

Summer Packet for Students Entering  
**Algebra 2** (Level 1 & 2)

I. Finding distance and midpoint

①  $(3, -5), (-7, 3)$

Distance:

Midpoint:

②  $(-4, 2), (-1, 6)$

Distance:

Midpoint:

II. Equations of lines

③ Write the equation of the line that contains the points  $(-2, 3)$  and  $(-4, 2)$

④ Write the equation of the line that contains the points  $(4, -6)$  and  $(5, -8)$

⑤ Write the equation of the line that is **parallel** to  $y = -\frac{1}{2}x + 3$  that contains the point  $(-4, 1)$

- ⑥ Write the equation of the line that is **perpendicular** to  $y = 3x + 2$  that contains the point  $(6, -5)$

### III. Two step word problems

- ⑦ Conrad and Jeremiah are preparing for their annual trip to Cousins Beach. They are terrible packers, especially Jeremiah. Because of his lack of foresight, Jeremiah only packs 3 bathing suits. With his meager weekly allowance, he decides he's going to spend every dollar on new bathing suits, so he'll be able to change suits as often as Taylor Swift changes her outfit during each show. If he can buy 2 new bathing suits a week, and he'd like a total of 31 suits, how many weeks will it take to attain this lofty goal? Hint: make  $x$  the number of weeks and set up an equation
- ⑧ Belly and Steven roll into Cousins Beach for the summer late on Friday night. They are starving. Collectively they pool their funds and scrounge together \$28. They head over to their local Jersey Mike's, ready to do some damage. They opt to try and take down the new "giant-giant sub," which boasts five kinds of meat with two kinds of cheese, on their choice of bread (and "Mike's Way," of course). The new sub starts at \$12 for the first 16 inches, and each additional inch is \$2. If Belly and Steven want to get the largest possible sub they can, with the \$28 they have, how many inches will the "giant-giant sub" be? Hint: there may be some unnecessary information in the problem. Let  $x$  be the number of inches above 16 inches, solve for  $x$ , and don't forget to add 16 to your answer at the end!

#### IV. Area and volume word problems

- ⑨ Jeremiah, the lifeguard, is bored at the Cousins Beach Country Club on a lazy Sunday afternoon. He's curious as to what the dimensions of the pool he's overseeing are (because why wouldn't he be?). He knows that the length is one foot more than twice its width and the total area of the pool is 55 square feet. What are the dimensions of the pool?
- ⑩ While working (and daydreaming) at the pool, Jeremiah is envisioning a giant hot tub where he can host some sick Cousins Beach parties (and maybe invite the "Outer Banks" crew?). Ideally, he'd like it to be four feet deep, five feet wide and six feet long. Because Jeremiah is so smart, he knows that 1 cubic foot is about 7.5 gallons. If "hot tub water" costs \$6/gallon, how much is it going to cost Jeremiah to fill the tub? Hint: the volume of a rectangular solid (the hot tub) is length x width x height. Then convert cubic feet into gallons

#### V. Solving linear equations

⑪  $5(x - 3) - 2(x + 1) = 7(x + 1)$

⑫  $-3(a - 2) + 2(a - 3) = 4(a + 5)$

VI. Solving quadratic equations (by factoring, no leading coefficient)

⑬  $x^2 - 5x - 14 = 0$

⑭  $b^2 - 8b + 12 = 0$

VII. Solving quadratic equations (by factoring, with leading coefficient)

⑮  $2a^2 - 5a = 12$

⑯  $3y^2 + 7y - 6 = 0$

VIII. Solving quadratic equations (using Quadratic Formula)

Hint:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

⑰  $4x^2 + 3x - 2 = 0$

⑱  $3x^2 - 5x - 4 = 0$

IX. Simplifying radicals

⑲  $\sqrt{72}$

⑳  $\sqrt{48}$

X. Systems of Equations (solve by substitution: solve for a variable and “substitute” into the second equation)

㉑  $y = -3x + 7$   
 $2x + 3y = -7$

㉒  $4x + y = -10$   
 $-5x + 3y = 21$

XI. Systems of Equations (solve by elimination: line up variables and add equations together)

②③  $2x + 3y = -7$   
 $-4x + y = 21$

②④  $3x + 5y = -13$   
 $2x - 3y = 4$

XII. Systems of Equations: Word Problems (solve by method of your choice)

- ②⑤ One day, Hopper walked down to his local “box in a tree stump” and decided to leave some Eggo® waffles and strawberry ice cream for his friend, Eleven. He was a little upset because he felt Stop & Shop ripped him off (he paid \$78 for 4 boxes of waffles and 3 pints of Ben & Jerry's). He then went to Whole Foods, and when he discovered Eggo®s weren't “Whole” enough to sell there, he had to go around back to Half Foods and purchase his goods there. The clerk at Half Foods told Chief Hopper that he'd sell him the waffles and ice cream at the same price Stop & Shop was advertising (Hopper didn't have any leverage here, the black market prices are what they are). Disgusted, Hopper purchased two more boxes of waffles and two more pints of ice cream for another \$45. How much did Hopper pay for each box of waffles and each pint of ice cream? Hint: make  $x$  the cost of a box of waffles and  $y$  the cost of a pint of strawberry ice cream. Make a system of equations and solve

- ②⑥ Vecna was holding a tag sale in the Upside Down. He was selling slightly used kids sneakers and jean jackets. He had quite the day, selling all 65 items, while collecting \$114.75. If he sold sneakers for \$1.50 each and jackets for \$2.25 each, how many of each did he sell? Hint: make  $x$  the number of sneakers he sells and  $y$  the number of jackets

### XIII. Binomial multiplication (FOIL)

②⑦  $(x - 3)(x + 5)$

②⑧  $(2x - 3)(3x - 7)$

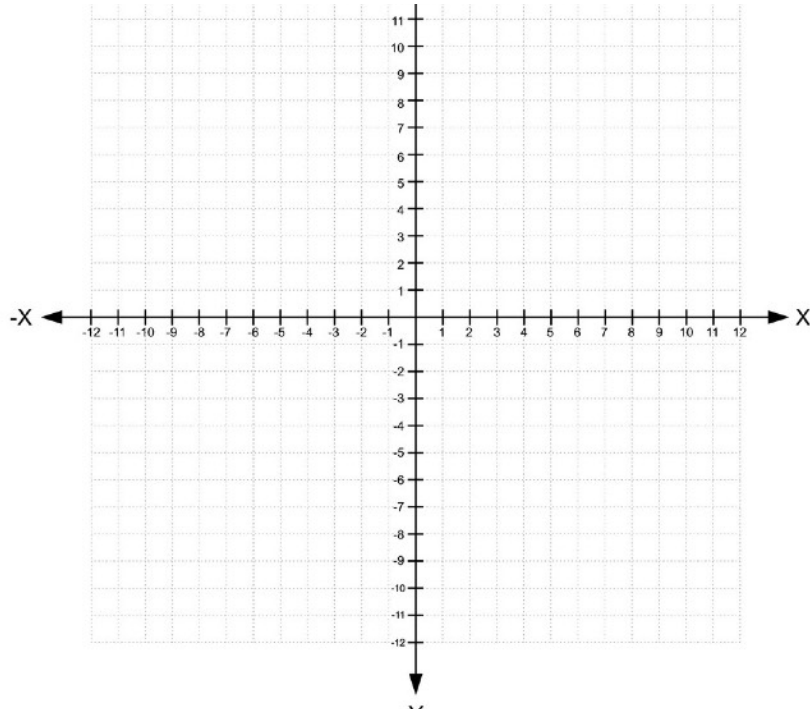
### XIV. Finding the slope between two points

②⑨  $(3, -4), (5, 1)$

③⑩  $(-6, -2), (-5, 3)$

XV. Graphing a linear equation

③①  $y = \frac{1}{3}x - 2$



③②  $2x + 3y = 9$

