

Honors Algebra II
Summer Review Packet

These problems represent a review of Algebra I material. You may have been away from Algebra for a year, if your previous course was Geometry. You may be moving to the Honors level from a college prep course. You may be coming to Honors Algebra II directly from Honors Algebra I. In any case, by using this review packet, you will be recalling your Algebra I skills. You may need to refer to your Algebra I notebook or other resource to refresh your memory. These are skills that we expect to be strong as you begin your work in Honors Algebra II.

DUE ON THE FIRST DAY OF CLASS

Complete the packet on loose leaf, showing your work and bring it with you on the first day of class. Answers are included at the end of the packet for your reference.

**Students moving to Honors Algebra II from
college prep Algebra I or 8th grade**

Be sure to complete the additional factoring packet that is posted with the summer assignments.

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Linear Inequalities: Solve. Graph the solution on a number line.

- $4 + 5x > 24$ or $16 + x \leq 17$
- $3(x + 2) < 5x - 11 < 3x + 7$
- $5(x + 3) \leq 2(x - 4) - 3(x + 1)$
- $(x + 5) + 2(7 - x) + 15 < \frac{1}{4}(32x - 44)$

Absolute Value Equations and Inequalities. Solve.

- $5|x - 2| + 7 < 17$
- $7 + \frac{1}{5}|x - 5(x + 2)| < 15$
- $|6x + 15| - 3 \geq 14$
- $3|6x - 7| + 10 = 8$
- $-5|4x + 3| - 14 = -34$
- $\left| \frac{2}{3}x - 6 \right| = 12$

Writing Equations of Lines

Remember: If the *y*-intercept is not given, you **MUST** use *point slope form*.

$$y - y_1 = m(x - x_1)$$

Write the equation of a line through the given point and parallel to the given line. Write the final result in standard form with integer coefficients.

- $(-1, 4)$ $3x - y = 5$
- $(0, 3)$ $2x - 4y = 7$

Write the equation of a line through the given point and perpendicular to the given line. Write the final result in standard form with integer coefficients.

- $(-4, -3)$ $2x - 5y = 10$
- $(2, -6)$ $-3x - 7y = 2$
- Write the equation of a line whose X intercept is -1 and is perpendicular to $4x + y = 2$

Write the equation for the function in slope intercept form given the following:

- $f(-4) = -33, f(0) = 5$
- $f(3) = -1, f(15) = 5$
- Write the equation of a line whose **x intercept is 3 and y intercept is 2**. Write the result in slope intercept form.
- A Hawaiian fruit company is studying the sales of a pineapple sauce to see if the product is to be continued. At the end of its first year, profits on the product were \$30,000. At the end of the fourth year, profits were \$66,000. Assume the relationship between years on the market and profit is linear. Write an equation to model the situation. Be sure to define your variables.

Use the equation to predict the profit at the end of 7 years.

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20. Erik pays \$225 in advance on his account at the athletic club. Each time he uses the club, \$9 is deducted from the account. Write an equation that represents the value remaining in his account after x visits to the club. Be sure to define your variables.

Find the value remaining in the account after 7 visits.

Graphing Linear Functions

21. Graph using a table of values. $2y + 3x = -6$
22. Graph using intercepts. $3x - y = 9$

Graph the following by using the slope intercept form of the equation.

23. $4y - 2x = 10$ 24. $\frac{1}{3}x + \frac{3}{4}y = 3$ 25. $3(x + y) = 2(x - 6)$

Graph by method of your choice.

26. $4x - 3y + 2[3(x - 2y)] = -30$ 27. $7x - 2(x + 5) = 25x - 5(x + 3)$

Calculate the slope of the line that joins the following points.

28. (2, 5), (7, 25) 29. (8, 11) (10,-6) 30. (3, 7), (3, 1.5)

Determine whether the graphs of the two equations are parallel, perpendicular or neither.

31. $y = x + 3$; $y = 6 + x$ 32. $y = 3x + 2$; $\frac{1}{3}x + y - 10 = 0$
33. $3x + 7y - 21 = 4x$; $8y - 15x = 25 - 3x + y$

Systems of Equations

34. Use **ELIMINATION** to solve the following system of linear equations. $\begin{cases} 3x + 2y = -5 \\ 4x - 3y = 16 \end{cases}$
35. Use **SUBSTITUTION** to solve the following system of linear equations. $\begin{cases} 5x - y = 13 \\ x - 4y = -5 \end{cases}$
36. Solve by **GRAPHING**. Identify your answer as an ordered pair. $\begin{cases} x + y = 1 \\ 3x - y = -5 \end{cases}$

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Operations with Polynomials

37. $(5x+1)(3x-2)$

39. $(3x^2-4x+1)(2x+5)$

41. $(2p+9)(3p-7)-(5p+2)(5p-2)$

38. $(5c-7)^2$

40. $(4x-5)(x+3)(4x+5)(x-3)$

42. $\left(\frac{1}{3}x+\frac{7}{4}\right)\left(\frac{1}{3}x-\frac{7}{4}\right)$

Factoring Fully factor the following expressions.

43. $x^2+6x-27$

45. $12x^2-23x-24$

47. $5x^4-80$

49. $3x^5+15x^3-108x$

51. $2m^3-10m^2+3m-15$

53. $b^2-14b+45$

55. b^4-26b^2+25

44. $3x^2-13x+14$

46. $18x^2-53x+20$

48. $9x^2+30x+25$

50. $12x^2-4x-21$

52. $2(x-1)^2-9(x-1)-5$

54. x^8-y^{16}

Quadratics and Radicals

56. Write the equation of a line through the vertex of $y=(x+4)(x-2)$ and parallel to $6x+2y=7$

Fully simplify:

57. $\frac{4\pm\sqrt{52}}{8}$

58. $\frac{-3\pm\sqrt{25}}{16}$

59. $\frac{\sqrt{75}\sqrt{12}}{\sqrt{2}}$

Solve using the most efficient algebraic method. Fully simplify your answers.

60. $2b^2+16b=4$

61. $y^2+8y=10$

62. $6a^2+15=-19a$

63. $3m^2-2m=1$

64. $2x^2=18$

65. $3x^2-12=9x$

66. $7(x^2-4)+2x=2(x-4)$

67. $5x^2-125=0$

68. $7(x^3+x^2-4)=7x^3+8$

69. $\frac{1}{5}(x^2-10)=18$

70. $3x^2-14x+17=-2x+5$

71. $4x^2-27x+35=0$

72. $30x=25x^2+2$

73. $x=56-x^2$

74. $2x^2-242=0$

75. $(2x+5)^2-4=21$

76. $x^2+4x-11=0$

77. $9x^2-16x+7=0$

78. Rewrite in vertex form:

$y=5x^2-40x+82$

79. $10x^2-11x+2=0$

80. $4x^2-6x-3=6x+4$

81. $6x^2-x-40=0$

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82. $-20x = 16x^2 + 5$

83. $2x = 63 - x^2$

84. $3x^2 - 147 = 0$

85. $(4x - 1)^2 - 3 = 33$

86. $x^2 + 6x - 10 = 0$

87. $12x^2 - 17x + 6 = 0$

88. Rewrite in vertex form:

$$y = 3x^2 - 12x + 34$$

89. $4x^2 + 7x = -1$

Identify the x intercepts of the following functions:

90. $y = x^2 - 4$

91. $y = \frac{1}{2}x^2 - 4x + 1$

Solve graphically.

92. $2x^2 - 12 = 5x$

93. $x^2 + 3x = 28$

Rational expressions and equations

94. Simplify $\frac{x^2 + 6x + 5}{(2x + 6)(x - 3)} \div \frac{2x^2 + 9x + 7}{4x^2 - 36}$

95. Simplify $\frac{x + 7}{x^2 + 8x + 15} - \frac{x + 6}{x^2 + 6x + 5}$

96. Solve $\frac{2x}{x} + \frac{3 - x}{x + 1} = \frac{-4}{x^2 + x}$

Domain

Identify the domain for the following expressions.

97. $7x^2 + 3x - 11$

98. $\sqrt{5x - 4}$

99. $\frac{x - 31}{x + 100}$

100. $\frac{x^2 - 100}{x^2 + 6x - 40}$

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Exponents

Simplify the following:

$$101. \quad \frac{(y^{-2}x^2)^{-1} \cdot 24x^{-3}}{15x^{-2}} \cdot \frac{24x^{-3}}{y^4}$$

$$102. \quad \left(\frac{y^4}{x^6y^2}\right) \cdot \left(\frac{4x^3y^{-1}}{6xy}\right)^{-3}$$

$$103. \quad \frac{3x^2y^7}{-2x} \cdot \frac{32x^4y^{-2}}{2x^{-3}y^3}$$

$$104. \quad \left(\frac{32y^3}{5x^2y^5}\right) \left(\frac{5xy}{8x^{-1}y^2}\right)^2$$

$$105. \quad \left(\frac{2x^3y}{z^2}\right)^4 - \left(\frac{5x^6y^2}{2z^4}\right)^2$$

$$106. \quad (2x^2y^3)^5 + (3x^4)(2x^3y)^2(4y^{13})$$

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Solutions: Linear Inequalities

1. $x > 4$ or $x \leq 1$	2. $17/2 < x < 9$
3. $x \leq -\frac{13}{3}$	4. $x > 5$

Solutions: Absolute Value Equations and Inequalities

5. $0 < x < 4$	6. $-\frac{25}{2} < x < \frac{15}{2}$
7. $x \geq \frac{1}{3}$ or $x \leq -\frac{16}{3}$	8. $ 6x - 7 = -\frac{2}{3}$ <i>no solution</i>
9. $x = \frac{1}{4}$ or $x = -\frac{7}{4}$	10. $x = -9, 27$

Solutions: Writing Equations of Lines

11. $3x - y = -7$	12. $x - 2y = -6$
13. $5x + 2y = -26$	14. $7x - 3y = 32$
15. $y = \frac{1}{4}x + \frac{1}{4}$	16. $f(x) = \frac{19}{2}x + 5$
17. $f(x) = \frac{1}{2}x - \frac{5}{2}$	18. $y = -\frac{2}{3}x + 2$
19. $y = 12000x + 18000$; \$102,000 Let x = number of years since sales began; let y = profits (\$)	20. $y = 225 - 9x$; \$162

Solutions: Graphing Linear Equations

21. Use your table of values to plot points, draw and label the line	22. X intercept = 3; y intercept = -9
23. $y = \frac{1}{2}x + \frac{5}{2}$; y intercept 5/2, slope = 1/2	24. $y = -\frac{4}{9}x + 4$; y intercept 4, slope -4/9

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25. $y = -\frac{1}{3}x - 4$; y intercept -4, slope -1/3	26. $y = \frac{2}{3}x + 2$; y intercept =2, slope= 2/3
27. $x = \frac{1}{3}$ Vertical line with x intercept 1/3	28. $m=4$
29. $m = -\frac{17}{2}$	30. undefined
31. Parallel lines; $m=1$	32. Perpendicular lines; $m_1 = 3; m_2 = -\frac{1}{3}$
33. Not parallel; not perpendicular. $m_1 = \frac{1}{7}; m_2 = \frac{12}{7}$	

Solutions: Systems of Equations

34. (1,-4)
35. (3,2)
36. (-1,2)

Solutions: Operations with Polynomials

37. $15x^2 - 7x - 2$	38. $25c^2 - 70c + 49$
39. $6x^3 + 7x^2 - 18x + 5$	40. $16x^4 - 169x^2 + 225$
41. $-19p^2 + 13p - 59$	42. $\frac{1}{9}x^2 - \frac{49}{16}$

Solutions: Factoring

43. $(x+9)(x-3)$	44. $(3x-7)(x-2)$
45. $(3x-8)(4x+3)$	46. $(2x-5)(9x-4)$
47. $5(x^2+4)(x+2)(x-2)$	48. $(3x+5)^2$
49. $3x(x^2+9)(x+2)(x-2)$	50. $(6x+7)(2x-3)$
51. $(m-5)(2m^2+3)$	52. $(2x-1)(x-6)$
53. $(b-9)(b-5)$	54. $(x^4+y^8)(x^2+y^4)(x+y^2)(x-y^2)$
55. $(b+5)(b-5)(b+1)(b-1)$	

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Solutions: Quadratics and radicals

Methods: Square roots (SR), Factoring (F), Quadratic Formula (QF), Completing the Square (CS)

56. $y = -3x - 12$ 57. $\frac{2 \pm \sqrt{13}}{4}$	58. $-\frac{1}{2}, \frac{1}{8}$	59. $15\sqrt{2}$
60. $-4 \pm 3\sqrt{2}$; QF or CS	61. $-4 \pm \sqrt{26}$; QF or CS	62. $-\frac{5}{3}, -\frac{3}{2}$; F
63. $1, -\frac{1}{3}$; F	64. ± 3 ; SR	65. $4, -1$; F
66. $\pm \frac{2\sqrt{35}}{7}$; SR	67. ± 5 ; SR OR F	68. $\pm \frac{6\sqrt{7}}{7}$; F
69. ± 10 ; SR OR F	70. 2 ; F	71. $\frac{7}{4}, 5$; F
72. $\frac{3 \pm \sqrt{7}}{5}$; QF	73. $-8, 7$; F	74. $-11, 11$; SQ or F
75. $0, -5$; SR	76. $-2 \pm \sqrt{15}$; QF or CS	77. $\frac{7}{9}, 1$; F
78. $y = 5(x-4)^2 + 2$; CS	79. $\frac{11 \pm \sqrt{41}}{20}$; QF	80. $-\frac{1}{2}, \frac{7}{2}$; F
81. $\frac{-5}{2}, \frac{8}{3}$; F	82. $\frac{-5 \pm \sqrt{5}}{8}$; QF	83. $-9, 7$; F
84. ± 7 ; SR or F	85. $\frac{7}{4}, -\frac{5}{4}$; SR	86. $-3 \pm \sqrt{19}$; QF or CS
87. $\frac{3}{4}, \frac{2}{3}$; F	88. $y = 3(x-2)^2 + 22$; CS	89. $\frac{-7 \pm \sqrt{33}}{8}$; QF
90. ± 2 ; F	91. $4 \pm \sqrt{14}$; QF	92. $-1.5, 4$; graph
93. $-7, 4$; graph		

Rational Expressions

94. $\frac{2(x+5)}{2x+7}$

95. $\frac{-x-11}{(x+5)(x+3)(x+1)}$

96. $x = 6$, Note:
 $x=1$ is
extraneous.

Domain

97. All real numbers

99. $x \neq -100$

98. $x \geq \frac{4}{5}$

100. $x \neq -10, 4$

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Exponents

101. $\frac{8}{5x^3y^2}$

102. $\frac{27y^8}{8x^{12}}$

103. $-24x^8y^2$

104. $\frac{5x^2}{2y^4}$

105. $\frac{39x^{12}y^4}{4z^8}$

106. $80x^{10}y^{15}$