Summer Math Packet 2021

Dear Students,

The teachers in the math department are very excited about the upcoming school year. We look forward to working with you and helping you to become successful in your math classes.

The problems in this packet are a review of concepts that you have learned in your previous math classes. A strong knowledge of this material will help you in your future math classes.

Here are some suggestions for the summer math packet:

- Print the packet or get a printed copy from the school
- Work on one page or section a week
- Do NOT wait until the end of the summer to complete the whole packet
- Use the examples provided and watch videos online for extra help if needed
    - Khanacademy.com
    - Ixl.com
- Turn the completed packet into your teacher on the first day of school
    - This is a grade. It is not optional.

Email us if you have any questions. We will answer emails when we can over the summer.

- Mae Margaret Davis – Algebra I, Geometry, Honors Geometry, and Business Calculus (mdavis@lee-scott.org)
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Thank you and have a great summer!

LSA Math Department

10^{th} Grade Summer Math Packet

Simplifying Polynomial Expressions:

If you are distributing, you multiply every term inside the parentheses by the term on the outside of the parentheses.

Ex.1 **$3(9x - 4)$**
$3 \bullet 9x - 3 \bullet 4$
$27x - 12$

Ex.2. **$4x^2 (5x^3 + 6x)$**
$4x^2 \bullet 5x^3 + 4x^2 \bullet 6x$
$20x^5 + 24x^3$

If you are combining like terms, you can add or subtract terms that have the same variables with the same exponents.

Ex.3. **$5x^2 + 7x + 10x^2 - 3x$**
$(5x^2 + 10x^2) + (7x - 3x)$
$15x^2 + 4x$

Sometimes, you have to distribute and then combine terms.

Simplify each expression.

1. $8x^3 - 9y + 16x^3 + 12y$

2. $14y + 22 - 15y^2 + 23y$

3. $-2(11b - 3)$

4. $-(5x - 6)$

5. $10r(16x + 11)$

6. $5n + 2(3 - 4n)$

7. $3(18z - 4w) + 2(10z - 6w)$

8. $(8c + 3) - 12(4c - 10)$

Solving Equations:

When solving equations with variables on both sides of the equal sign, be sure to get all terms with the variable on one side and all the terms without the variable on the other side.

Ex. $8x - 4 = 4x + 28$

$$\begin{array}{r} -4x \quad -4x \\ 4x - 4 = 28 \\ +4 \quad +4 \\ \hline \frac{4x}{4} = \frac{32}{4} \\ X = 8 \end{array}$$

Sometimes, you will need to distribute and/or combine terms before you solve the equations.

Solve each equation.

9. $5x - 2 = 33$

10. $140 = 4x + 36$

11. $8(3x - 4) = 196$

12. $45x - 720 + 15x = 60$

13. $132 = 4(12x - 9)$

14. $198 = 154 + 7x - 68$

15. $-131 = -5(3x - 8) + 6x$

16. $-7x - 10 = 18 + 3x$

Exponent Rules:

Multiplication $(x^m)(x^n) = x^{(m+n)}$ **Ex. $(3x^4y^2)(4xy^5) = 12x^5y^7$**

Division $\frac{x^m}{x^n} = x^{(m-n)}$ **Ex. $\frac{42m^5x^2}{-3m^3x} = -14m^2x$**

Powers: $(x^m)^n = x^{(m\bullet n)}$ **Ex. $(-2a^3bc^4)^3 = (-2)^3(a^3)^3(b)^3(c^4)^3$**
$= -8a^9b^3c^{12}$

Power of Zero $x^0 = 1$ **Ex. $5x^0y^4 = (5)(1)(y^4) = 5y^4$**

Simplify each expression.

17. $(c^5)(c)(c^2)$

18. $\frac{m^{15}}{m^3}$

19. (k^4)

20. d^0

21. $(p^4s^2)(p^7s^5)$

22. $\frac{45y^3z^{10}}{5y^3z}$

23. $(-t^7)^3$

24. $3f^3g^0$

25. $(4h^5k^3)(15k^2h^3)$

26. $\frac{12a^4b^6}{36ab^2c}$

27. $(3m^2n)^4$

28. $(12x^2y)^0$

Binomial Multiplication:

When multiplying two binomials, you use the FOIL Method.

Ex. (2x – 6)(x + 5)

First: $2x \bullet x = 2x^2$
Outer: $2x \bullet 5 = 10x$
Inner: $-6 \bullet x = -6x$
Last: $-6 \bullet 5 = -30$

$2x^2 + 10x – 6x – 30$
$2x^2 + 4x - 30$

*Remember that $(x – 4)^2 = (x – 4)(x – 4)$

Multiply and simplify.

29. $(x + 10)(x – 9)$

30. $(7 + x)(x – 12)$

31. $(x – 10)(x – 2)$

32. $(x – 8)(x + 81)$

33. $(2x – 1)(4x + 3)$

34. $(10 – 2x)(5 – 9x)$

35. $(-3x – 4)(2x + 4)$

36. $(x + 10)^2$

Factoring:

When factoring an expression, always factor out the GCF first if you can. If the remaining expression is a trinomial determine if it can be factored as well.

Ex.1 $3x^2y^2 - 15xy^3$ **The GCF is** $3xy^2$

$3xy^2(x - 5y)$

Ex.2 $4x^2 - 44x + 120$ **The GCF is 4.**

$4(x^2 - 11x + 30)$ **Can this trinomial be factored?**

$4(x - 5)(x - 6)$

30	-11	
-1 • -30	-1 + -30 = -31	No
-2 • -15	-2 + -15 = -17	No
-3 • -10	-3 + -10 = -13	No
-5 • -6	-5 + -6 = -11	Yes

Factor completely.

37. $3x^2 + 6x$

38. $4a^2b^2 - 16ab^3 + 8ab^2c$

39. $n^2 + 8n + 15$

40. $g^2 – 9g + 20$

41. $d^2 + 3d – 28$

42. $z^2 – 7z – 30$

43. $2m^2 + 36m + 162$

44. $5k^2 + 30k - 135$

Radicals:

To simplify a radical, find the largest perfect square factor of the number under the radical sign and then take the square root of that number.

Ex. $\sqrt{90}$ **=** $\sqrt{9}$ **•** $\sqrt{10}$ **= 3**$\sqrt{10}$

Simplify each radical.

45. $\sqrt{121}$

46. $\sqrt{48}$

47. $\sqrt{72}$

48. $2\sqrt{16}$

Graphing Lines (Finding Slope):

To find the slope between two points, label the coordinates (x_1, y_1) and (x_2, y_2) and then use the slope formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Ex. (-3, 2) and (2, 3) **m =** $\frac{3-2}{2-(-3)} = \frac{1}{5}$

Find the slope of a line between the following pairs of points.

49. (-1, 4) and (1, -2)

50. (3, 5) and (-3, 1)

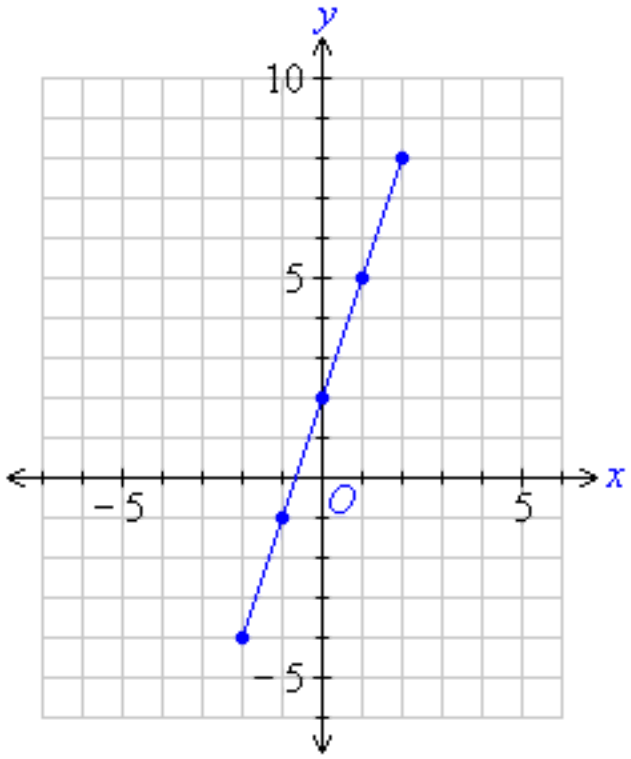
51. (2, -4) and (6, -4)

52. (5, -2) and (5, 7)

Graphing Lines in the Slope-Intercept form:

To graph a line in slope-intercept form, first identify the slope and y-intercept. Then, graph the y-intercept on the y-axis. Next, use the slope to get the second point by counting up and to the right or down and to the right from the y-intercept. Finally, draw the line with arrows on the ends.

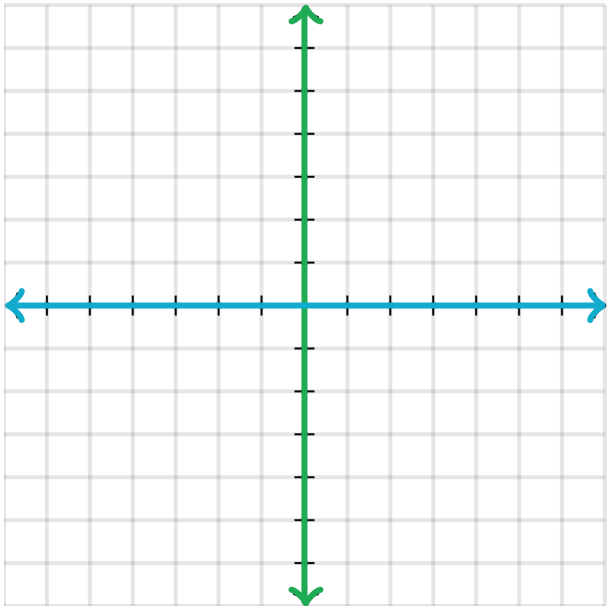
Ex. Graph y = 3x + 2 Slope = 3 = $\frac{3}{1}$ Y – Intercept = 2



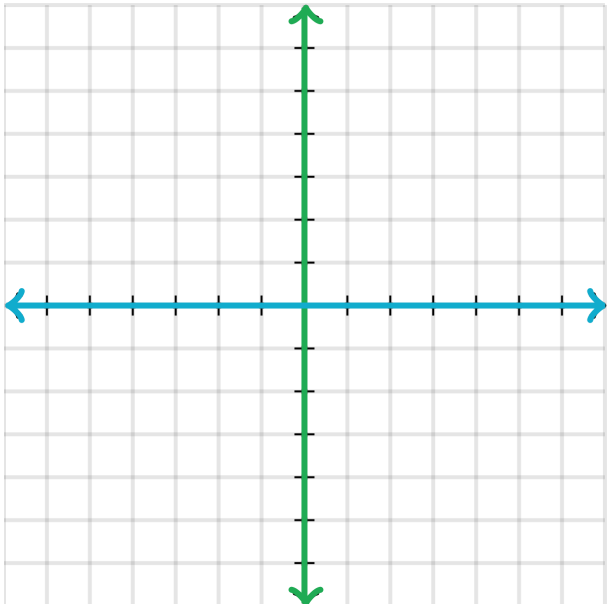
Place a point on the y-axis at positive 2

From that point, travel up 3 (because it is a positive slope) and to the right one to get the second point. Draw the line and add arrows on the ends.

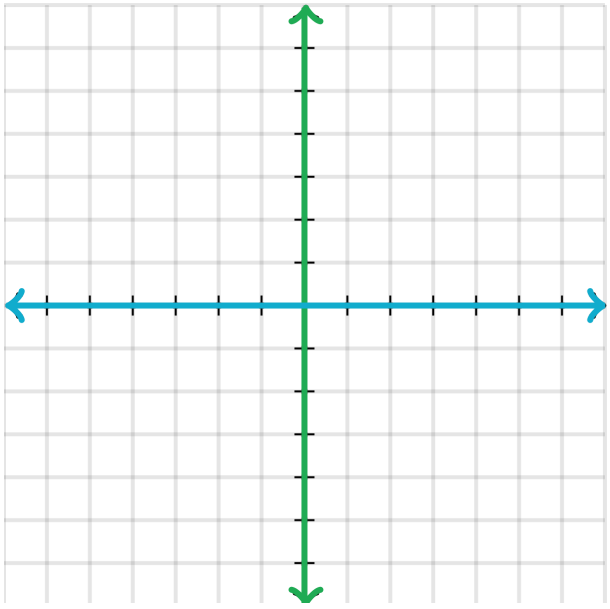
53. Graph $y = 2x + 5$ Slope:_____ Y-Intercept: _____



54. Graph $y = \frac{1}{2}x - 3$ Slope: _____ Y-Intercept: _____



55. Graph $y = -\frac{2}{5}x + 4$ Slope: _____ Y-Intercept _____



56. Graph $y = -3x$ Slope:_____Y-Intercept _____