

## 2019 Summer Math Packet (completed Algebra II → going into Algebra III)

Congratulations, you made it through your math class this year! Your fabulous prize will be an even more challenging and interesting math class for next year. Yay!

Here is a packet to do over the summer to keep your math skills sharp, because we want you to be ready for your new math class in the fall. Do the indicated page(s) each week during the summer. You will find dates on the pages.

**Complete your summer packet on separate paper without using a calculator, and remember to show all of your work.** Do not do the whole packet right away, or you will forget some of the concepts before the fall. Do not leave the packet until the end of the summer, or you will have forgotten some of the concepts.

You have learned how to do everything in this packet at some point during the year, there is nothing new. Use your notes to help you with the packet. If you get completely stuck, then give one of us a call.

Bring the packet with you to your new math class in the fall. You will have a quiz during the first week of class to make sure you have done the packet and are ready for your new math class. Your math teacher might even give you extra credit for your summer math packet. Who doesn't love extra credit?

Have a wonderful and slightly mathematical summer!

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**Week #1 6/9-6/15**

1. Find the intersection point algebraically (elimination or substitution). Check your solution.

$$y = 3x + 5$$

$$x + y = 2$$

2. Factor the expression completely (factor or use the quadratic formula).

$$x^2 - x - 6$$

3. Find the vertex algebraically (complete the square).

$$y = 2x^2 + 3x - 2$$

4. Find the  $x$ -intercepts algebraically (set  $y = 0$ , then factor or use the quadratic formula).

$$y = x^2 + 8x + 16$$

5. Solve for the unknown quantity.

$$\frac{x+5}{2} + 2 = \frac{3}{x}$$

6. Simplify completely.

$$\sqrt{98}$$

**Week #2 6/16-6/22**

7. Find the intersection point algebraically. Check your solution.

$$x + 2y = 14$$

$$x = 3y - 11$$

8. Factor the expression completely.

$$x^2 + 12x - 28$$

9. Find the vertex algebraically.

$$y = x^2 - 2x - 15$$

10. Find the  $x$ -intercepts algebraically.

$$y = x^2 + 2x - 3$$

11. Simplify completely.

$$(5x^3 y^{-3})^{-2} (2x^5 y^{-4})^{-3}$$

12. Simplify completely.

$$\frac{x^2 y^{-3} x^0 x x}{y^2 y^{-5} x^{-2} x}$$

**Week #3 6/23-6/29**

13. Find the intersection point algebraically. Check your solution.

$$x = y + 8$$

$$x = -3y + 10$$

14. Factor the expression completely.

$$2x^2 - 5x - 7$$

15. Find the vertex algebraically.

$$y = -6(x - 3)(x - 4)$$

16. Find the  $x$ -intercepts algebraically.

$$y = x^2 - 9x$$

17. Simplify completely.

$$\frac{x^2 - 1}{3x^3 + 6x^2 + 3x}$$

18. Find the inverse of the following function.

$$f(x) = 7x + 2$$

**Week #4 6/30-7/6**

19. Find the intersection point algebraically. Check your solution.

$$x = y + 8$$

$$y - 3x = 10$$

20. Factor the expression completely.

$$2x^2 + 9x - 95$$

21. Find the vertex algebraically.

$$y = -1(x + 7)(2x - 9)$$

22. Find the  $x$ -intercepts algebraically.

$$y = 7x^2 + 14x - 2$$

23. Simplify completely.

$$\left( \frac{a^2b}{b^{-3}c^4} \right)^3 (a^{-3}b)^{-2}$$

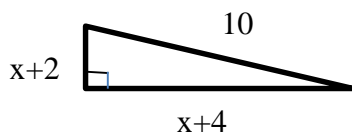
24. Find the distance between (3, 2) and (24, 27).

**Week #5 7/7-7/13**

25. Find the intersection point algebraically. Check your solution.  
 $x - y = -4$   
 $x + 2y = -5$
26. Factor the expression completely.  
 $x^2 - 13x - 48$
27. Find the vertex algebraically.  
 $y = x^2 + 6x + 8$
28. Find the  $x$ -intercepts algebraically.  
 $y = -2(x - 4)(x + 7)$
29. Simplify completely.  
$$\frac{4a - 12}{2a^2 - 18}$$
30. Find the equation in standard form for a parabolic function that goes through the points (1, -12), (3, 16), and has a stretch factor of 2.

**Week #6 7/14-7/20**

31. Find the intersection point algebraically. Check your solution.  
 $4w - t = -1$   
 $t = 6w$
32. Factor the expression completely.  
 $3x^2 + 13x - 10$
33. Find the vertex algebraically.  
 $y = x^2 - 6x$
34. Find the  $x$ -intercepts algebraically.  
 $y = 2x^2 + 7x - 6$
35. Use the Pythagorean theorem to find the value of  $x$ .



36. Simplify completely.  
 $\sqrt{-2250}$

**Week #7 7/21-7/27**

37. Find the intersection point algebraically. Check your solution.

$$-3y + 4x = 15$$

$$-2y + x = 0$$

38. Factor the expression completely.

$$4x^2 - 12x - 40$$

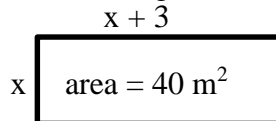
39. Find the vertex algebraically.

$$y = x^2 - x - 6$$

40. Find the  $x$ -intercepts algebraically.

$$x^2 + 8 = 6x + y$$

41. Find the length and width of the following rectangle.



42. Simplify completely.

$$\frac{abcb^{-5}cca^2}{(a^5c^{-2}bbc)^0}$$

**Week #8 7/28-8/3**

43. Find the intersection point algebraically. Check your solution.

$$x + 4y = 5$$

$$3x - 4y = 7$$

44. Factor the expression completely.

$$-2x^2 - 16x - 37$$

45. Find the vertex and the  $y$ -intercept algebraically.

$$y = 6x^2 + 5x - 4$$

46. Find the  $x$ -intercepts algebraically.

$$y = 2x^2 - 12x - 18$$

47. Simplify completely.

$$\frac{3^{-2}x^5(x^{-1})^{-5}}{x(x^2)^{-4}}$$

48. Find the inverse of the following function.

$$f(x) = 2(x - 2)^2 + 2$$

**Week #9 8/4-8/10**

49. Find the intersection point algebraically. Check your solution.

$$10 = 7a + b$$

$$11 - 5a = 2b$$

50. Factor the expression completely.

$$-6x^2 + 42x - 72$$

51. Find the vertex and the y-intercept algebraically.

$$y = 4x^2 - 10x - 14$$

52. Find the x-intercepts algebraically.

$$y + 7 = x^2 + 6x$$

53. Simplify completely.

$$\frac{2x^2 - 3x - 20}{(2x + 5)^2}$$

54. Find the distance between  $\left(\frac{2}{3}, -5\right)$  and  $(3, 3)$ .

**Week #10 8/11-8/17**

55. Find the intersection point algebraically. Check your solution.

$$4y - 2x = 7$$

$$12y + x = -3$$

56. Factor the expression completely.

$$-16t^2 + 200$$

57. Find the vertex and the y-intercept algebraically.

$$y = (-2x + 5)(-3x + 1)$$

58. Find the x-intercepts algebraically.

$$y + 4x + 8 = x^2$$

59. Simplify completely.

$$\frac{x+1}{2x+10} - \frac{x-1}{3x+15}$$

60. What is the equation for the parabolic function that goes through the points  $(-3, 67)$ ,  $(-1, 1)$ , and has a stretch factor of 9.

**Week #11 8/18-8/24**

61. Find the intersection point algebraically. Check your solution.

$$2w - t = 10$$

$$w + 2t = -5$$

62. Factor the expression completely.

$$2x^2 - 4x + 3$$

63. Find the vertex and the y-intercept algebraically.

$$y = x^2 + 6x + 40$$

64. Find the x-intercepts algebraically.

$$y = (x - 2)(3x + 3)$$

65. Solve the inequality.

$$|x + 3| - 2 > 9$$

66. Simplify completely.

$$\sqrt{\frac{256}{484}}$$

**Week #12 8/25-8/31**

67. Find the intersection point algebraically. Check your solution.

$$y - 2x = -8$$

$$y = -3x + 7$$

68. Factor the expression completely.

$$x^2 + 2x - 10$$

69. Find the vertex and the y-intercept algebraically.

$$3x^2 + y = 6x - 2$$

70. Find the x-intercepts algebraically.

$$4x^2 = 42 + x + y$$

71. Simplify completely.

$$\frac{4x^2 + 4x - 8}{10x^2 - 40x + 30}$$

72. Find the inverse of the following function.

$$f(x) = 9x^2 - 25$$

# Answers

## Week 1

1.  $\left(-\frac{3}{4}, \frac{11}{4}\right)$
2.  $(x-3)(x+2)$
3.  $\left(-\frac{3}{4}, -\frac{25}{8}\right)$
4.  $(-4, 0)$
5.  $x = \frac{-9 \pm \sqrt{105}}{2}$
6.  $7\sqrt{2}$

## Week 2

7.  $(4, 5)$
8.  $(x+14)(x-2)$
9.  $(1, -16)$
10.  $(-3, 0)(1, 0)$
11.  $\frac{y^{18}}{200x^{21}}$
12.  $x^5$

## Week 3

13.  $\left(\frac{17}{2}, \frac{1}{2}\right)$
14.  $(2x-7)(x+1)$
15.  $\left(\frac{7}{2}, \frac{3}{2}\right)$
16.  $(0, 0)(9, 0)$
17.  $\frac{x-1}{3x(x+1)}$
18.  $f^{-1}(x) = \frac{1}{7}x - \frac{2}{7}$

## Week 4

19.  $(-9, -17)$
20.  $(2x+19)(x-5)$
21.  $\left(-\frac{5}{4}, \frac{529}{8}\right)$
22.  $\left(\frac{-7+3\sqrt{7}}{7}, 0\right)\left(\frac{-7-3\sqrt{7}}{7}, 0\right)$
23.  $\frac{a^{12}b^{10}}{c^{12}}$
24.  $\sqrt{1066}$

## Week 5

25.  $\left(\frac{-13}{3}, \frac{-1}{3}\right)$
26.  $(x+3)(x-16)$
27.  $(-3, -1)$
28.  $(4, 0)(-7, 0)$
29.  $\frac{2}{a+3}$
30.  $y = 2x^2 + 6x - 20$

## Week 6

31.  $\left(3, \frac{1}{2}\right)$
32.  $(3x-2)(x+5)$
33.  $(3, -9)$
34.  $\left(\frac{-7+\sqrt{97}}{4}, 0\right)\left(\frac{-7-\sqrt{97}}{4}, 0\right)$
35.  $x = 4$
36.  $15i\sqrt{10}$

## Week 7

37.  $(6, 3)$
38.  $4(x-5)(x+2)$
39.  $\left(\frac{1}{2}, -\frac{25}{4}\right)$
40.  $(4, 0)(2, 0)$
41. *width = 5m, length = 8m*
42.  $\frac{a^3c^3}{b^4}$

## Week 8

43.  $\left(3, \frac{1}{2}\right)$
44.  $\left(x - \left(-4 + \frac{i\sqrt{10}}{2}\right)\right)\left(x - \left(-4 - \frac{i\sqrt{10}}{2}\right)\right)$
45.  $\left(-\frac{5}{12}, -\frac{121}{24}\right)(0, -4)$
46.  $(3+3\sqrt{2}, 0)(3-3\sqrt{2}, 0)$
47.  $\frac{x^{17}}{9}$
48.  $f^{-1}(x) = 2 \pm \sqrt{\frac{x-2}{2}}$

## Week 9

49.  $(1, 3)$
50.  $-6(x-3)(x-4)$
51.  $\left(\frac{5}{4}, -\frac{81}{4}\right)(0, -14)$
52.  $(1, 0)(-7, 0)$
53.  $\frac{x-4}{2x+5}$
54.  $\frac{25}{3}$

## Week 10

55.  $\left(-\frac{24}{7}, \frac{1}{28}\right)$
56.  $\left(t + \frac{5\sqrt{2}}{2}\right)\left(t - \frac{5\sqrt{2}}{2}\right)$
57.  $\left(\frac{17}{12}, -\frac{169}{24}\right)(0, 5)$
58.  $(2+2\sqrt{3}, 0)(2-2\sqrt{3}, 0)$
59.  $\frac{1}{6}$
60.  $y = 9x^2 + 3x - 5$

## Week 11

61.  $(-4, 3)$
62.  $\left(x - \left(\frac{2+i\sqrt{2}}{2}\right)\right)\left(x - \left(\frac{2-i\sqrt{2}}{2}\right)\right)$
63.  $(-3, 31)(0, 40)$
64.  $(2, 0)(-1, 0)$
65.  $x < -14$ , or  $x > 8$
66.  $\frac{8}{11}$

## Week 12

67.  $(3, -2)$
68.  $(x - (-1 + \sqrt{11}))(x - (-1 - \sqrt{11}))$
69.  $(1, 1)(0, -2)$
70.  $\left(\frac{1+\sqrt{673}}{8}, 0\right)\left(\frac{1-\sqrt{673}}{8}, 0\right)$
71.  $\frac{2(x+2)}{5(x-3)}$
72.  $f^{-1}(x) = \frac{\pm\sqrt{x+25}}{3}$