

for students entering Mrs. Thornton's Algebra 2 Class

- This packet will be graded for accuracy, and it will be included into your Fall 2023 Algebra 2 Grade as a Test
- I will be offering a number of HELP SESSIONS at the school during the week before school starts this fall, and I am available to help this summer by email at athornton@unitychristianschool.org (Please do allow a few days for me to answer summer emails)
- I am available, and I will be happy to help you this summer with the work for this important Summer Packet.
- Regrettably, my help with this packet will not be available after the first day of school has started.
- Students who do not submit a packet by Fall Semester Day 1 will be given a 0.

**Summer Packet 2023 –
Due on the 1st Day of School at the
beginning of your class period.**

Student Name: _____

Summer Packet – Entering Algebra 2

Please write out each of the following equations:

Slope Intercept Form of a Linear Equation

Standard Form of a Linear Equation

Point-Slope Form of a Linear Equation

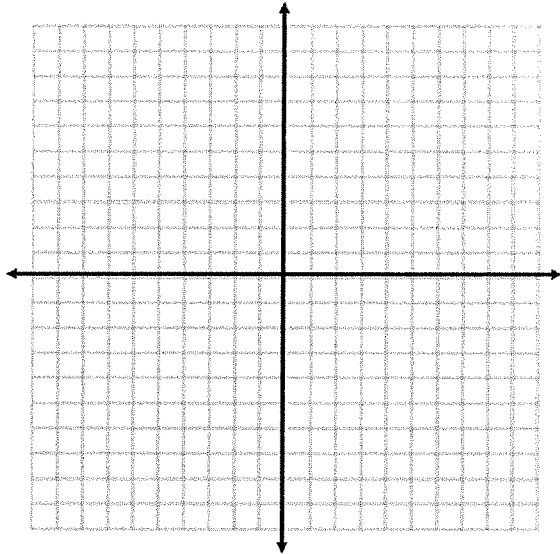
Direct Variation Equation

Slope Equation

Graph the following equations *using the form given*. **Do not** convert the equation to another form. **You must show all your work.**

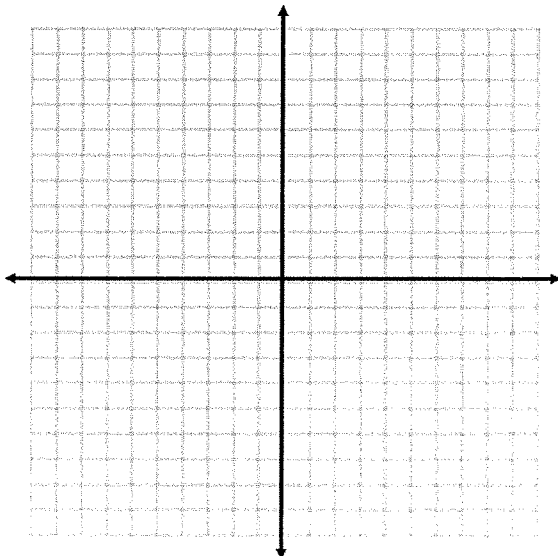
1. slope-intercept form

$$y = \frac{1}{3}x + 2$$

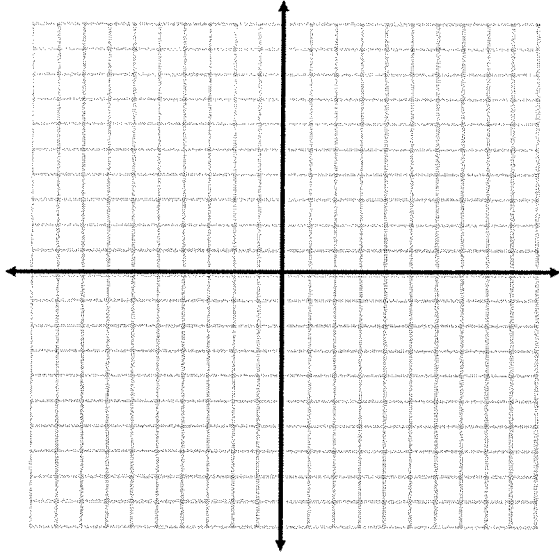


2. using x and y intercepts

$$x - 4y = 8$$



3. point-slope form
 $y - 1 = -3(x - 3)$



Convert the following linear equation to slope-intercept form.

4. $x - 3y = -18$

5. $m=3 ; (-4, -8)$

6. $(0,7) , (1,5)$

Write the following linear equation in standard form.

7. $y = -7x + 2$

8. $m = \frac{1}{2}$; $(-4, -8)$

9. $y - 5 = -6(x + 3)$

Write the following linear equation in point-slope form.

10. $m = -5$, $(3, 8)$

11. $(5, -8)$, $(-9, -1)$

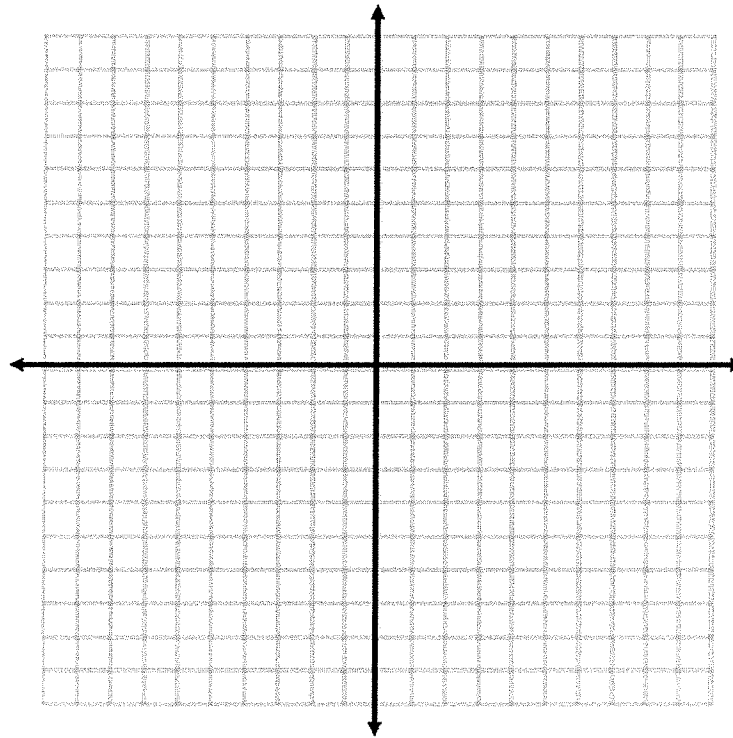
12. Circle the equations that are parallel lines. (Hint : Convert each equation into slope-intercept form in order to compare the slopes.) Then graph the lines that are parallel. You may use any form to graph.

$$4x + y = 5$$

$$y = \frac{1}{4}x + 1$$

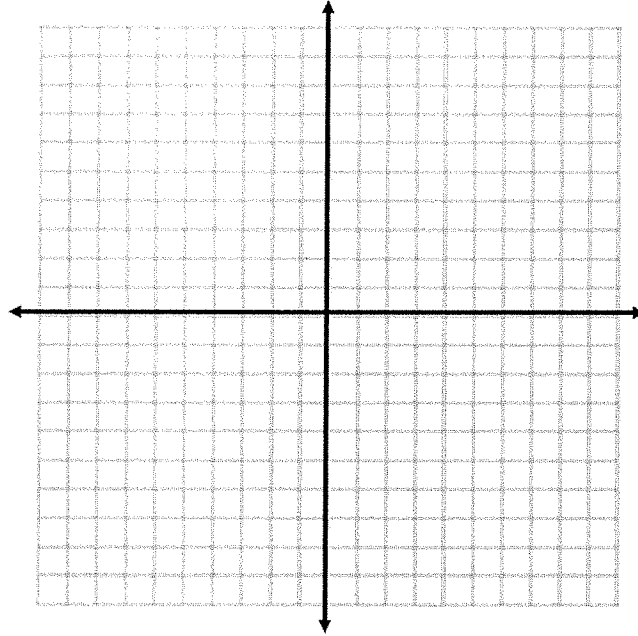
$$y = -4x + 1$$

$$x + 4y = 20$$



13. Write an equation in slope-intercept form for a line that passes through the given point and that is perpendicular to the given line. Graph both lines.

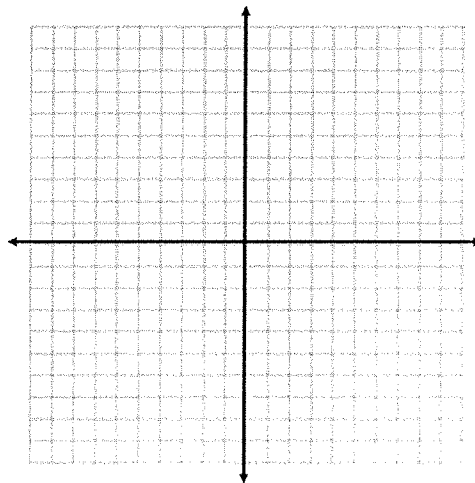
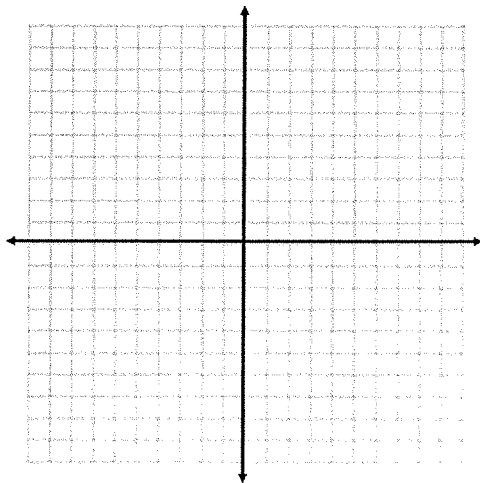
$y = -2x$; $(4,0)$ $y =$ _____



Solve the systems by graphing, and write your solution as an ordered pair.

14. $y = 3x - 7$
 $y = -x + 1$

15. $4x + 8y = 24$
 $2x - 5y = -15$



Solve the systems by substitution or elimination, and write your answer as an ordered pair. Please check your solution for x and y in BOTH equations.

16. $8x + 2y = -2$
 $y = -5x + 1$

17. $y + 6 = 2x$
 $4x - 10y = -4$

Solve the systems by elimination or substitution, and write your answer as an ordered pair. Please check your solution for x and y in BOTH equations.

18. $x + y = 10$
 $-x - 2y = -14$

19. $3x + 2y = -9$
 $-10x + 5y = -5$

20. Coach Spike is planning a fund raiser for the athletic program. He had a local restaurant donate barbeque dinners and sold adult plates for \$12 and child plates for \$8. If he raised \$3,208.00 and sold a total of 348 plates, how many adult plates and how many child plates were sold? (use a system of equations to solve)

21. Mallory and Tristan went looking for coins. They looked under couch cushions, on top of the dryer, in the car and even searched Daddy's pockets. They found a total of 32 coins - only dimes and nickels. When they counted up the money they had \$2.60. How many dimes and how many nickels did they find? (use a system of equations to solve)

Hint - a dime has a value of ____ and a nickel has a value of ____

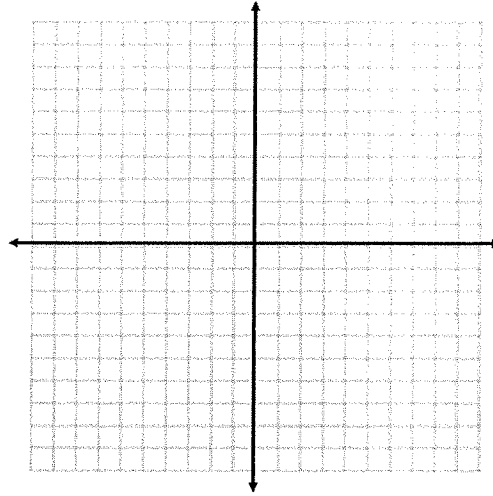
22. Graph the inequality $y < 3x - 1$. Which points are **NOT** a solution?
Circle your choices.

(2, -4)

(0, -1)

(-5, 7)

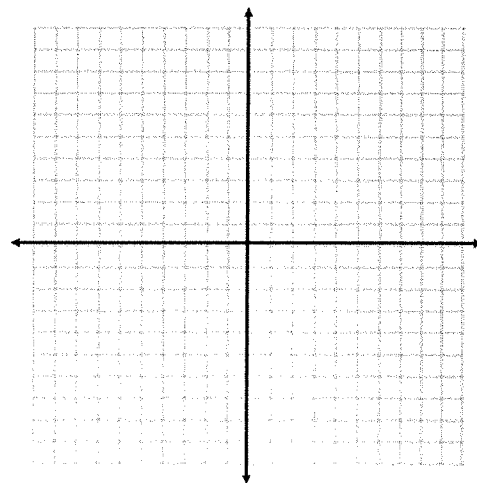
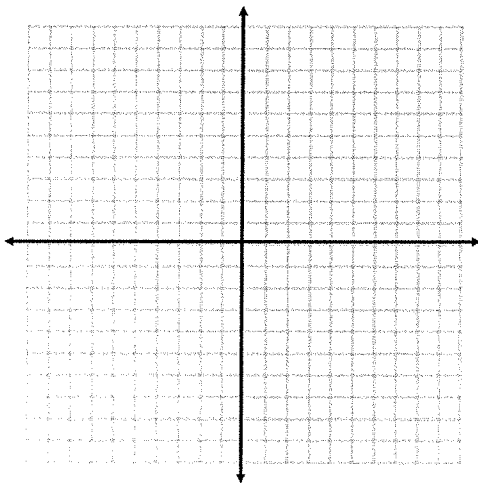
(-2, -9)



Solve each system of inequalities by graphing.

23. $y \leq 3x + 5$
 $y > -x - 2$

24. $x > -1$
 $-4x + y \leq 6$



MULTI. PROPERTIES OF EXPONENTS

Product of Powers

For any number a and all integers m and n ,

$$a^m \cdot a^n = a^{m+n}$$

Simplify $(4a^3bc)(-3a^2b^5)$

$$y(y^5)$$

$$m^2 \cdot m^7$$

$$x^4(x^3)$$

$$n^5 \cdot n^3$$

Power of a Power

For any number a and all integers m and n ,

$$(a^m)^n = a^{mn}$$

Simplify $(b^5)^3$

$$(y^5)^2$$

$$(x^2)^5(x^3)$$

$$(x^3)^3$$

$$(n^3)^2(n^4)^3$$

Power of a Product

For all numbers a and b and integer m ,

$$(ab)^m = a^m b^m$$

Simplify $(3a^2b^5c)^3$

$$(-4xy)^3(-2x^2)^3$$

$$(-3m^2n^4)^3(2n^5)^4$$

DIVISION PROPERTIES OF EXPONENTS

Quotient of Powers

For any nonzero number a , and any integers m and p ,

$$\frac{a^m}{a^p} = a^{m-p}$$

Simplify

$$\frac{x^3y^5}{xy^2}$$

$$\frac{4^5}{4^2}$$

$$\frac{x^6}{x^4}$$

$$\frac{g^5h^4}{g^2h}$$

$$\frac{z^2}{z}$$

$$\frac{x^5y^3}{x^5y^2}$$

$$\frac{-3m^7}{15m^4}$$

$$\frac{rs^6}{r^4s}$$

$$\frac{x^8y^9z^2}{z^3x^4y^6}$$

$$\left(\frac{3x^2y}{xy}\right)^4$$

$$\left(\frac{5m^4n^5}{2m^2n}\right)^3$$

$$\left(\frac{-3b^6c^3}{2b^5c}\right)^2$$

$$\left(\frac{5g^4h}{g^4h^2}\right)^4$$

Power of a Quotient

For any real numbers a and $b \neq 0$, and any integer m ,

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

Simplify

$$\left(\frac{4x^3}{5}\right)^2$$

25. Omitted

Simplify.

26. $(-3x^{-1})^3 x^2$

27. $9^{-2} x^4 y^2 x^{-9}$

28. $\frac{(x^{-8} y^2)^2}{(y^{-3})^{-1}}$

29. $\left(\frac{2x^4 y^{-3}}{x^2}\right)^2$

30. $\left(\frac{a^2 b^3}{a^5 b^{-1} c^2}\right)^{-3}$

31. Thou shalt never leave a _____ in the denominator.
- a. rude relative
 - b. large number
 - c. radical
 - d. Labrador Retriever

Simplify the following radical expressions. Show your work when possible.
Answers should be given as simplified radicals, no decimals.

32.

$$-21\sqrt{27x^9}$$

33.

$$\sqrt{192s^2}$$

Simplify each of the following radical expressions. Show your work when possible.

34.

$$-2\sqrt{243y^3}$$

35.

$$\frac{\sqrt{6}}{\sqrt{2n}}$$

36.

$$\sqrt{\frac{15x}{x^3}}$$

Simplify each product. Show your work when possible.

37.

$$5\sqrt{6} \cdot \frac{1}{6}\sqrt{216}$$

38.

$$-9\sqrt{28a^2} \cdot \frac{1}{3}\sqrt{63a}$$

Simplify each product. Show your work when possible.

39.

$$\sqrt{2y} \cdot \sqrt{128y^5}$$

40.

$$\frac{1}{3}\sqrt{6} \cdot \sqrt{24}$$

Simplify each radical expression. Show your work when possible.

41.

$$\sqrt{\frac{36}{25}}$$

42.

$$7\sqrt{\frac{6}{32}}$$

43.

$$\frac{2\sqrt{24}}{\sqrt{48t^4}}$$

44. Write out the *standard form of a quadratic equation*.

45. Write out the *quadratic formula*.

Solve using the *quadratic formula*.

46. $x^2 + 9x - 7 = 0$

47. $4x^2 - 10x - 1 = 0$