 8, y = -9, z = 5$ _____

24. $q + r + s$, for $q = 46, r = 19, s = 54$ _____

25. $a(b)(-c)$, for $a = 7, b = -2, c = 15$ _____

Reteaching 2-2 The Distributive Property

According to the Distributive Property, you distribute or “pass out” a multiplication to each part of a sum or difference in parentheses.

In $2(a + b) = 2a + 2b$, we “pass out” the 2 by multiplying it by both the a and the b .

Multiply $6(x - 9)$.

$$\begin{aligned}6(x - 9) &= 6x - 6(9) \\ &= 6x - 54\end{aligned}$$

Multiply $(4 - h)(-3)$.

$$\begin{aligned}(4 - h)(-3) &= 4(-3) - h(-3) \\ &= -12 - (-3h) \\ &= -12 + 3h \\ &= 3h - 12\end{aligned}$$

Complete with the appropriate number or variable.

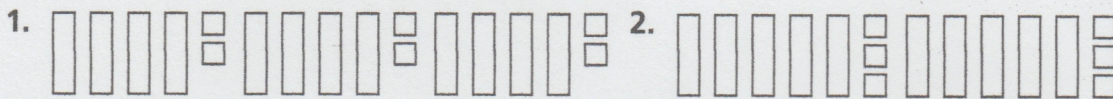
- $12(5 + 9) = 12 \cdot 5 + \underline{\hspace{2cm}} \cdot 9$
- $(3 - 8)7 = \underline{\hspace{2cm}} \cdot 7 - 8 \cdot \underline{\hspace{2cm}}$
- $z(a - b - c) = \underline{\hspace{2cm}} \cdot a - z \cdot \underline{\hspace{2cm}} - \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$
- $[14 + (-3)]7 = 14 \cdot \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \cdot 7$
- $p[(-3) + n] = p \cdot \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$

Multiply each expression.

- $4(x + 5) = \underline{\hspace{4cm}}$
- $(6 - m)(-4) = \underline{\hspace{4cm}}$
- $s(-6 + t) = \underline{\hspace{4cm}}$
- $8(j - 2k + l) = \underline{\hspace{4cm}}$
- $(z - 4)(-5) = \underline{\hspace{4cm}}$
- $9[(-7) - y] = \underline{\hspace{4cm}}$

Practice 2-2 The Distributive Property

Write an expression using parentheses for each model. Then multiply.



Multiply each expression.

3. $6(h - 4)$ _____

4. $(p + 3)5$ _____

5. $-3(x + 8)$ _____

6. $(4 - y)(-9)$ _____

7. $2(7n - 11)$ _____

8. $-10(-a + 5)$ _____

Use the distributive property to simplify.

9. $98 \cdot 7$ _____

10. $9 \cdot 28$ _____

11. $78 \cdot 8$ _____

12. $7(2,009)$ _____

13. $899 \cdot 5$ _____

14. $30 \cdot 105$ _____

15. $8 \cdot 5 \div 12 \cdot 5$ _____

16. $7 \cdot 10 + 7(-3)$ _____

17. $-4(3) + (-4)(6)$ _____

18. $6(8) + 6(-2)$ _____

Solve using mental math.

19. A shipping container holds 144 boxes. How many boxes can be shipped in 4 containers? _____

Reteaching 2-3 Simplifying Variable Expressions

Simplify $5n + (-n - 4)(-2)$.

$$5n + (-n - 4)(-2)$$

$$= 5n + (-n)(-2) - 4(-2)$$

$$= 5n + 2n + 8$$

$$= (5 + 2)n + 8$$

$$= 7n + 8$$

Use the Distributive Property.

Multiply. Think of $-4(-2)$ as $+(-4)(-2)$.

Use the Distributive Property to combine like terms.

Add.

Complete each equation.

1. $9a - 7a + 5$

$$= (9 - 7) \underline{\hspace{2cm}} + 5$$

$$= \underline{\hspace{2cm}} a + 5$$

2. $5k - 4 - 8k$

$$= 5k - 8 \underline{\hspace{2cm}} - 4$$

$$= (5 - 8) \underline{\hspace{2cm}} - 4$$

$$= \underline{\hspace{2cm}} - 4$$

Simplify each expression.

3. $12a + 4 - 10a$

4. $7 + x - 7x$

5. $2(n - 4) + 3$

6. $-3(a + 5) + 9$

7. $5(2y + 1) - 7y$

8. $2(4 - 3t) - (-3) + 2t$

9. $8c + 5(c - 3)$

10. $-2(-4 - 3s)$

11. $q(-3) + 3(2 + q)$

12. $(3 + k)(-4) - 5k$

13. $(-3)(1 - 2n) + 2(n + 4)$

14. $9p - 3(5p + 2) + 6$

Practice 2-3 Simplifying Variable Expressions

Simplify each expression.

1. $16 + 7y - 8$

2. $18m - 7 + 12m$

3. $5(3t) - 7(2t)$

4. $2x - 9y + 7x + 20y$

5. $3(9k - 4) - 4(5n - 3)$

6. $6(g - h) - 6(g - h)$

7. $-21(a + 2b) + 14a - 9b$

8. $-7a + 3(a - c) + 5c$

9. $-2(-5)q + (-72)(-q)$

Name the coefficients, any like terms, and any constants.

| | Coefficients | Like Terms | Constants |
|---------------------------|--------------|------------|-----------|
| 10. $3x + 7$ | _____ | _____ | _____ |
| 11. $4m + (-3n) + n$ | _____ | _____ | _____ |
| 12. $6kp + 9k + kp - 14$ | _____ | _____ | _____ |
| 13. $-8y + 6ab + 7 - 3ba$ | _____ | _____ | _____ |
| 14. $c + 2c + c - 5c + 1$ | _____ | _____ | _____ |

Write an expression for each model. Simplify the expression.

15. _____

16. _____

Justify each step.

17. $5(n + 4) + 9n = (5n + 20) + 9n$ _____
 $= 5n + (20 + 9n)$ _____
 $= 5n + (9n + 20)$ _____
 $= (5n + 9n) + 20$ _____
 $= (5 + 9)n + 20$ _____
 $= 14n + 20$ _____

Reteaching 2-5 Solving Equations by Adding or Subtracting

Solve $x - 9 = 2$ and $x + 8 = 3$.

Since the 9 is subtracted from x , do the inverse and add 9 to each side of the equation.

$$\begin{aligned} x - 9 &= 2 \\ x - 9 + 9 &= 2 + 9 \\ x &= 11 \end{aligned}$$

In $x + 8 = 3$, 8 is added to x . So, subtract 8 from each side of the equation.

$$\begin{aligned} x + 8 &= 3 \\ x + 8 - 8 &= 3 - 8 \\ x &= -5 \end{aligned}$$

Solve each equation.

- | | |
|--|--|
| <p>1. $17 + m = 21$ _____</p> <p>3. $t + 9 = -9$ _____</p> <p>5. $r + 7 = -16$ _____</p> <p>7. $144 + g = 78$ _____</p> <p>9. $-11 + b = -11$ _____</p> <p>11. $24 = k - 2$ _____</p> <p>13. $37 = z - 3$ _____</p> <p>15. $18 + n - 7 = 44$ _____</p> | <p>2. $y - 34 = 43$ _____</p> <p>4. $15 = z + 6$ _____</p> <p>6. $68 = p - 41$ _____</p> <p>8. $311 = y - 281$ _____</p> <p>10. $s + 31 = 14$ _____</p> <p>12. $8 + f = 30$ _____</p> <p>14. $a + 19 = -82$ _____</p> <p>16. $15 = 7 + h + 14$ _____</p> |
|--|--|

Practice 2-5 Solving Equations by Adding or Subtracting**Use mental math to solve each equation.**

1. $-52 = -52 + k$ _____

2. $837 = p + 37$ _____

3. $x - 155 = 15$ _____

4. $180 = 80 + n$ _____

5. $2,000 + y = 9,500$ _____

6. $81 = x - 19$ _____

7. $111 + f = 100$ _____

8. $w - 6 = -16$ _____

Solve each equation.

9. $m - 17 = -8$ _____

10. $k - 55 = 67$ _____

11. $-44 + n = 36$ _____

12. $-36 = p - 91$ _____

13. $x - 255 = 671$ _____

14. $19 = c - (-12)$ _____

15. $x + 14 = 21$ _____

16. $31 = p + 17$ _____

17. $-19 = k + 9$ _____

18. $87 + y = 19$ _____

19. $36 + n = 75$ _____

20. $-176 = h + (-219)$ _____

21. $41 + k = 7$ _____

22. $1,523 + c = 2,766$ _____

23. $-88 + z = 0$ _____

24. $-33 + (-7) = 29 + m$ _____

25. $t + (-2) = -66$ _____

26. $-390 + x = 11 - 67$ _____

27. The combined enrollment in the three grades at Jefferson Middle School is 977. There are 356 students in the seventh grade and 365 in the eighth grade. Write and solve an equation to find how many students are in the ninth grade.

Equation _____

Solution _____

Reteaching 2-6 Solving Equations by Multiplying or Dividing

Solve $4x = -32$.

$$4x = -32$$

$\frac{4x}{4} = \frac{-32}{4}$ Since 4 is multiplied by x , divide each side of the equation by 4.

$$x = -8$$

Solve $\frac{x}{-5} = -9$.

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

$-5\left(\frac{x}{-5}\right) = -5(-9)$ Since x is divided by -5 , multiply each side of the equation by -5 .

$$x = 45$$

Solve each equation.

1. $7m = 35$

2. $\frac{b}{8} = -3$

3. $90 = 10k$

4. $1 = \frac{n}{14}$

5. $100 = -20n$

6. $\frac{p}{15} = 5$

7. $-87,654y = 0$

8. $\frac{m}{4} = -12$

9. $-10a = 10$

10. $\frac{z}{-4} = 16$

11. $350t = -700$

12. $11j = 121$

13. $\frac{r}{-7} = 13$

14. $-7,650 = 10c$

15. $23 = \frac{w}{3}$

16. $125 = 25g$

Practice 2-6 Solving Equations by Multiplying or Dividing

Solve each equation.

- | | |
|--------------------------------|-----------------------------------|
| 1. $\frac{k}{-5} = -5$ _____ | 2. $-3 = \frac{n}{7}$ _____ |
| 3. $\frac{x}{12} = 0$ _____ | 4. $-6 = \frac{m}{-2}$ _____ |
| 5. $\frac{y}{-4} = -12$ _____ | 6. $\frac{s}{30} = 6$ _____ |
| 7. $\frac{1}{9}z = 0$ _____ | 8. $-\frac{m}{55} = 1$ _____ |
| 9. $-3x = 18$ _____ | 10. $-56 = 8y$ _____ |
| 11. $8p = -8$ _____ | 12. $-4s = -32$ _____ |
| 13. $14h = 42$ _____ | 14. $-175 = 25g$ _____ |
| 15. $-42 = 6m$ _____ | 16. $-2x = 34$ _____ |
| 17. $\frac{x}{-9} = -11$ _____ | 18. $216 = 9w$ _____ |
| 19. $-17v = -17$ _____ | 20. $-161 = 23t$ _____ |
| 21. $56h = 3,136$ _____ | 22. $20 = \frac{e}{-25}$ _____ |
| 23. $4,200 = 30x$ _____ | 24. $\frac{y}{-21} = -21$ _____ |
| 25. $\frac{m}{-3} = 21$ _____ | 26. $4,000 = \frac{x}{-40}$ _____ |

27. A bamboo tree grew 3 in. per day. Write and solve an equation to find how many days d it took the tree to grow 144 in.

Equation: _____ Solution: _____

28. Carl drove 561 miles. His car averages 33 miles per gallon of gas. Write and solve an equation to find how much gas g Carl's car used.

Equation: _____ Solution: _____

For what values of y is each equation true?

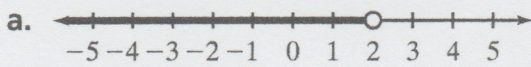
29. $-5|y| = -25$

30. $\frac{|y|}{2} = 28$

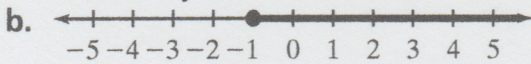
31. $9|y| = 27$

Reteaching 2-8 Inequalities and Their Graphs

Write an inequality for each graph.

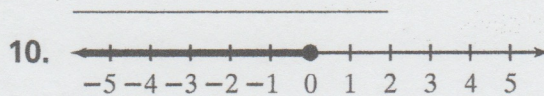
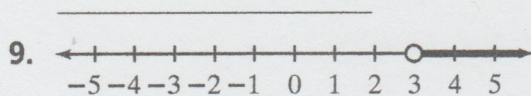
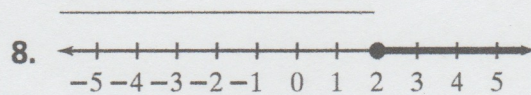
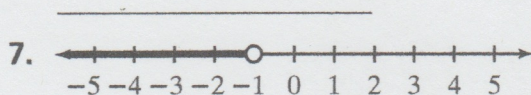
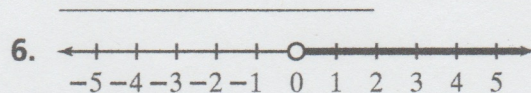
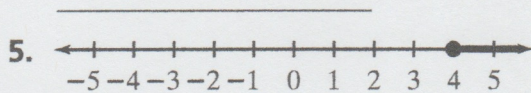
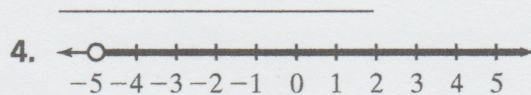
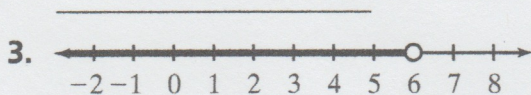
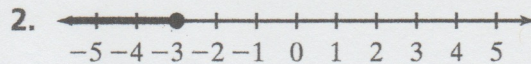
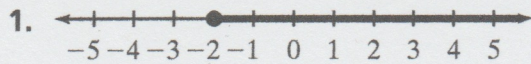


The open dot indicates 2 is not a solution. However, every number less than 2 is a solution. Thus, $x < 2$. Check by testing a point. Since 1 is shaded, try it. Is $1 < 2$? Yes.



The closed dot indicates -1 is a solution. Every number greater than -1 is also a solution. Thus, $x \geq -1$. Check by testing a point. Since 2 is shaded, try it. Is $2 \geq -1$? Yes.

Write an inequality for each graph.

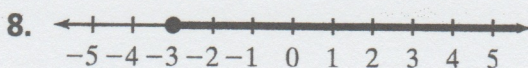
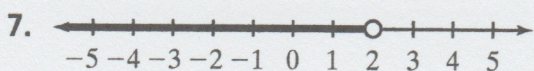
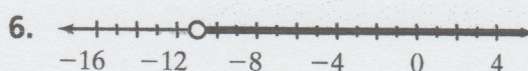
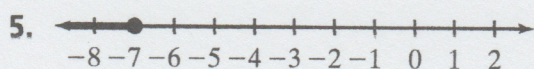


Practice 2-8 Inequalities and Their Graphs

Write an inequality for each sentence.

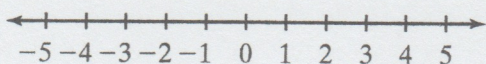
- The total t is less than sixteen. _____
- A number h is not less than 7. _____
- The price p is less than or equal to \$25. _____
- A number n is negative. _____

Write an inequality for each graph.

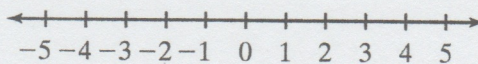


Graph the solutions of each inequality on a number line.

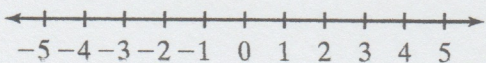
9. $x < -2$



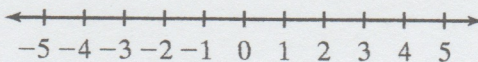
10. $y \geq -1$



11. $k > 1$



12. $p \leq 4$



Write an inequality for each situation.

- Everyone in the class is under 13 years old. Let x be the age of a person in the class.

- The speed limit is 60 miles per hour. Let s be the speed of a car driving within the limit.

- You have \$4.50 to spend on lunch. Let c be the cost of your lunch.

Reteaching 2-9 Solving One-Step Inequalities by Adding or Subtracting

Write an inequality for the sentence. Then solve the inequality. The sum of a number n and seven is greater than twelve.

Words Sum of a number n and seven is greater than twelve



Inequality $n + 7 > 12$

To solve, subtract 7 from each side.

$$n + 7 > 12$$

$$n + 7 - 7 > 12 - 7$$

$$n > 5$$

Check: $6 > 5$

Is $6 + 7 > 12$? Yes.

Write an inequality for each sentence. Then solve the inequality.

1. Eight less than a number k is less than 5.

2. Nine plus a number x is greater than or equal to negative two.

3. Five subtracted from a number p is less than or equal to negative ten.

4. A number d plus 17 is less than 25.

5. The sum of a number s and six is greater than negative seven.

6. Ten subtracted from a number y is less than twenty.

7. 82 plus a number j is greater than or equal to -28 .

8. A number n minus 9 is less than or equal to -23 .

9. Nineteen less than a number h is greater than three.

Practice 2-9 Solving One-Step Inequalities by Adding or Subtracting

Write an inequality for each sentence. Then solve the inequality.

1. Six less than n is less than -4 .

2. The sum of a number k and five is greater than or equal to two.

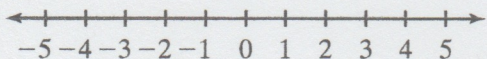
3. Nine more than a number b is greater than negative three.

4. You must be at least 48 inches tall to ride an amusement park ride, and your little sister is 39 inches tall. How many inches i must she grow before she may ride the ride?

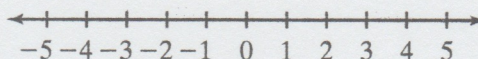
5. You need no more than 3,000 calories in a day. You consumed 840 calories at breakfast and 1,150 calories at lunch. How many calories c can you eat for dinner?

Solve each inequality. Graph the solutions.

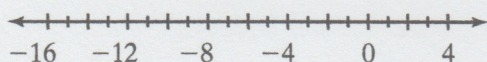
6. $7 + x \geq 9$ _____



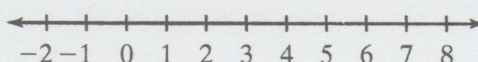
7. $-5 \leq x - 6$ _____



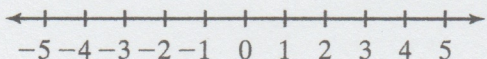
8. $0 \geq x + 12$ _____



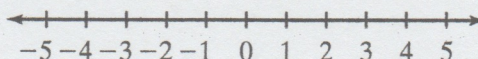
9. $x - 15 \leq -8$ _____



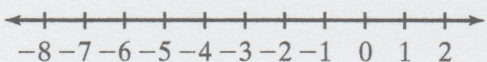
10. $13 + x \geq 13$ _____



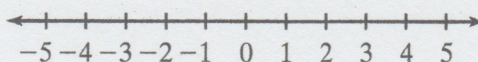
11. $x - 8 > -5$ _____



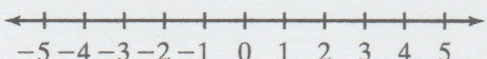
12. $4 + x < -2$ _____



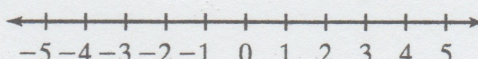
13. $x - 9 > -11$ _____



14. $x - 6 \leq -1$ _____



15. $-4 + x < -4$ _____



Reteaching 2-10 Solving One-Step Inequalities by Multiplying or Dividing

Solve $5x < -40$.

$$5x < -40$$

Since 5 and x are multiplied, use a division property of inequality and divide each side by 5.

$$5x < -40$$

$$\frac{5x}{5} < \frac{-40}{5}$$

$$x < -8$$

Solve $\frac{x}{-4} \geq 3$.

Since x is divided by -4 , use a multiplication property of inequality and multiply each side by -4 .

When you multiply each side of an inequality by a negative number, you must reverse the direction of the inequality symbol.

$$\frac{x}{-4} \geq 3$$

$$(-4)\frac{x}{-4} \leq (-4)3$$

$$x \leq -12$$

Solve each inequality.

1. $7n \geq 42$

2. $-3m < 27$

3. $\frac{x}{3} > 7$

4. $\frac{y}{4} \leq 8$

5. $\frac{q}{-2} < 5$

6. $-n \geq 2$

7. $27 \leq 3k$

8. $6 \geq \frac{d}{7}$

9. $\frac{r}{-9} < 12$

10. $-13 < \frac{h}{-3}$

11. $-15 \geq -3z$

12. $2f \leq -27$

Practice 2-10 Solving One-Step Inequalities by Multiplying or Dividing

Write an inequality for each sentence. Then solve the inequality.

1. The product of k and -5 is no more than 30.

2. Half of p is at least -7 .

3. The product of k and 9 is no more than 18.

4. One-third of p is at least -17 .

5. The opposite of g is at least -5 .

Solve each inequality.

6. $-5x < 10$ _____

7. $\frac{x}{4} > 1$ _____

8. $-8 < -8x$ _____

9. $\frac{1}{3}x > -2$ _____

10. $48 \geq -12x$ _____

11. $\frac{1}{3}x < -6$ _____

12. $\frac{x}{5} < -4$ _____

13. $-x \leq 2$ _____

Determine whether each number is a solution of $7 \geq -3k$.

14. 2 _____ 15. -2 _____ 16. 0 _____ 17. -3 _____

Justify each step.

18. $-5n \geq 45$

$$\frac{-5n}{-5} \leq \frac{45}{-5}$$

$$n \leq -9$$
