

Advanced Algebra 2

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Rationale:

- In order to help ensure you are ready for success from the first day of class, the summer assignment will review important algebra skills that are essential for Advanced Algebra 2.
- Complete this summer assignment so you may ask questions over any content.
- The first test will be over the summer assignment algebra skills.

Essential Skills / Content:

- Order of Operations, exponent rules, and simplifying radicals
- Solve equations including equations with fractions, literal equations, and absolute value equations
- Solve and graph linear inequalities
- Simplify, factor and solve polynomials
- Linear equations including determining slope, writing equations of lines using two points, point and slope, or intercepts
- Solve and graph systems of equations and inequalities
- Function basics

Time Frame for Completing the Assignment: About 3 hours.

Due Date: The day of the Unit 0 Test.

Detailed Description of Assignment:

The Advanced Algebra 2 Summer Assignment contains an essential review of algebra skills that will be expanded upon in the course. If students are unable to successfully complete the summer assignment, then the course will be very difficult to pass. We expect students to be able to use the essential skills and concepts from algebra in every lesson of the course. It is vital that students complete the summer assignment and pass the first test of the course to succeed in the course.

Materials to be Purchased:

- Pencils, erasers, highlighters, 6" clear ruler, notebook paper, binder with dividers are supplies needed.
- Recommend, but not required: TI 84+ calculator

Internet Links to be Used:

- <https://www.khanacademy.org/math/algebra2>
- <https://www.ixl.com/math/algebra-2>
- <https://www.kutasoftware.com/freeia2.html>

Advanced Algebra 2 Summer Assignment

Simplify using the order of operations. (TEKS A2.1.A)

1. $-[6^2 - 10(2 - 7 \div 10)]$	2. $7[5 \cdot 3^2 - 11 \cdot 4]$	3. Evaluate -5^2 and $(-5)^2$. Explain why the answers are different.
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Solve the following equations. (TEKS A2.1.B)

4. $3(x-2)+2x = -5(x-2) - 1$	5. $\frac{2x}{5} + \frac{3}{4} = 5 - \frac{4x}{5}$	6. $\frac{3}{4}x + 6 = x + 5$	7. $3 x + 4 = 18$
8. $ x - 2 = -5$	9. $\frac{6}{7}(4x+1) + 5x = 2(x-8) + 4$	10. $\frac{2}{3} + x = \frac{5}{2} - \frac{5}{6}x$	

Solve for the indicated variable. (TEKS A2.1.B)

11. Solve for x: $5abx = 30ac^2$	12. Solve for r : $A = \pi r^2$	13. Solve for b_1 : $A = \frac{h(b_1 + b_2)}{2}$
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Solve the following inequalities and graph the solution on a number line. (TEKS A2.1.A, A.2.H & A.5.B)

14. $7 - 4x \leq 31$	15. $\frac{2}{3}(5 + 2x) > -9 + \frac{1}{2}x$
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(TEKS A2.1.F)

16. A rectangular pen has a length 3 feet greater than its width. If both dimensions are increased by 5 feet, which expression represents the final area?			
A. $10x + 40$	B. $13x + 40$	C. $x^2 + 13x + 40$	D. $x^2 + 10x + 40$

Perform the indicated operation and state your answer in simplest form. (TEKS A2.1.B, A.8.A, A.1A.A, A.10.B)

17. $-5x(x^2 + 7x - 1)$	18. $(3x + 5y)(5x - 6y)$	19. $(a - 3b)^2$
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Simplify the following. (TEKS 6.1.E)

20. $\frac{8t^2 - 24t + 10}{4}$	21. $\frac{x^2 + 5x}{5}$
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Factor the polynomials completely. Don't forget to factor out the GCF first! (TEKS A2.7.C)

22. $x^2 + 6x - 40$	23. $x^2 - 16$	24. $3x^2 - 6x$	25. $4x^2 - 100$
26. $x^3 + 6x^2 - 4x - 24$	27. $2x^2 + 8$	28. $3x^2 + 11x + 8$	29. $25t^4 - 100t^2$
30. $2x^2 - 5xy - 3y^2$	31. $6v^3 - 16v^2 + 21v - 56$		

Solve by Factoring. (TEKS A2.7.C, A.8.A, A.10.E)

32. $x^2 - 36 = 0$	33. $x^2 - 6x = 0$	34. $5x^2 - 18x = -9$	35. $4x^2 - 4x + 1 = 0$
36. Which is a root of the function $x^2 - 11x + 30 = 0$? A. 3 B. 6 C. 10 D. 11			
37. Which of the following is an x-intercept of $y = -8x^2 - 10x + 3$? A. 3 B. $\frac{1}{4}$ C. $\frac{2}{3}$ D. $\frac{3}{2}$			
38. Which of the following statements best describes the solution(s) of $2x^2 + x = 18$? A. no real solution B. one negative solution C. one positive and one negative solution D. two positive solutions			

Express your answer in simplified form with positive exponents. (TEKS A.11.A)

39. $(3x^4y^2)^3$	40. $4x^3 - x^3$	41. $(4x^{-8})(4x^{-3})$	42. $\frac{10x^6}{-2x^{-2}}$
43. $\frac{20 \cdot 10^7}{5 \cdot 10^4}$	44. $\frac{6x^2y^{-3}z^3}{2x^{-2}z^{-4}}$	45. $\frac{4x^0y^{-2}z^3}{2x}$	

Write the expression in simplest radical form. All variables represent positive numbers. (TEKS A2.7.G, A.11.A)

46. $\sqrt{700}$	47. $3\sqrt{7} \cdot 5\sqrt{14}$	48. $(\sqrt{7} + 4)(\sqrt{7} - 3)$	49. $\frac{24\sqrt{32}}{4\sqrt{2}}$
50. $\frac{\sqrt{5} + 4}{\sqrt{3}}$	51. $\sqrt{48} + 5\sqrt{3}$	52. $\sqrt{48x^5y^6}$	

53. Use the linear equation $3x + 4y = 12$ to answer the questions below. (TEKS A.2.B, A.2.C)

a. What is the slope?	b. What is the y-intercept?	c. Determine its root.
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54. Lacey has to stuff 1000 letters into envelopes. She stuffs letters at a steady rate of 7 letters per minute. (TEKS A2.1.D, A.2.B, A.2.C, A.3.A)

a. Define a variable for the time she has been stuffing, then write an expression for the number of letters remaining to be stuffed.	b. How many letters remain after 93 minutes?	c. About how long must Lacey stuff in order for only 400 letters to remain?
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55. A giraffe was 7 ft tall at age 4 and 11.5 ft tall at age 7. (TEKS A2.1.D, A.2.B, A.2.C, A.3.A)

a. Using graph paper, create a graph reflecting this information. Assume the rate of growth was constant	b. Determine the rate of change (slope).	c. Determine the y-intercept.	d. Write the equation of the line in point-slope form.
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Slope. (TEKS A2.1.D, A.3.A, A.3.B)

56. Determine the slope of the line between the points $(-2, 3)$ and $(-5, -10)$.	57. If the slope of a line changes from -4 to $-1/4$ and the y-intercept changes from -2 to 0 , then the graph of the line will be affected in what ways? A. less steep, up 2 units B. less steep, down 2 units C. steeper, up 2 units D. steeper, down 2 units	58. In the figure, the slope through the points is $3/2$. What is the value of k ?
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59. Given $(m + 2, 4)$ and $(6, 3m)$ and the slope between the points is 4, what is the value of m ?
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Write the equation of each line in slope-intercept form. (TEKS A2.1.D, A.2.B, A.2.C)

60. slope of zero, passes through $(-8, 3)$	61. undefined slope, contains $(5, -6)$	62. passes through $(5, 2)$ and is perpendicular to $y = (4/7)x - 1$	63. passes through $(-8, 10)$ and is parallel to $y = (5/2)x - 3$
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Write the equation of each line in standard form. (TEKS A2.1.D, A.2.B, A.2.C, A.3.A)

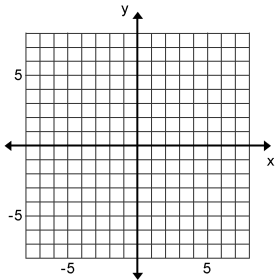
64. contains $(-8, 4)$ and the midpoint of the segment connecting $(-10, 5)$ and $(-5, 0)$	65. OMIT	66. x-intercept = 2, parallel to the line through $(6, 2)$ and $(2, -5)$	67. y-intercept = -5 , perpendicular to the line containing $(9, 8)$ and $(6, -1)$
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68. The following table gives value for the function f for several values of m . If the graph of f is a line, which of the following defines $f(m)$? (TEKS A.4.C)

m	$f(m)$
-6	-5
-3	-4
0	-3
6	-1
9	0

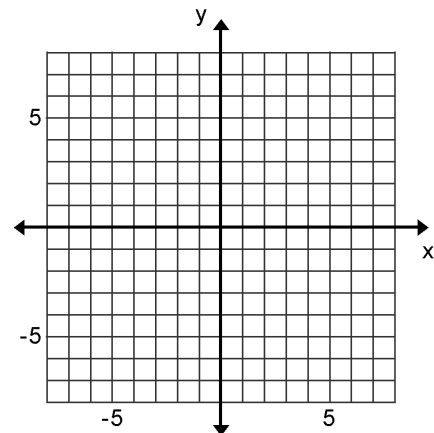
- A. $f(m) = 3m - 3$ B. $f(m) = 1/3 m - 3$
 C. $f(m) = 3m + 9$ D. $f(m) = 1/3m + 9$
 E. $f(m) = -3m + 31$

Solve Systems of Equations and Inequalities
(TEKS A2.3.E, A.2.I, A.5.C, A.3.F)

<p>69. Given $y = x - 3$ and $4x + y = 32$, solve for x and y.</p>	<p>70. Given $5x + 2y = 24$ and $4x + 3y = 29$, what is $2x - y$?</p>	<p>71. Five bags of fertilizer and six bags of peat cost a total of \$123. Three bags of fertilizer and three bags of peat cost a total of \$69. How much would it cost to purchase 2 bags of fertilizer and two bags of peat?</p>	<p>72. </p> <p>In the (x, y) plane which of the following is/are true?</p> <p>I. Line $y + x = 5$ is perpendicular to line $y - x = 5$. II. Lines $y + x = 5$ and $y - x = 5$ intersect each other on the y-axis. III. Lines $y + x = 5$ and $y - x = 5$ intersect each other on the x-axis.</p> <p>A. I only B. II only C. I and II D. I and III E. II and III</p>
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73. Graph the following. (TEKS A2.3.E, A.3.H)

$3x + 2y > -9$
 $x - y \geq 2$



Functions (TEKS A2.1.E, A.2.A, A.6.C, A.7.A, A.7.B, A.12.A)

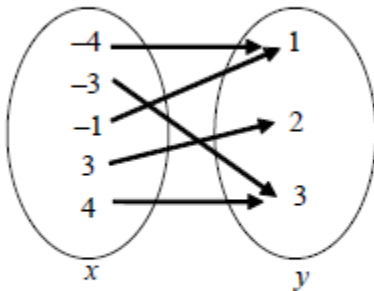
74. The function $h(t) = -16t^2 + 400$ can be used to study the relationship between the height, $h(t)$, of a falling object that is dropped from an altitude of 400 feet and the time, t , it takes to hit the ground. What is the independent variable for the function?

- A. height of object B. speed C. time D. starting altitude

75. Which of the following represents a function?

I. $\{(1,2), (3,-7), (0,6), (-4,4), (3,5)\}$

II.



III.

x	2	3	7	10
y	6	9	6	9

- A. I only
 B. I and II only
 C. I and III only
 D. II and III only
 E. I, II, and III

76. Given $f(x) = 3x + 4$, determine $f(2)$

77. Given $f(x) = 3x + 4$, if $f(x) = 5$, what is x ?

Answers

- 23
- 7
- Following the order of operations, $-5^2 = -1 \cdot 5^2 = -25$, but $(-5)^2 = (-5)(-5) = 25$
- $x = 3/2$
- $x = 85/24$
- $x = 4$
- $x = \{-10, 2\}$
- No Solution or ϕ
- $x = -2$
- $x = 1$
- $\frac{6c^2}{b}$
- $\frac{\sqrt{A\pi}}{\pi}$
- π (don't forget you have to rationalize the denominator)

13. $\frac{2A}{h} - b_2$

14. $x \geq -6$



15. $x > -74/5$



16. C

17. $-5x^3 - 35x^2 + 5x$

18. $15x^2 + 7xy - 30y^2$

19. $a^2 - 6ab + 9b^2$

20. $2t^2 - 6t + 5/2$

21. already in simplest form or $\frac{x^2}{5} + x$

22. $(x + 10)(x - 4)$

23. $(x - 4)(x + 4)$

24. $3x(x - 2)$

25. $4(x + 5)(x - 5)$

26. $(x + 6)(x + 2)(x - 2)$

27. $2(x^2 + 4)$

28. $(3x + 8)(x + 1)$

29. $25t^2(t + 2)(t - 2)$

30. $(2x + y)(x - 3y)$

31. $(3v - 8)(2v^2 + 7)$

32. $x = \pm 6$

33. $x = \{0, 6\}$

34. $x = \{3/5, 3\}$

35. $x = \{1/2\}$

36. B

37. B

38. C

39. $27x^{12}y^6$

40. $3x^3$

41. $\frac{16}{x^{11}}$

42. $-5x^8$

43. $4 \cdot 10^3 = 4000$

44. $\frac{3x^4z^7}{y^3}$

45. $\frac{2z^3}{xy^2}$

46. $10\sqrt{7}$

47. $105\sqrt{2}$

48. $-5 + \sqrt{7}$

49. 24

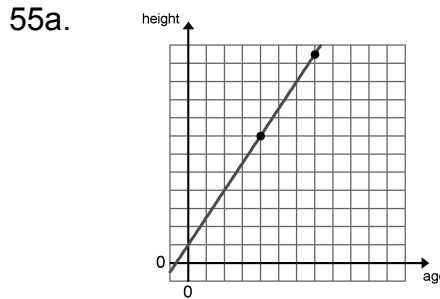
50. $\frac{\sqrt{15} + 4\sqrt{3}}{3}$

51. $9\sqrt{3}$

52. $4x^2y^3\sqrt{3x}$

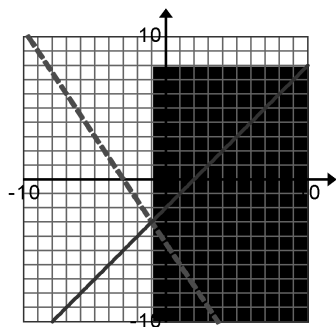
- 53a. $-3/4$ b. $(0,3)$ c. $(4,0)$

54. a) Let m = number of minutes; $1000 - 7m$ = number of letters remaining
 b) $1000 - 7(93) = 349$; 349 letters
 c) 85.7 minutes



- b. $3/2$
 c. $(0,1)$
 d. $(y - 7) = \frac{3}{2}(x - 4)$

56. $13/3$
 57. A
 58. $k = 5$
 59. $m = 20/7$
 60. $y = 3$
 61. $x = 5$
 62. $y = (-7/4)x + 43/4$
 63. $y = (5/2)x + 30$
 64. $3x + y = -20$
 65. $44x + 56y = 95$
 66. $7x - 4y = 14$
 67. $x + 3y = -15$
 68. B
 69. $(7, 4)$
 70. If $x = 2$ and $y = 7$, then $2x - y = -3$
 71. The total cost for two bags each of fertilizer and peat is \$46.00
 72. C
 73.



74. C
 75. D
 76. $f(2) = 10$
 77. $x = 1/3$