2017 Summer Math Packet
for students who have completed Algebra II

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 skills 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!

The MSA Math Department

Bronwen Williams	Lauren Zachman	Aaron Wojahn	Caitlin Harper	Noah Langseth
651-353-2309	651-353-2305	651-578-7507 ext: 4009	651-578 7507 ext: 4010	651-353-2319
bwilliams@mnmsa.org	lzachman@mnmsa.org	awojahn@mnmsa.org	charper@mnmsa.org	nlangseth@mnmsa.org

Week #1 6/12-6/18

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 6/19-6/25

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.
    $$\left(5x^3 y^{-3}\right)^{-2} \left(2x^5 y^{-4}\right)^{-3}$$

12. Simplify completely.
    $$\frac{x^2 y^{-3} x^0 xx}{y^2 y^{-5} x^{-2} x}$$

Week #3 6/26-7/2

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 7/3-7/9

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.
$$\left(\frac{a^2 b}{b^{-3} c^4}\right)^3 \left(a^{-3} b\right)^{-2}$$
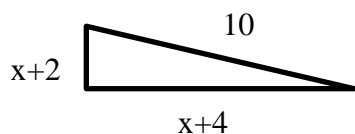
24. Find the distance between (3, 2) and (24, 27).

Week #5 7/10-7/16

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 7/17-7/23

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.

10

x+2

x+4

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

Week #7 7/24-7/30

37. Find the intersection point algebraically. Check your solution.
$$-3y + 4x = 15$$
$$-2y + x = 0$$

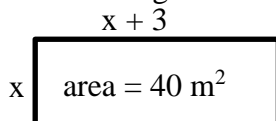38. Factor the expression completely.
$$4x^2 - 12x - 40$$

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.

$$\text{x} + 3$$

x | area = 40 m^2

42. Simplify completely.
$$\frac{abcb^{-5}cca^2}{\left(a^5c^{-2}bbc\right)^0}$$

Week #8 7/31-8/6

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

48. Find the inverse of the following function.
$$f(x) = 2(x-2)^2 + 2$$

Week #9 8/7-8/13

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 8/14-8/20

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 8/21-8/27

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.

$\sqrt{\dfrac{256}{484}}$

Week #12 8/28-9/3

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.

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

72. Find the inverse of the following function.

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

Answers

Week 1

1. $\left(-\dfrac{3}{4},\dfrac{11}{4}\right)$

2. $(x-3)(x+2)$

3. $\left(-\dfrac{3}{4},-\dfrac{25}{8}\right)$

4. $(-4,0)$

5. $x=\dfrac{-9\pm\sqrt{105}}{2}$

6. $7\sqrt{2}$

Week 2

7. $(4,5)$

8. $(x+14)(x-2)$

9. $(1,-16)$

10. $(-3,0)\,(1,0)$

11. $\dfrac{y^{18}}{200x^{21}}$

12. x^5

Week 3

13. $\left(\dfrac{17}{2},\dfrac{1}{2}\right)$

14. $(2x-7)(x+1)$

15. $\left(\dfrac{7}{2},\dfrac{3}{2}\right)$

16. $(0,0)\,(9,0)$

17. $\dfrac{x-1}{3x(x+1)}$

18. $f^{-1}(x)=\dfrac{1}{7}x-\dfrac{2}{7}$

Week 4

19. $(-9,-17)$

20. $(2x+19)(x-5)$

21. $\left(-\dfrac{5}{4},\dfrac{529}{8}\right)$

22. $\left(\dfrac{-7+3\sqrt{7}}{7},0\right)\left(\dfrac{-7-3\sqrt{7}}{7},0\right)$

23. $\dfrac{a^{12}b^{10}}{c^{12}}$

24. $\sqrt{1066}$

Week 5

25. $\left(\dfrac{-13}{3},\dfrac{-1}{3}\right)$

26. $(x+3)(x-16)$

27. $(-3,-1)$

28. $(4,0)\,(-7,0)$

29. $\dfrac{2}{a+3}$

30. $y=2x^2+6x-20$

Week 6

31. $\left(3,\dfrac{1}{2}\right)$

32. $(3x-2)(x+5)$

33. $(3,-9)$

34. $\left(\dfrac{-7+\sqrt{97}}{4},0\right)\left(\dfrac{-7-\sqrt{97}}{4},0\right)$

35. $x=4$

36. $15i\sqrt{10}$

Week 7

37. $(6,3)$

38. $4(x-5)(x+2)$

39. $\left(\dfrac{1}{2},-\dfrac{25}{4}\right)$

40. $(4,0)\,(2,0)$

41. $width=5m,\ length=8m$

42. $\dfrac{a^3c^3}{b^4}$

Week 8

43. $\left(3,\dfrac{1}{2}\right)$

44. $\left(x-\left(-4+\dfrac{i\sqrt{10}}{2}\right)\right)\left(x-\left(-4-\dfrac{i\sqrt{10}}{2}\right)\right)$

45. $\left(-\dfrac{5}{12},-\dfrac{121}{24}\right)(0,-4)$

46. $(3+3\sqrt{2},0)(3-3\sqrt{2},0)$

47. $\dfrac{x^{17}}{9}$

48. $f^{-1}(x)=2\pm\sqrt{\dfrac{x-2}{2}}$

Week 9

49. $(1,3)$

50. $-6(x-3)(x-4)$

51. $\left(\dfrac{5}{4},-\dfrac{81}{4}\right)(0,-14)$

52. $(1,0)\,(-7,0)$

53. $\dfrac{x-4}{2x+5}$

54. $\dfrac{25}{3}$

Week 10

55. $\left(-\dfrac{24}{7},\dfrac{1}{28}\right)$

56. $\left(t+\dfrac{5\sqrt{2}}{2}\right)\left(t-\dfrac{5\sqrt{2}}{2}\right)$

57. $\left(\dfrac{17}{12},-\dfrac{169}{24}\right)(0,5)$

58. $(2+2\sqrt{3},0)(2-2\sqrt{3},0)$

59. $\dfrac{1}{6}$

60. $y=9x^2+3x-5$

Week 11

61. $(-4,3)$

62. $\left(x-\left(\dfrac{2+i\sqrt{2}}{2}\right)\right)\left(x-\left(\dfrac{2-i\sqrt{2}}{2}\right)\right)$

63. $(-3,31)\,(0,40)$

64. $(2,0)\,(-1,0)$

65. $x<-14,\ or\ x>8$

66. $\dfrac{8}{11}$

Week 12

67. $(3,-2)$

68. $\left(x-\left(-1+\sqrt{11}\right)\right)\left(x-\left(-1-\sqrt{11}\right)\right)$

69. $(1,1)\,(0,-2)$

70. $\left(\dfrac{1+\sqrt{673}}{8},0\right)\left(\dfrac{1-\sqrt{673}}{8},0\right)$

71. $\dfrac{2(x+2)}{5(x-3)}$

72. $f^{-1}(x)=\dfrac{\pm\sqrt{x+25}}{3}$