LESSON Practice B

Solving Inequalities with Variables on Both Sides

Solve each inequality and graph the solutions.

1.
$$2x + 30 \ge 7x$$

2.
$$2k + 6 < 5k - 3$$





3.
$$3b - 2 \le 2b + 1$$

4.
$$2(3n + 7) > 5n$$





5.
$$5s - 9 < 2(s - 6)$$

6.
$$-3(3x+5) \ge -5(2x-2)$$





7.
$$1.4z + 2.2 > 2.6z - 0.2$$

8.
$$\frac{7}{8}p - \frac{1}{4} \le \frac{1}{2}p$$





Solve each inequality.

9.
$$v + 1 > v - 6$$

10.
$$3(x+4) \le 3x$$

11.
$$-2(8-3x) \ge 6x+2$$

Write and solve an inequality for each problem.

- 12. Ian wants to promote his band on the Internet. Site A offers website hosting for \$4.95 per month with a \$49.95 startup fee. Site B offers website hosting for \$9.95 per month with no startup fee. For how many months would lan need to keep the website for Site B to be less expensive than Site A?
- **13.** For what values of *x* is the area of the rectangle greater than the perimeter?



Practice A

3-5 Solving Inequalities with Variables on Both Sides

Fill in the blanks to solve each inequality.



2.
$$8y > -2(3y-7)$$

3.
$$3(5n+6) < 10n-4$$

$$-\frac{3x}{-1x} = \frac{-3x}{8}$$

$$8y > \frac{-6y}{-6y} + \underline{14}$$

$$+ \underline{6y} + \underline{6y}$$

$$15n + 18 < 10n - 4$$

$$\frac{\div(-1)}{\div(-1)} \div \frac{(-1)}{}$$

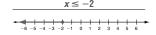
$$\frac{-10n}{5n_{+}18_{-}<-4}$$

$$x \ge -8$$

Solve each inequality and graph the solutions.

4.
$$5x \ge 7x + 4$$

5.
$$3(b-5) < -2b$$





Identify each inequality as an identity (all real numbers are solutions) or contradiction (no solutions).

7.
$$a - 7 \le a$$

8.
$$2(z+3) > 2z$$

Write and solve an inequality for each problem.

9. Jay can buy a stereo either online or at a local store. If he buys online, he gets a 15% discount, but has to pay a \$12 shipping fee. At the local store, the stereo is not on sale, but there is no shipping fee. For what regular prices is it cheaper for Jay to buy the stereo online?

$$p - 0.15p + 12 < p$$
; $p > 80$; greater than \$80

10. For what values of x is the area of the rectangle greater than the area of the triangle?

$$6x > \frac{1}{2}(4)(x+6); x > 3$$





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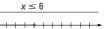
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SSON Practice B

3-5 Solving Inequalities with Variables on Both Sides

Solve each inequality and graph the solutions.

1. 2x + 30 > 7x

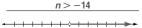






3. $3b - 2 \le 2b + 1$





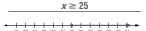
5. 5s - 9 < 2(s - 6)

6.
$$-3(3x+5) \ge -5(2x-2)$$

2. 2k + 6 < 5k - 3

4. 2(3n+7) > 5n

s < -1 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 19 20 21 22 23 24 25 26 27 28 29 30 31



7. 1.4z + 2.2 > 2.6z - 0.2

8.
$$\frac{7}{8}p - \frac{1}{4} \le \frac{1}{2}p$$

$$p \le \frac{2}{3}$$

9.
$$v+1>v-6$$

10.
$$3(x+4) \le 3x$$

11.
$$-2(8-3x) \ge 6x+2$$

all real numbers

no solutions

no solutions

Write and solve an inequality for each problem.

12. Ian wants to promote his band on the Internet. Site A offers website hosting for \$4.95 per month with a \$49.95 startup fee. Site B offers website hosting for \$9.95 per month with no startup fee. For how many months would lan need to keep the website for Site B to be less expensive than Site A?

9.95m < 4.95m + 49.95; m < 9.99; for 0 to 9 months

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Variables must be collected on the same side of an inequality before the inequality can be solved. If you collect the variables so that the variable term is positive, you will not have to

Solve x > 8(x - 7).

x > 8(x - 7)

_-x _-x

0 > 7x - 56

+56 +56

56 > 7*x*

 $\frac{56}{7} > \frac{7x}{7}$

Collect the variables on the right.

x > 8x - 56 Distribute.

3-5 Solving Inequalities with Variables on Both Sides

13. For what values of x is the area of the rectangle greater than 7(x+2) > 7 + (x+2) + 7 + (x+2); x > 0.8



Add - x to both sides.

Divide both sides by 7.

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multiply or divide by a negative number.

Collect the variables on the left.

x > 8x - 56 Distribute.

-8x -8x Add -8x to both sides.

Notice that if you want to have the variable on the left to make graphing solutions easier, you may still need

to switch the inequality sign, even

if you did not multiply or divide by a

Divide both sides by −7.

Reverse the sian.

_™ Reteach

Solve x > 8(x - 7).

x > 8(x - 7)

-7x > -56

 $\frac{-7x}{-7} > \frac{-56}{-7}$

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Practice C

3-5 Solving Inequalities with Variables on Both Sides

Solve each inequality.

1.
$$2x + 1 < 8x - 2$$

2.
$$4(3p + 5) \ge -2p$$

3.
$$-2s + 3 \ge -7s$$

$$p \ge -1\frac{3}{7}$$

$$s \ge -\frac{3}{5}$$

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

 $x > \frac{1}{2}$

5.
$$5(n-2) < 4(2n+6) + 2$$
 6. $\frac{2}{3}y + 6 < \frac{2}{3}y - 6$

$$s \ge -\frac{1}{5}$$

all real numbers

$$3^{y+6} < 3^{y-6}$$
no solutions

7.
$$\frac{3x}{8} + 4 \le 0.2x + 5$$

8.
$$-z + 20 > z + 20$$

$$x \le 5\frac{5}{7}$$

10.
$$5b + 20 > -2 + 3b$$

11.
$$6(k-5) > 3k-26$$

$$k > 1\frac{1}{2}$$

12. 0.42*d* < 152.5 + 0.17*d*

$$d < 610$$

For 13-17, use the table at right. The table gives the populations of Toledo, Ohio, and exington, Kentucky, during the last three U.S. Censuses.

	1980	1990	2000
Toledo, OH	350,000	330,000	310,000
Levington KV	200 000	230 000	260,000

13. About how much did the population of Toledo change each year? (Note: Not each decade!)

decreased 2000 people each year

14. Write an expression for the population of Toledo any number of years after 1980.

350,000 - 2000v

15. About how much did the population of Lexington change each year? 16. Write an expression for the population of

increased 3000 people each year 200,000 + 3000v

Lexington any number of years after 1980. 17. Assuming the patterns in the table continue. write and solve an inequality to find the years in which the population of Lexington will be greater than the population of Toledo.

350,000 - 2000 y < 200,000 +3000y y > 30 for years after 2010 Write the first step you would take to solve each inequality if you wanted to keep the variable positive.

1. 6*y* < 10*y* + 1 ___ **2.** $4p - 2 \ge 3p$ **3.** $5 - 3r \le 6r$

negative number

add -6 <i>y</i> to	both sides
add −3 <i>p</i> to	both sides
add 3r to l	ooth sides

Solve each inequality.

4.
$$8c + 4 > 4(c - 3)$$

5.
$$5(x-1) < 3x + 10 - 8x$$

5.
$$5(x-1) < 3x + 10 - 8x$$
 6. $-8 + 4a - 12 > 2a + 10$

c > -4

 $x < \frac{3}{2}$

a > 15

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