

Unit 2 Review

Equations and Inequalities

Name: _____

Simplify.

1. $6y + 3x - x + 2$

$$2x + 6y + 2$$

2. $2(x - 5) + 7x$

$$2x - 10 + 7x$$
$$9x - 10$$

3. $-3(x + 9) - 2 + 5x$

$$-3x - 27 - 2 + 5x$$
$$2x - 29$$

4. $22x - 7 - 2(x - 5) + 13x$

$$22x - 7 - 2x + 10 + 13x$$
$$33x + 3$$

Solve. Don't forget to SHOW ALL YOUR STEPS!

5. $a - 6 = -21$

$$+6 \quad +6$$
$$a = -15$$

6. $-6 - d = 7$

$$+6 \quad +6$$
$$-d = 13$$
$$-1 \quad -1$$
$$d = -13$$

7. $\frac{6f}{6} = \frac{-54}{6}$

$$f = -9$$

8. $-7 = \frac{-8}{2} \cdot -2$

$$14 = 9$$

$$\begin{array}{r}
 9. \quad 5 = -\frac{1}{3}h - 7 \\
 +7 \quad +7 \\
 \hline
 -3 \cdot 12 = -\frac{1}{3}h \cdot \frac{3}{1} \\
 \frac{-3}{1} \cdot \frac{12}{1} = \frac{-1}{3}h \cdot \frac{3}{1} \\
 \hline
 -36 = h \\
 \boxed{-36 = h}
 \end{array}$$

$$\begin{array}{r}
 11. \quad -2 = \frac{3}{4}n - 8 \\
 +8 \quad +8 \\
 \hline
 \frac{4}{3} \cdot 6^2 = \frac{3}{4}n \cdot \frac{4}{3} \\
 \frac{4}{3} \cdot \frac{6^2}{1} = \frac{3}{4}n \cdot \frac{4}{3} \\
 \hline
 8 = n \\
 \boxed{8 = n}
 \end{array}$$

$$\begin{array}{r}
 13. \quad (2m) + 12 + (6m) = -4 \\
 8m + 12 = -4 \\
 -12 \quad -12 \\
 \hline
 8m = -16 \\
 \frac{8m}{8} = \frac{-16}{8} \\
 \boxed{m = -2}
 \end{array}$$

$$\begin{array}{r}
 15. \quad 4x - (x - 6) = 30 \\
 (4x) - x + 6 = 30 \\
 3x + 6 = 30 \\
 -6 \quad -6 \\
 \hline
 3x = 24 \\
 \frac{3x}{3} = \frac{24}{3} \\
 \boxed{x = 8}
 \end{array}$$

$$\begin{array}{r}
 10. \quad -2 + \frac{m}{4} = -9 \\
 +2 \quad +2 \\
 \hline
 4 \cdot \frac{m}{4} = -7 \cdot 4 \\
 \hline
 \boxed{m = -28}
 \end{array}$$

$$\begin{array}{r}
 12. \quad 3k - 8 = 16 \\
 +8 \quad +8 \\
 \hline
 \frac{3k}{3} = \frac{24}{3} \\
 \hline
 \boxed{k = 8}
 \end{array}$$

$$\begin{array}{r}
 14. \quad -2(3x + 6) = 6 \\
 -6x - 12 = 6 \\
 +12 \quad +12 \\
 \hline
 -6x = 18 \\
 -6 \quad -6 \\
 \hline
 \boxed{x = -3}
 \end{array}$$

$$\begin{array}{r}
 16. \quad 4x - 1 = 6x - 5 \\
 -4x \quad -4x \\
 \hline
 -1 = 2x - 5 \\
 +5 \quad +5 \\
 \hline
 4 = 2x \\
 \frac{4}{2} = \frac{2x}{2} \\
 \boxed{2 = x}
 \end{array}$$

17. $(6f - 4 + 7 - f) - f - 18 - 3f$

$$\begin{array}{r} 5f + 3 = -2f - 18 \\ +2f \quad +2f \end{array}$$

$$\begin{array}{r} 7x + 3 = -18 \\ -3 \quad -3 \end{array}$$

$$\begin{array}{r} 7x = -21 \\ \hline 7 \quad 7 \end{array}$$

$$x = -3$$

18. $5 - (2g + 3) - 4 = 3(g + 4) + 2g$

$$5 - 2g - 3 - 4 = 3g + 12 + 2g$$

$$\begin{array}{r} -2 - 2g = 5g + 12 \\ +2g \quad +2g \end{array}$$

$$\begin{array}{r} -2 = 7g + 12 \\ -12 \quad -12 \end{array}$$

$$\begin{array}{r} -14 = 7g \\ \hline 7 \quad 7 \end{array}$$

$$-2 = g$$

For each of the following, write an equation and show your work for solving it.

19. A student has a gift card for 48 free movie rentals from Blockbuster (is Blockbuster even around anymore?). If he went to Blockbuster 8 times and rented the same number of moves each time, how many movies did he get each time?

$$\begin{array}{r} 8x = 48 \\ \hline 8 \quad 8 \end{array}$$

$$x = 6 \text{ movies}$$

20. Mr. Cravatta and Mr. Moundros decided to prepare for the school rollerblading race by rollerblading a certain number of miles each day. Mr. Cravatta practiced for 5 days. Mr. Moundros attended a family reunion in East Lansing and could only practice for 3 days. Together, they rollerbladed 32 miles. How many miles did they rollerblade per day?

$$5x + 3x = 32$$

$$\begin{array}{r} 8x = 32 \\ \hline 8 \quad 8 \end{array}$$

$$x = 4 \text{ miles}$$

21. Density is a measurement of an objects mass per unit volume ($D = \frac{m}{V}$). First, solve the equation for m, then determine the mass of an object that has a volume of 34cm^3 and a density of 6g/cm^3 ?

$$V \cdot D = \frac{m}{V} \cdot V$$

$$VD = m$$

$$m = VD$$

$$m = 34 \cdot 6$$

$$m = 204 \text{ g}$$

$$\begin{array}{r} 2 \\ 34 \\ \times 6 \\ \hline 204 \end{array}$$

Determine whether each number is a solution of the given inequality.

22. $2z + 1 \geq -5$

a. -4

$$2(-4) + 1 \geq -5$$

$$-8 + 1 \geq -5$$

$$-7 \geq -5$$

No

b. -2

$$2(-2) + 1 \geq -5$$

$$-4 + 1 \geq -5$$

$$-3 \geq -5$$

Yes

c. 4

$$2(4) + 1 \geq -5$$

$$8 + 1 \geq -5$$

$$9 \geq -5$$

Yes

Define a variable and write an inequality to model each situation.

23. At least 35 students needed their schedule changed before school started.

$S = \# \text{ of students}$

$$S \geq 35$$

24. The speed limit on the highway is 70 mph

$S = \text{speed}$

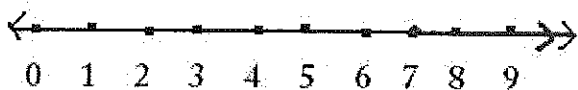
$$S \leq 70$$

Write an inequality for each graph.



25.

$$x < 4$$



26.

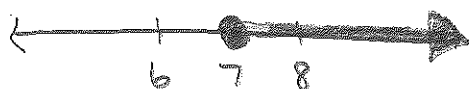
$$x \geq 7$$

Solve each inequality and graph the solution.

27.

$$\frac{12}{-12} + v \leq \frac{19}{-12}$$

$$v \leq 7$$

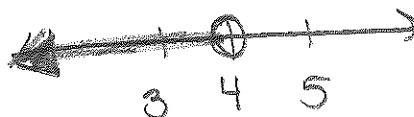


28.

$$\frac{-9n}{-9} \geq \frac{-36}{-9}$$

$$n \leq 4$$

← flip sign



29.

$$\frac{-5x + 12}{-12} \leq \frac{-18}{-12}$$

$$\frac{-5x}{-5} \leq \frac{-30}{-5}$$

$$x \geq 6$$

← flip the sign



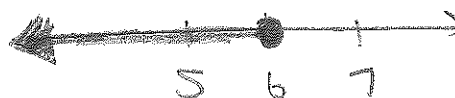
30.

$$\frac{16 - u}{-6} > \frac{10}{-6}$$

$$\frac{-u}{-1} > \frac{-6}{-1}$$

$$u < 6$$

← flip the sign



31.

$$-4 > 4(m-1) \geq 4$$

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

$$0 > \frac{4x}{4} \geq \frac{8}{4}$$

$$0 > x \geq 2$$

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

$$0 > \frac{4x}{4}$$

$$0 > x$$

$$x < 0$$



$$4(m-1) \geq 4$$

$$\frac{4m - 4}{4} \geq \frac{4}{4}$$

$$\frac{4m}{4} \geq \frac{8}{4}$$

$$m \geq 2$$

32.

$$-3 - 4(2x-1) + 4x > 7 - 1 - 6 + 11$$

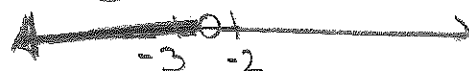
$$-3 - 8x + 4 + 4x > 7 - 1 - 6 + 11$$

$$\frac{-4x + 1}{-1} > \frac{11}{-1}$$

$$\frac{-4x}{-4} > \frac{10}{-4}$$

$$x < -2\frac{1}{2}$$

← flip the sign



Write and solve an inequality.

33. It takes Ms. Bader no more than 25 minutes to get to school. If she has traveled 13.5 minutes already, how much longer, at most, might Ms. Bader take to get to school?

$$\begin{array}{r} 13.5 + x < 25.0 \\ -13.5 \quad -13.5 \\ \hline x < 11.5 \text{ minutes} \end{array}$$

34. Lizzy collects nail polish and currently owns 74 bottles. She tries to add 6 each month and her goal is to own at least 150. What is the least number of months that will go by before Lizzy meets her goal?

$$\begin{array}{r} 6x + 74 \geq 150 \\ -74 \quad -74 \\ \hline 6x \geq 76 \\ \frac{6x}{6} \geq \frac{76}{6} \\ x \geq 12\frac{4}{6} \end{array}$$

$$\begin{array}{r} 12 \\ 6 \overline{) 76} \\ - 6 \\ \hline 16 \\ - 12 \\ \hline 4 \end{array}$$

round $\left(\begin{array}{l} x \geq 12\frac{2}{3} \text{ bottles} \\ x \geq 13 \text{ bottles} \end{array} \right.$

Answers

- | | | |
|------------------|-----------------------|-------------------------------------|
| 1) $6y + 2x + 2$ | 13) -2 | 25) $x < 4$ |
| 2) $9x - 10$ | 14) -3 | 26) $x \geq 7$ |
| 3) $2x - 29$ | 15) 8 | 27) $v \leq 7$ |
| 4) $33x + 3$ | 16) 2 | 28) $n \leq 4$ |
| 5) -15 | 17) -3 | 29) $x \geq 6$ |
| 6) -13 | 18) -2 | 30) $u < 6$ |
| 7) -9 | 19) $8m = 48, 6$ | 31) $0 > m \geq 2$ |
| 8) 14 | 20) $5m + 3m = 32, 4$ | 32) $x < -2\frac{1}{2}$ |
| 9) -36 | 21) 204 g | 33) $13.5 + x \leq 25, x \leq 11.5$ |
| 10) -28 | 22) b, c | 34) $6x + 74 \geq 150, x \geq 13$ |
| 11) 8 | 23) $s \geq 35$ | |
| 12) 8 | 24) $s \leq 70$ | |