

## Honors Algebra II Summer Review Packet

This packet includes material your teacher expects you to know when you begin the course. It is designed to be done over the course of the summer to provide practice and highlight the concepts you learned in Honors Algebra 1.

### Instructions:

- Complete the packet on loose leaf paper.
- Write your name and the course on the top of every sheet you use.
- Number your work, and do the problems in order.
- Copy each problem before showing your work.
- Check your answers as you go (answers are included at the end of the packet).

Note: Students moving to *Honors Algebra II* from *8<sup>th</sup> grade* or *college prep Algebra I* must complete the additional summer worksheet on factoring.

**The completed assignment is due on the first day of class and is worth 25 points for all math courses.**



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

1.  $4 + 5x > 24$  or  $16 + x \leq 17$

2.  $3(x + 2) < 5x - 11 < 3x + 7$

3.  $5(x + 3) \leq 2(x - 4) - 3(x + 1)$

4.  $(x + 5) + 2(7 - x) + 15 < \frac{1}{4}(32x - 44)$

**Absolute Value Equations and Inequalities.** Solve.

5.  $5|x - 2| + 7 < 17$

6.  $7 + \frac{1}{5}|x - 5(x + 2)| < 15$

7.  $|6x + 15| - 3 \geq 14$

8.  $3|6x - 7| + 10 = 8$

9.  $-5|4x + 3| - 14 = -34$

10.  $\left| \frac{2}{3}x - 6 \right| = 12$

**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.**

11. (-1, 4)  $3x - y = 5$

12. (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.**

13. (-4, -3)  $2x - 5y = 10$

14. (2, -6)  $-3x - 7y = 2$

15. 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:**

16.  $f(-4) = -33, f(0) = 5$

17.  $f(3) = -1, f(15) = 5$

18. Write the equation of a line whose **x intercept is 3 and y intercept is 2**. Write the result in slope intercept form.

19. 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.

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. 
$$\begin{cases} x + y = 1 \\ 3x - y = -5 \end{cases}$$

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

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

## Exponents

Simplify the following:

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

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

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

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

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

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

**SOLUTIONS:**

**Solutions: Linear Inequalities**

1. $x > 4$ or $x \leq 1$	2. $17\frac{1}{2} < x < 9$
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 $\frac{5}{2}$ , slope = $\frac{1}{2}$	24. $y = -\frac{4}{9}x + 4$ ; y intercept 4, slope = $\frac{4}{9}$



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. $(b+5)(b-5)(b+1)(b-1)$	

**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. $\pm 3$ ; SR	65. $4, -1$ ; F
66. $\pm \frac{2\sqrt{35}}{7}$ ; SR	67. $\pm 5$ ; SR OR F	68. $\pm \frac{6\sqrt{7}}{7}$ ; F
69. $\pm 10$ ; 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. $\pm 7$ ; 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. $\pm 2$ ; 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.  $x = -4$ , Note:  
 $x = -1$  is extraneous.

**Domain**

97. All real numbers

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

99.  $x \neq -100$

100.  $x \neq -10, 4$

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

