Section 3.2 – Grouping Like Terms

This booklet belongs to:_____**Block:**_____

❖ Now we find ourselves in the situation where we have **more** than just the $1\ Step$

Example: $3t + 4 - 2t + 5 = -t - 3$

➢ There is a lot going on here.
➢ 1ˢᵗ we can **group** the **Like Terms,** which means **gather similar terms** on **each side** of the **equal sign**
➢ **Like Terms** have the **Same Variable** to the **Same Exponent**

Example: $2x\ and\ 3x$ $5t^2\ and\ 7t^2$ $18v^5\ and\ 19v^5$

All of these have the same variable to the same exponent

Consider this:

$2\ apples$	$8\ T-Shirts$	$4t$	$12d^2$
$+\ 3\ apples$	$-\ 3\ T-Shirts$	$+\ \ \ 7t$	$-\ \ 7d^2$
$5\ apples$	$5\ T-Shirts$	$11t$	$5d^2$

➢ We can't combine $apples$ and $T-Shirts,$ much like we can't combine t and d or x and x^2, they aren't the same things

• Once we have **grouped the terms together**, we can finish off the questions using the **Steps** we learned previously.

• It is very good form to **combine everything** on the **individual sides** of the **equal sign** first

• Remember that this is **just grouping** and the **BALANCE** is not affected.

• Very Important!!! **The sign in front of a number belongs to that number.**

Example 1:

$$3x + 4 - 2x + 5 = -x - 3$$

✓ 1st Combine the Like Terms on either side of the equals sign

$$3x + 4 - 2x + 5 = -x - 3$$

$$x + 9 = -x - 3$$

  o We have **combined** our **variable terms** and **non-variable terms**
  o Now we have to **combine across** the **equals sign**
  o It doesn't matter if the variables end up on the left or right
  o General notation has the variable on the left

✓ 2nd Subtract 9 from both sides, to isolate the variable on the left

$$x + 9 - 9 = -x - 3 - 9$$

$$x = -x - 12$$

✓ 3rd Add x to both sides, to cancel out the variable on the right

$$x + x = -x - 12 + x$$

$$2x = -12$$

✓ Last of all divide the variable by 2 to cancel out the 2

$$\frac{2x}{2} = \frac{-12}{2}$$

$$x = -6$$

Example 2:

$$5t + 3 - 3t + 2t - 7 + 2t = t + 6$$

$$5t + 3 - 3t + 2t - 7 + 2t = t + 6 \qquad \boxed{\text{Group Like Terms}}$$

$$6t - 4 = t + 6$$

$$6t - 4 - t = t + 6 - t \qquad \boxed{\text{Subtract } t \text{ from both sides}}$$

$$5t - 4 = 6$$

$$5t - 4 + 4 = 6 + 4 \qquad \boxed{\text{Add four to both sides}}$$

$$5t = 10$$

$$\frac{5t}{5} = \frac{10}{5} \qquad \boxed{\text{Divide both sides by 5}}$$

$$\boldsymbol{t = 2}$$

Section 3.2 – Practice Questions

EMERGING LEVEL QUESTIONS

When we combine terms, we can only combine ones that are the same.

1. $1\,Apple + 3\,Apples =$	2. $3\,Bananas - 2\,Bananas =$	3. $7\,Cookies + 5\,Cookies =$

It works the same with variables, they have to be the same to the same exponent!

4. $3x + 2x =$	5. $5x^2 - 2x^2 =$	6. $2x + 3y =$
7. $-2x + 7x =$	8. $-5x^2 - 7x^2 =$	9. $4x^2 + 5x - 3x =$
10. $-3xy - 4xy =$	11. $2t^2 - 3r^2 + t^2 - 5r^2 =$	12. $3r + 5r - 8r =$

PROFICIENT LEVEL QUESTIONS

Combine the **LIKE TERMS** and solve for the variable.

13. $3x - 4 - 2x + 8 = 7$	14. $4r + 6 - 3r - 5 = 2r + 8$

15. $9k - 4 + 6 - 2k = 3k - 7 + 2k - 8$

16. $8t - 4 + 3t + 5 = t - 7$

17. $z + 4 - 3z = -z + 4$

18. $5 - 2s + 6 = 4s - 4$

19. $2x + 3 + 4x = -3 - 2x$

20. $2t + 6 = 2t + 6$

21. $-4t + 7 = -4t + 8$

22. $3f + 7 - 4f = -5 + 3f$

23. $7r + 5 - 2r - 4 = -4r + 2 + 5r$

24. $-d + 1 - 5d - 7 = 12 + 3d$

25. $-3r + 5 - 2r - 7 + 9r + 3 - r = 13 - 12r + 6 - 4r + 7 - r$

26. $-3w + 7 + 6w + 5 - w = 9 - 5w + 8 + w - 5 + 6w$

Answer Key – Section 3.2

1. $4\ Apples$	2. $1\ Banana$	3. $12\ Cookies$
4. $5x$	5. $3x^2$	6. $2x + 3y$
7. $5x$	8. $-12x^2$	9. $4x^2 + 2x$
10. $-7xy$	11. $3t^2 - 8r^2$	12. 0
13. $x = 3$	14. $r = -7$	15. $k = -\dfrac{17}{2}$
16. $t = -\dfrac{4}{5}$	17. $z = 0$	18. $s = \dfrac{5}{2}$
19. $x = -\dfrac{3}{4}$	20. $t = Anything$	21. $t = No\ Solution$
22. $f = 3$	23. $r = \dfrac{1}{4}$	24. $d = -2$
25. $r = \dfrac{5}{4}$	26. $w = Anything$	

Extra Work Space