

CHAPTER 3 STUDY GUIDE (BASIC EQUATIONS & INEQUALITIES)

3.1 Solving Equations by Adding or Subtracting examples on pages 84-88 (see Chapter 3.1 notes)

- > **Tips:** Opposites are two numbers located in opposite directions on a number line, but the same distance from zero.
- > **Tips:** Inverse Operations are operations that undo one another (whatever you do to one side, you must do to the other).
- > **Tips:** The variable must always be on one side and a number must be on the other side

1. $k + 5 = -7$
 $\frac{k}{1} + \frac{5}{-5} = \frac{-7}{-5}$
 $k = -12$

4. $w - 7 = 6$
 $\frac{w}{1} - \frac{7}{+7} = \frac{6}{+7}$
 $w = 13$

2. $16 = m + 9$
 $\frac{16}{-9} = \frac{m}{-9} + \frac{9}{-9}$
 $-7 = m$
 $m = -7$

5. $-21 = x - (-14)$
 $\frac{-21}{-14} = \frac{x}{-14} + \frac{14}{-14}$
 $-35 = x$
 $x = -35$

3. $n + (-8) = -3$
 $\frac{n}{1} + \frac{-8}{+8} = \frac{-3}{+8}$
 $n = -11$

6. $-y - 13 = -29$
 $\frac{-y}{-1} - \frac{13}{+13} = \frac{-29}{+13}$
 $-y = -16$
 $y = 16$

3.2 Solving Equations by Multiplying or Dividing examples on pages 93-96 (see Chapter 3.2 notes)

- > **Tips:** Multiplication and division are inverse operations of each other.
- > **Tips:** Whatever you do to one side of the equation must be done to the other side (this keeps both sides equal).
- > **Tips:** If two numbers being multiplied have different signs, the answer will be negative.
- > **Tips:** If two numbers being multiplied have the same sign, the answer will be positive (two negatives will cancel each other).
- > **Tips:** When dividing numbers with different signs, the answer will be negative.
- > **Tips:** When dividing numbers with the same sign, the answer will be positive (two negatives will cancel each other).

7. $\frac{5k}{5} = \frac{40}{5}$
 $k = 8$

10. $\frac{w}{15} = 4$
 $w = 60$

8. $\frac{-63}{9} = \frac{9m}{9}$
 $-7 = m$
 $m = -7$

11. $6 = \frac{x}{6}$
 $-36 = x$
 $x = -36$

9. $\frac{6n}{-6} = \frac{-18}{-6}$
 $n = -3$

12. $\frac{y}{-13} = -24$
 $y = 312$

3.3 Solving Two-Step Equations examples on pages 98-102 (see Chapter 3.3 notes)

- > **Tips:** Solving equations with two terms, undo the "order of operations" in reverse by performing the inverse operations on both sides of the equation (1) add/subtract, (2) multiply/divide, (3) exponents, (4) grouping.

13. $3k + 8 = -4$
 $\frac{3k}{3} + \frac{8}{-8} = \frac{-4}{-8}$
 $k = -4$

16. $\frac{w}{-11} + (-3) = 8$
 $\frac{w}{-11} - 3 = 8$
 $\frac{w}{-11} = 11$
 $w = -121$

14. $18 = -5m + 13$
 $\frac{18}{-5} = \frac{-5m}{-5} + \frac{13}{-5}$
 $-1 = m$
 $m = -1$

17. $-33 = \frac{x}{5} - (-7)$
 $-33 = \frac{x}{5} + 7$
 $-40 = \frac{x}{5}$
 $-200 = x$
 $x = -200$

15. $7n - (-6) = -8$
 $7n + 6 = -8$
 $\frac{7n}{7} + \frac{6}{-6} = \frac{-8}{-6}$
 $n = -2$

18. $\frac{y}{-8} - 21 = -29$
 $\frac{y}{-8} = -8$
 $y = 64$

3.4 Simplifying Before Solving examples on pages 104-106 (see Chapter 3.4 notes)

- > **Tips:** Combine like terms, then solve for the variable.

19. $12k + 15k + 2 = 56$
 $27k + 2 = 56$
 $27k = 54$
 $k = 2$

22. $-4w - 9w + 6 = -33$
 $-13w + 6 = -33$
 $-13w = -39$
 $w = 3$

20. $121 = 9m + 3m - 23$
 $121 = 12m - 23$
 $144 = 12m$
 $m = 12$

23. $-19 = 2x - (-17x) - 114$
 $-19 = 2x + 17x - 114$
 $-19 = 19x - 114$
 $95 = 19x$
 $5 = x$
 $x = 5$

21. $5n - (-4n) + 3 = -69$
 $5n + 4n + 3 = -69$
 $9n + 3 = -69$
 $9n = -72$
 $n = -8$

24. $-6y - 7y + 3y - 124 = -64$
 $-13y + 3y - 124 = -64$
 $-10y - 124 = -64$
 $-10y = 60$
 $y = -6$

3.5 Using Equations examples on pages 110-112 (see Chapter 3.5 notes)

- **Tips:** R.E.S.T. = (R)ead – the problem carefully. (E)valuate – how to represent the words with an algebraic equation. (S)olve – the equation. (T)ry again – by plugging in the answer to verify if it is correct.

Write an equation & solve:

25. Mrs. Lygea loves to give students mints. How many days will her supply last if she has a total of 3080 mints and 220 students come by each day to grab 1 mint?

$$\frac{220d}{220} = \frac{3080}{220}$$

$$d = 14 \text{ days}$$

26. Mr. Wright loves watching his favorite sports team, the Oklahoma Sooners. He spends a total of 15 hours a week watching ESPN SportsCenter and his Sooners on TV. If he spends twice as much time watching ESPN, how many hours did he spend watching the Sooners?

$$2t + t = 15$$

$$\frac{3t}{3} = \frac{15}{3}$$

$$t = 5 \text{ hours}$$

Using the equation below, write a word problem & solve:

$$\frac{8x}{8} = \frac{192}{8}$$

If Jeff makes \$192 per week at his job, how many hours did he work if he makes \$8 hour?

$$x = 24 \text{ hours}$$

3.7 Solving Linear Inequalities examples on pages 120-124 (see Chapter 3.7 notes)

- **Tips:** Always read from the variable. For example, $x > 0$ is the same as $0 < x$.
- **Tips:** If the alligator is eating the variable, it is the greater than sign. If the alligator is not eating the variable, it is the less than sign.
- **Tips:** If $>$ or $<$ sign, the dot on the line is empty (not filled in). If \geq or \leq sign, then the dot on the line is solid (filled in).
- **Tips:** When you multiply or divide by a negative number, flip the sign.

$$28. \frac{2m}{2} \leq \frac{16}{2}$$

$$m \leq 8$$

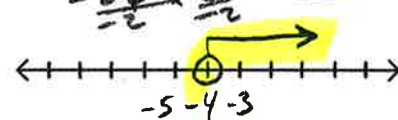
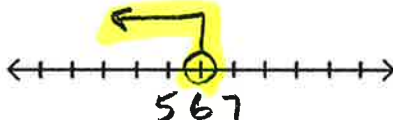
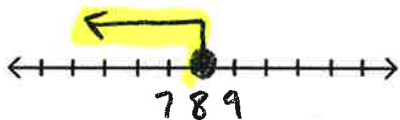
$$29. (2)\frac{n}{2} < 3(2)$$

$$n < 6$$

$$30. -2p + 3 < 11$$

$$\begin{aligned} -2p &< 8 \\ -2p &\leq \frac{8}{-2} \end{aligned}$$

$$p > -4$$



$$31. \frac{40}{-5} > \frac{-5m}{-5}$$

$$-8 < m$$

$$m > -8$$

$$32. (-3) \cdot 2 \geq \frac{n}{-2} \cdot (-3)$$

$$6 \leq n$$

$$n \geq 6$$

$$33. -27 \leq -4p - 11$$

$$\begin{aligned} -16 &\leq -4p \\ -16 &\leq \frac{-4p}{-4} \end{aligned}$$

$$4 \geq p$$

$$p \leq 4$$



3.8 Using Inequalities examples on pages 126-128 (see Chapter 3.8 notes)

- **Tips:** R.E.S.T. = (R)ead – the problem carefully. (E)valuate – how to represent the words with an algebraic equation. (S)olve – the equation. (T)ry again – by plugging in the answer to verify if it is correct.

Write an equation & solve:

34. Mrs. Taylor bought her and her husband matching ORU t-shirts for basketball season. She also purchased a small car flag for \$8.00. She spent less than \$30.00 for all of these items. How much did she spend on each t-shirt?

$$2x + \$8.00 < \$30.00$$

$$\frac{2x}{2} < \frac{22}{2}$$

$$x < 11$$

$$\text{less than } \$11$$

35. Mr. Iwanaga loves watching his favorite sports team, the OSU Cowboys. He spends a total of 28 hours a month between going to the games in person and watching the games on TV. If he spends triple the time going to games, how many hours did he spend watching his team on TV?

$$3x + x > 28$$

$$\frac{4x}{4} > \frac{28}{4}$$

$$x > 7 \text{ hours}$$

Using the equation below, write a word problem & solve:

$$36. \$200x + \$350 \leq \$1150$$

$$-350 \quad -350$$

$$\frac{200x}{200} \leq \frac{800}{200}$$

$$x \leq 4$$

$$4 \text{ chairs or less}$$

Tina has a budget of \$1150 and cannot go over that limit. She purchased a table for \$350, so how many \$200 chairs can she buy?