3-3 Solve Inequalities Using Multiplication or Division
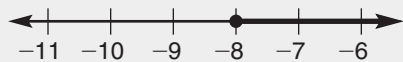
Name _____ Date _____

Solve: $-3d \leq 24$ ←—multiplication inequality

$\dfrac{-3d}{-3} \geq \dfrac{24}{-3}$ ←—Divide by a negative number; reverse the inequality symbol.

$d \geq -8$

Graph: $d \geq -8$

The graph shows the solution set for $\{d \mid d \geq -8\}$ or $[-8, \infty)$.

Check:

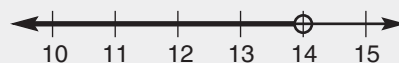Try $d = -8 \longrightarrow -3(\mathbf{-8}) \overset{?}{\leq} 24$

$24 \leq 24$ **True**

Solve: $\dfrac{v}{7} + v < 16$ ←—Identify like terms.

$\dfrac{8}{7}v < 16$ ←—Simplify: combine like terms.

$\left(\dfrac{7}{8}\right) \bullet \left(\dfrac{8}{7}v\right) < 16 \bullet \left(\dfrac{7}{8}\right)$ ←—Use the Multiplication Property of Inequality.

$v < 14$

Graph: $v < 14$

The graph shows the solution set for $\{v \mid v < 14\}$ or $(-\infty, 14)$.

Check:

Try $v = 13 \longrightarrow \dfrac{\mathbf{13}}{7} + (\mathbf{13}) \overset{?}{<} 16$

$7\left[\dfrac{13}{7} + 13\right] \overset{?}{<} \mathbf{7}(16)$

$104 < 112$ **True**

Solve each inequality.

1. $-2c > 24$

$\dfrac{\mathbf{-2c}}{\mathbf{-2}} < \dfrac{\mathbf{24}}{\mathbf{-2}}$

$c < \mathbf{-12}$

2. $-4a > 20$

3. $2n \leq 10$

4. $5t \leq 35$

5. $\dfrac{v}{9} < 6$

6. $\dfrac{h}{3} < 5$

7. $\dfrac{k}{-5} > 2$

8. $\dfrac{y}{-8} > -4$

9. $21 \geq -7s$

10. $30 \geq -15f$

11. $-9 < \dfrac{k}{11}$

12. $-7 < \dfrac{u}{12}$

13. $\dfrac{u}{-6.1} < -9.4$

14. $-\dfrac{5}{6}p > 2$

15. $\dfrac{16}{-17}q > \dfrac{8}{34}$

Use with SOURCEBOOK **Lesson 3-3, pages 74–75.**

Solve each inequality. Write the solution set in both set-builder and interval notation. On a separate sheet of paper, graph and check the solution set.

16. $-7x + 3x \geq 3$

$$-4x \geq 3$$
$$\frac{-4x}{-4} \leq \frac{3}{-4}$$
$$x \leq -\frac{3}{4}; \left\{x \mid x \leq -\frac{3}{4}\right\}; \left(-\infty, -\frac{3}{4}\right]$$

17. $-9b + 3b \geq 5$

_____

18. $v + \frac{v}{9} < 15$

_____

19. $d + \frac{d}{6} < -2$

_____

20. $0.75 \geq -5n + 2n$

_____

21. $-2.4 \geq -12m + 4m$

_____

22. $-3 \leq \frac{i}{-2}$

_____

23. $8 \leq \frac{c}{-6}$

_____

24. $-\frac{6}{10} < \frac{h}{10}$

_____

25. $-\frac{9}{2} < \frac{a}{2}$

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26. $-\frac{3}{4} \geq -\frac{5}{4} - e$

_____

27. $\frac{7}{2} \geq -\frac{\ell}{2} - \frac{\ell}{2}$

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Problem Solving

28. If one school bus can hold 64 students, what is the least number of buses needed to transport 700 students on a field trip?

_____

29. Carlos can spend at most $147 on mechanical pencils for the office. If each pencil costs $2.50, what is the greatest number of mechanical pencils he can buy?

_____

TEST PREPARATION

30. Which is the solution set of $-12 \geq \frac{c}{3}$?

    A. $(-\infty, -36]$ **B.** $(-36, \infty)$ **C.** $[-36, \infty)$ **D.** $(-\infty, -36)$