

Honors Algebra II Summer Packet

This summer packet is for students enrolled in Honors Algebra II (518). The assignment should be completed by the first Friday of school. An assessment on the material will be within the first two weeks of school. The objectives in this packet are Algebra I objectives, and all of the objectives are NON – CALCULATOR objectives. *The score on this assessment is a strong indicator of success in the class.*

This summer packet will also introduce you to the online Algebra 2 & Trigonometry Textbook for the Honors Algebra II course. Use the textbook sections to review any topics for problems with which you struggle to complete or need review. The textbook has an online version as well as a PDF version. The link to the answers to ODD problems is also below. You can access each with the links below:

[OpenStax Algebra 2 & Trigonometry online version](#) - Objectives, Sample Problems and links to videos for each section in interactive format. Find video resources at the end of each section where available.

[OpenStax Algebra 2 & Trigonometry PDF version](#) – Objectives, Samples Problems and Sections Exercises in pdf form.

[ODD Answers](#) – Answers to the odd problems in the Section Exercises, Chapter Review, and Chapter Practice Test in the PDF version.

The summer packet problems are chapter reviews of the following chapters of the textbook.

Chapter 1: Introduction to Prerequisites

Chapter 2: Equations and Inequalities

DIRECTIONS: Complete the assigned problems for the Chapters described. When completing the problems, you should be practicing good work habits: copy the problem, show all work (usually best in a vertical format), circle your final answer and check the answer using the ODD answers. If you choose to complete more practice, each section of the chapters has a problem set of exercises and you can practice as many problems as you think you need to be prepared for the assessment.

Chapter 1 Review Problems: #1-67 Odd EXCEPT # 33,55,57,59

Chapter 2 Review Problems: #1-15 Odd, 19-25, 40-45, 48-51, 58-59, 61-67 odd (for 61-67 write the solution as an inequality or compound inequality)

OBJECTIVES:

Chapter 1:

- Classify a real number as a natural, whole, integer, rational, or irrational number.
- Perform calculations using order of operations.
- Use the following properties: commutative, associative, distributive, inverse, and identity.
- Evaluate algebraic expressions.
- Simplify algebraic expressions.
- Use the product rule of exponents.
- Use the quotient rule of exponents.
- Use the power rule of exponents.
- Use the zero-exponent rule of exponents.
- Use the negative rule of exponents.
- Find the power of a product and a quotient.
- Simplify exponential expressions.
- Evaluate square roots.
- Use the product rule to simplify square roots.
- Use the quotient rule to simplify square roots.
- Add and subtract square roots.
- Rationalize denominators.
- Add and subtract polynomials.
- Multiply polynomials.
- Perform operations with polynomials of several variables.
- Factor the greatest common factor of a polynomial.
- Factor a trinomial.
- Factor by grouping.
- Factor a perfect square trinomial.
- Factor a difference of squares.
- Simplify rational expressions.
- Multiply rational expressions.
- Divide rational expressions.
- Add and subtract rational expressions.

Chapter 2:

- Plot ordered pairs in a Cartesian coordinate system.
- Graph equations by plotting points.
- Graph equations with a graphing utility.
- Find x-intercepts and y-intercepts.
- Use the distance formula.
- Use the midpoint formula.
- Solve equations in one variable algebraically.
- Solve a rational equation.
- Solve an absolute value equation.
- Find a linear equation.
- Given the equations of two lines, determine whether their graphs are parallel or perpendicular.
- Write the equation of a line parallel or perpendicular to a given line.
- Solve quadratic equations by factoring.
- Solve quadratic equations by the square root property.
- Solve quadratic equations by using the quadratic formula.
- Solve inequalities in one variable algebraically.

We will be using graphing calculators throughout the course. If you do not own a graphing calculator, it is recommended that you purchase your own calculator. We recommend purchasing a TI – 84 Plus calculator. DO NOT buy a TI-89 calculator because they are not allowed in class, on the SAT's or other standardized tests.

PLEASE NOTE: The decision to take an Honors class is a serious one. The work in this class will require the following:

- Exemplary work habits.
- Exemplary time management skills.
- A genuine desire to learn.
- Personal responsibility for attendance and work requirements.
- Independent review and study habits.

CHAPTER 1 REVIEW EXERCISES

REAL NUMBERS: ALGEBRA ESSENTIALS

For the following exercises, perform the given operations.

1. $(5 - 3 \cdot 2)^2 - 6$

2. $64 \div (2 \cdot 8) + 14 \div 7$

3. $2 \cdot 5^2 + 6 \div 2$

For the following exercises, solve the equation.

4. $5x + 9 = -11$

5. $2y + 4^2 = 64$

For the following exercises, simplify the expression.

6. $9(y + 2) \div 3 \cdot 2 + 1$

7. $3m(4 + 7) - m$

For the following exercises, identify the number as rational, irrational, whole, or natural. Choose the most descriptive answer.

8. 11

9. 0

10. $\frac{5}{6}$

11. $\sqrt{11}$

EXPONENTS AND SCIENTIFIC NOTATION

For the following exercises, simplify the expression.

12. $2^2 \cdot 2^4$

13. $\frac{4^5}{4^3}$

14. $\left(\frac{a^2}{b^3}\right)^4$

15. $\frac{6a^2 \cdot a^0}{2a^{-4}}$

16. $\frac{(xy)^4}{y^3} \cdot \frac{2}{x^5}$

17. $\frac{4^{-2}x^3y^{-3}}{2x^0}$

18. $\left(\frac{2x^2}{y}\right)^{-2}$

19. $\left(\frac{16a^3}{b^2}\right)(4ab^{-1})^{-2}$

20. Write the number in standard notation:
 2.1314×10^{-6}

21. Write the number in scientific notation: 16,340,000

RADICALS AND RATIONAL EXPRESSIONS

For the following exercises, find the principal square root.

22. $\sqrt{121}$

23. $\sqrt{196}$

24. $\sqrt{361}$

25. $\sqrt{75}$

26. $\sqrt{162}$

27. $\sqrt{\frac{32}{25}}$

28. $\sqrt{\frac{80}{81}}$

29. $\sqrt{\frac{49}{1250}}$

30. $\frac{2}{4 + \sqrt{2}}$

31. $4\sqrt{3} + 6\sqrt{3}$

32. $12\sqrt{5} - 13\sqrt{5}$

33. $\sqrt[5]{-243}$

34. $\frac{\sqrt[3]{250}}{\sqrt[3]{-8}}$

POLYNOMIALS

For the following exercises, perform the given operations and simplify.

35. $(3x^3 + 2x - 1) + (4x^2 - 2x + 7)$

36. $(2y + 1) - (2y^2 - 2y - 5)$

37. $(2x^2 + 3x - 6) + (3x^2 - 4x + 9)$

38. $(6a^2 + 3a + 10) - (6a^2 - 3a + 5)$

39. $(k + 3)(k - 6)$

40. $(2h + 1)(3h - 2)$

41. $(x + 1)(x^2 + 1)$

42. $(m - 2)(m^2 + 2m - 3)$

43. $(a + 2b)(3a - b)$

44. $(x + y)(x - y)$

FACTORING POLYNOMIALS

For the following exercises, find the greatest common factor.

45. $81p + 9pq - 27p^2q^2$

46. $12x^2y + 4xy^2 - 18xy$

47. $88a^3b + 4a^2b - 144a^2$

For the following exercises, factor the polynomial.

48. $2x^2 - 9x - 18$

49. $8a^2 + 30a - 27$

50. $d^2 - 5d - 66$

51. $x^2 + 10x + 25$

52. $y^2 - 6y + 9$

53. $4h^2 - 12hk + 9k^2$

54. $361x^2 - 121$

55. $p^3 + 216$

56. $8x^3 - 125$

57. $64q^3 - 27p^3$

58. $4x(x - 1)^{-\frac{1}{4}} + 3(x - 1)^{\frac{3}{4}}$

59. $3p(p + 3)^{\frac{1}{3}} - 8(p + 3)^{\frac{4}{3}}$

60. $4r(2r - 1)^{-\frac{2}{3}} - 5(2r - 1)^{\frac{1}{3}}$

RATIONAL EXPRESSIONS

For the following exercises, simplify the expression.

61. $\frac{x^2 - x - 12}{x^2 - 8x + 16}$

62. $\frac{4y^2 - 25}{4y^2 - 20y + 25}$

63. $\frac{2a^2 - a - 3}{2a^2 - 6a - 8} \cdot \frac{5a^2 - 19a - 4}{10a^2 - 13a - 3}$

64. $\frac{d - 4}{d^2 - 9} \cdot \frac{d - 3}{d^2 - 16}$

65. $\frac{m^2 + 5m + 6}{2m^2 - 5m - 3} \div \frac{2m^2 + 3m - 9}{4m^2 - 4m - 3}$

66. $\frac{4d^2 - 7d - 2}{6d^2 - 17d + 10} \div \frac{8d^2 + 6d + 1}{6d^2 + 7d - 10}$

67. $\frac{10}{x} + \frac{6}{y}$

68. $\frac{12}{a^2 + 2a + 1} - \frac{3}{a^2 - 1}$

69. $\frac{\frac{1}{d} + \frac{2}{c}}{\frac{6c + 12d}{dc}}$

70. $\frac{\frac{3}{x} - \frac{7}{y}}{\frac{2}{x}}$

CHAPTER 2 REVIEW EXERCISES

THE RECTANGULAR COORDINATE SYSTEMS AND GRAPHS

For the following exercises, find the x -intercept and the y -intercept without graphing.

1. $4x - 3y = 12$

2. $2y - 4 = 3x$

For the following exercises, solve for y in terms of x , putting the equation in slope–intercept form.

3. $5x = 3y - 12$

4. $2x - 5y = 7$

For the following exercises, find the distance between the two points.

5. $(-2, 5)(4, -1)$

6. $(-12, -3)(-1, 5)$

7. Find the distance between the two points $(-71, 432)$ and $(511, 218)$ using your calculator, and round your answer to the nearest thousandth.

For the following exercises, find the coordinates of the midpoint of the line segment that joins the two given points.

8. $(-1, 5)$ and $(4, 6)$

9. $(-13, 5)$ and $(17, 18)$

For the following exercises, construct a table and graph the equation by plotting at least three points.

10. $y = \frac{1}{2}x + 4$

11. $4x - 3y = 6$

LINEAR EQUATIONS IN ONE VARIABLE

For the following exercises, solve for x .

12. $5x + 2 = 7x - 8$

13. $3(x + 2) - 10 = x + 4$

14. $7x - 3 = 5$

15. $12 - 5(x + 1) = 2x - 5$

16. $\frac{2x}{3} - \frac{3}{4} = \frac{x}{6} + \frac{21}{4}$

For the following exercises, solve for x . State all x -values that are excluded from the solution set.

17. $\frac{x}{x^2 - 9} + \frac{4}{x + 3} = \frac{3}{x^2 - 9} \quad x \neq 3, -3$

18. $\frac{1}{2} + \frac{2}{x} = \frac{3}{4}$

For the following exercises, find the equation of the line using the point-slope formula.

19. Passes through these two points: $(-2, 1), (4, 2)$.

20. Passes through the point $(-3, 4)$ and has a slope of $-\frac{1}{3}$.

21. Passes through the point $(-3, 4)$ and is parallel to the graph $y = \frac{2}{3}x + 5$.

22. Passes through these two points: $(5, 1), (5, 7)$.

MODELS AND APPLICATIONS

For the following exercises, write and solve an equation to answer each question.

23. The number of males in the classroom is five more than three times the number of females. If the total number of students is 73, how many of each gender are in the class?

24. A man has 72 ft of fencing to put around a rectangular garden. If the length is 3 times the width, find the dimensions of his garden.

25. A truck rental is \$25 plus \$.30/mi. Find out how many miles Ken traveled if his bill was \$50.20.

COMPLEX NUMBERS

For the following exercises, use the quadratic equation to solve.

26. $x^2 - 5x + 9 = 0$

27. $2x^2 + 3x + 7 = 0$

For the following exercises, name the horizontal component and the vertical component.

28. $4 - 3i$

29. $-2 - i$

For the following exercises, perform the operations indicated.

30. $(9 - i) - (4 - 7i)$

31. $(2 + 3i) - (-5 - 8i)$

32. $2\sqrt{-75} + 3\sqrt{25}$

33. $\sqrt{-16} + 4\sqrt{-9}$

34. $-6i(i - 5)$

35. $(3 - 5i)^2$

36. $\sqrt{-4} \cdot \sqrt{-12}$

37. $\sqrt{-2}(\sqrt{-8} - \sqrt{5})$

38. $\frac{2}{5 - 3i}$

39. $\frac{3 + 7i}{i}$

QUADRATIC EQUATIONS

For the following exercises, solve the quadratic equation by factoring.

40. $2x^2 - 7x - 4 = 0$

41. $3x^2 + 18x + 15 = 0$

42. $25x^2 - 9 = 0$

43. $7x^2 - 9x = 0$

For the following exercises, solve the quadratic equation by using the square-root property.

44. $x^2 = 49$

45. $(x - 4)^2 = 36$

For the following exercises, solve the quadratic equation by completing the square.

46. $x^2 + 8x - 5 = 0$

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

For the following exercises, solve the quadratic equation by using the quadratic formula. If the solutions are not real, state *No real solution*.

48. $2x^2 - 5x + 1 = 0$

49. $15x^2 - x - 2 = 0$

For the following exercises, solve the quadratic equation by the method of your choice.

50. $(x - 2)^2 = 16$

51. $x^2 = 10x + 3$

OTHER TYPES OF EQUATIONS

For the following exercises, solve the equations.

52. $x^{\frac{3}{2}} = 27$

53. $x^{\frac{1}{2}} - 4x^{\frac{1}{4}} = 0$

54. $4x^3 + 8x^2 - 9x - 18 = 0$

55. $3x^5 - 6x^3 = 0$

56. $\sqrt{x+9} = x-3$

57. $\sqrt{3x+7} + \sqrt{x+2} = 1$

58. $|3x-7| = 5$

59. $|2x+3| - 5 = 9$

LINEAR INEQUALITIES AND ABSOLUTE VALUE INEQUALITIES

For the following exercises, solve the inequality. Write your final answer in interval notation.

60. $5x - 8 \leq 12$

61. $-2x + 5 > x - 7$

62. $\frac{x-1}{3} + \frac{x+2}{5} \leq \frac{3}{5}$

63. $|3x+2| + 1 \leq 9$

64. $|5x-1| > 14$

65. $|x-3| < -4$

For the following exercises, solve the compound inequality. Write your answer in interval notation.

66. $-4 < 3x + 2 \leq 18$

67. $3y < 1 - 2y < 5 + y$

For the following exercises, graph as described.

68. Graph the absolute value function and graph the constant function. Observe the points of intersection and shade the x -axis representing the solution set to the inequality. Show your graph and write your final answer in interval notation.
 $|x+3| \geq 5$

69. Graph both straight lines (left-hand side being y_1 and right-hand side being y_2) on the same axes. Find the point of intersection and solve the inequality by observing where it is true comparing the y -values of the lines. See the interval where the inequality is true.
 $x+3 < 3x-4$