

Algebra II **Non-Calculator**
Spring Semester Exam Review

Name: _____
Date: _____ Block: _____

Simplify the expression. Leave only positive exponents.

1. $(a^2)^4$	2. $(-3p^2s^{-4})^3$
3. $\frac{3mn^2}{15m^3n^{-2}}$	4. $\frac{9cd}{3cd^2}$
5. $(w^2x^{-3})(w^4x^2)$	6. $\frac{3^3}{3^5}$
7. $7^5 \cdot 7^{-3}$	

Write the answer in scientific notation.

8. $(1.2 \times 10^3)(1.5 \times 10^6)$	9. $(2.0 \times 10^3)^5$
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Describe the end behavior of the graph of the polynomial function.

10. $P(x) = -2x^5 + x^4 - 7x + 15$	11. $P(x) = -3x^4 + 3x^3 - x - 9$
12. $P(x) = 5x^3 + 4x^2 - 3x + 2$	13. $P(x) = 7x^4 - 3x^2 - 2x + 21$

Use synthetic substitution to evaluate the polynomial function for the given value of x .

14. $P(x) = 3x^5 + 18x^4 + 27x^3 - 2x + 5;$
 $x = -3$

15. $P(x) = x^4 - 13x^2 - x + 36; x = 3$

Find the sum or difference.

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

17. $(5x^4 + 3x^3 - 2x^2 + 4) - (x^4 - 5x^2 - x + 1)$

Find the product of the polynomials.

18. $(m + n)^2$

19. $m(m - 5)^2$

Factor the polynomial completely.

20. $a^3 - 5a^2 + 3a - 15$

21. $x^3 + 3x^2 - 2x - 6$

22. $6x^4 - 3x^3 + 15x$

23. $a^5 - 4a^3$

Find the real-number solutions of the equation.

24. $x^3 + 5x^2 - 3x - 15 = 0$

25. $x^4 - 7x^2 + 12 = 0$

26.	Rewrite the expression in radical notation. a.) $5^{\frac{3}{4}}$ b.) $3^{\frac{1}{5}}$
27.	Rewrite the expression in rational exponent notation. a.) $\sqrt[3]{11}$ b.) $(\sqrt[5]{12})^2$
28.	Simplify the expression. a.) $\sqrt[3]{9} \cdot \sqrt[3]{3}$ b.) $\frac{\sqrt[4]{32}}{\sqrt[4]{2}}$
29.	Simplify the expression. a.) $\sqrt{32} \cdot \sqrt{2}$ b.) $\sqrt[3]{25} \cdot \sqrt[3]{-5}$
30.	Use the properties of rational exponents to simplify: a.) $3^{\frac{1}{4}} \cdot 3^{\frac{1}{2}}$ b.) $5^{\frac{1}{4}} \cdot 3^{\frac{1}{4}}$
31.	Use the properties of rational exponents to simplify: a.) $\left(3^{\frac{1}{3}} \cdot 2^{\frac{1}{3}}\right)^2$ b.) $(4^3 \cdot 2^3)^{-\frac{1}{3}}$ c.) $\frac{7}{7^{\frac{2}{3}}}$ d.) $\left(\frac{6^{\frac{1}{4}}}{2^{\frac{1}{4}}}\right)^3$
32.	Solve the equation $\sqrt{4x+1} = \sqrt{x+10}$
33.	Solve the equation $\sqrt[3]{8x} - 3 = -7$

34.	Solve the equation $\sqrt[3]{x-16} = 2$
35.	Solve the equation $\sqrt{9x} + 11 = 14$
36.	Solve the equation $\sqrt{5x+1} = 6$
37.	Solve $x^3 = 64$
38.	Solve $(x-5)^3 = 27$
39.	What is the value of $\sqrt[5]{32}$?
40.	What is the value of $\sqrt[3]{-125}$?
41.	What is the value of 128^0 ?

Rewrite the expression in exponential form:

42. $\log_4 64 = 3$	43. $\log_2 32 = 5$	44. $\log_4 1 = 0$
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Evaluate the expression:

45. $\log_5 25$	46. $\log_3 27$	47. $\log_2 16$
48. $\log_{64} 4$	49. $\log_5 1$	50. $\log_{25} 5$

Use the properties of logarithms to expand:

51. $\log_3 \frac{5}{6}$	52. $\log_4 x^2 y^3$	53. $\log_5 xyz$
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Use the properties of logarithms to condense:

54. $\log_2 3 + \log_2 x$	55. $\log_3 4 + 2 \log_3 x$	56. $\log_4 x + \log_4 y + 3 \log_4 z$
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Solve:

57. $\log(x+9) = \log(2x+5)$	58. $\log_3(5x-1) = 2$	59. $\log x + \log(x-15) = 2$
60. $\log_4(3x+5) = \log_4(5x-9)$	61. $\log_2(x-6) = 5$	62. $\log_4(x+12) + \log_4 x = 3$

63.	Which equation represents inverse variation? a.) $xy = 3$ b.) $y = 3 + x$ c.) $\frac{y}{3} = x$ d.) $y = 3x$
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64.	<p>If y varies directly with x and $y = -20$ when $x=5$, what is the value of y when $x = -3$?</p> <p>a.) -12 b.) 12 c.) 15 d.) -15</p>
65.	<p>Which function has the domain of all real numbers except -5?</p> <p>a.) $y = \frac{x-5}{x-5}$ b.) $y = \frac{x^2}{x-5}$ c.) $y = \frac{x}{x-5}$ d.) $y = \frac{x-5}{x+5}$</p>
66.	<p>What are the asymptotes of the function $y = \frac{3x^2 + 4x + 1}{x^2 - 4}$</p> <p>a.) $x = 0, y = 0$ b.) $x = 3, y = 4$ c.) $x = 0, x = 2, y = 3$ d.) $x = -2, x = 2, y = 3$</p>
67.	<p>Which expression is the product of $\frac{16a^2b}{11abc} \cdot \frac{22a^3c^2}{4b^3c^2}$?</p> <p>a.) $\frac{8a^4}{b^3}$ b.) $8a^4b^3c$ c.) $\frac{8a^4}{b^3c}$ d.) $\frac{a^4c}{8b^3}$</p>
68.	<p>What is the simplified form of $\frac{24x^7y^3}{2y^2} \cdot \frac{xy^4}{3x^3y^2}$?</p>
69.	<p>Perform the indicated operation and simplify: $\frac{x^2 - 2x - 3}{x^2 - 6x + 9} \div \frac{5x + 5}{x + 3}$</p>
70.	<p>What are the asymptotes of the graph $y = \frac{3}{x + 5}$?</p>
71.	<p>Perform the indicated operation and simplify: $\frac{x + 1}{x^2 + 6x + 9} - \frac{2}{x^2 - 9}$</p>
72.	<p>State the domain and range of the function $y = \frac{2}{x + 3} - 5$.</p> <p>a.) domain: all real numbers except 3, range: all real numbers except 5 b.) domain: all real numbers except 3, range: all real numbers except -5 c.) domain: all real numbers except -3, range: all real numbers except 5 d.) domain: all real numbers except -3, range: all real numbers except -5</p>

73.	Perform the indicated operation and simplify: $\frac{3}{x-1} + \frac{4}{x+2}$
74.	Solve: $\frac{2x}{25} = \frac{2}{x}$
75.	Solve: $\frac{3}{x} = \frac{2}{x+6}$
76.	Solve: $\frac{x+1}{x-2} = \frac{x-3}{x}$
77.	Solve: $\frac{x-1}{x+6} = \frac{x-1}{2x-1}$
78.	Solve: $\frac{x+7}{x-3} = 3$

You may use a calculator on this part!

Use the change-of-base formula to evaluate (Round to three decimal places.):

79. $\log_4 31$

80. $\log_5 19$

81. $\log_{13} 6$

82. The value of a television has been decreasing by 18% each year since it was new. After 5 years, the value is \$550. Find the original cost of the television. Hint: Exponential Decay can be modeled by the equation:

$$y = a(1-r)^t$$

	<p>83. You deposit \$3500 in an account that pays 4% annual interest. Find the balance after 7 years if the interest is compounded monthly. Hint: Compound Interest can be modeled by the equation: $A = P\left(1 + \frac{r}{n}\right)^{nt}$.</p>
	<p>84. In 2002, the average price of a concert ticket for Super Grouper was \$72. Ticket prices increased an average of 3% each year. How much did a ticket cost after 3 years? Hint: Exponential growth can be modeled by the equation: $y = a(1+r)^t$.</p>
	<p>85. Harry invested \$5000 at 5% interest compounded quarterly. How much will the investment be worth after 5 years. Hint: Compound Interest can be modeled by the equation: $A = P\left(1 + \frac{r}{n}\right)^{nt}$.</p>
86.	<p>A men's basketball has a surface area of about 1000 square inches. Find the radius of the basketball. (Hint: Use the formula $S = 4\pi r^2$ for the surface area of a sphere.)</p>
87.	<p>Find the value of $\sqrt[5]{316}$.</p>
88.	<p>What is the domain of the function $y = \sqrt[3]{x-3}$?</p>
89.	<p>Solve the equation $2(x-2)^{\frac{3}{4}} = 54$</p>
90.	<p>Solve the equation $\sqrt{x+2} + 4 = x$</p>

Spring Exam Review Answers

1. a^8	2. $\frac{-27p^6}{s^{12}}$	3. $\frac{n^4}{5m^2}$	4. $\frac{3}{d}$
5. $\frac{w^6}{x}$	6. $\frac{1}{9}$	7. 49	8. (1.8×10^9)
9. (3.2×10^{16})	10. $\uparrow\downarrow$	11. $\downarrow\downarrow$	12. $\downarrow\uparrow$
13. $\uparrow\uparrow$	14. 11	15. -3	16. $2x^4 + 5x^3 - 2x + 5$
17. $4x^4 + 3x^3 + 3x^2 + x + 3$	18. $m^2 + 2mn + n^2$	19. $m^3 - 10m^2 + 25m$	20. $(a^2 + 3)(a - 5)$
21. $(x^2 - 2)(x + 3)$	22. $3x(2x^3 - x^2 + 5)$	23. $a^3(a + 2)(a - 2)$	24. $x = -5, \pm\sqrt{3}$
25. $x = \pm 2, \pm\sqrt{3}$			
26) a) $(\sqrt[4]{5})^3$	b) $\sqrt[3]{3}$		
27) a) $11^{\frac{1}{3}}$	b) $12^{\frac{2}{5}}$		
28) a) 3	b) 2		
29) a) 8	b) -5		
30) a) $3^{\frac{3}{4}}$	b) $15^{\frac{1}{4}}$		
31) a) $6^{\frac{2}{3}}$	b) $\frac{1}{8}$	c) $7^{\frac{1}{3}}$	d) $3^{\frac{3}{4}}$
32) $x = 3$	33) $x = -8$	34) $x = 24$	35) $x = 1$
36) $x = 7$	37) $x = 4$	38) $x = 8$	39) 2
40) -5	41) 1		
42. $4^3 = 64$	43. $2^5 = 32$	44. $4^0 = 1$	
45. $x = 2$	46. $x = 3$	47. $x = 4$	
48. $x = \frac{1}{3}$	49. $x = 0$	50. $x = \frac{1}{2}$	
51. $\log_3 5 - \log_3 6$	52. $2\log_4 x + 3\log_4 y$	53. $\log_5 x + \log_5 y + \log_2 z$	
54. $\log_2 3x$	55. $\log_3 4x^2$	56. $\log_4 xyz^3$	
57. $x = 4$	58. $x = 2$	59. $x = 20$	

60. $x = 7$	61. $x = 1$	62. $x = 4$
63. A	64. B	65. D
66. D	67. C	68. $4x^5y^3$
69. $\frac{x+3}{5(x-3)}$	70. $x = -5, y = 0$	71. $\frac{x^2 - 4x - 9}{(x-3)(x+3)^2}$
72. D	73. $\frac{7x+2}{(x-1)(x+2)}$	74. $x = \pm 5$
75. $x = -18$	76. $x = 1$	77. $x = 1, x = 7$
78. $x = 8$	79. 2.477	80. 1.830
81. 0.699	82. \$1483.52	83. \$4628.80
84. \$78.68	85. \$6410.19	86. 8.921
87. \mathbb{R}	88. $x = 83$	89. $x = 83$
90. $x = 7$		