Algebra 2 Name_____

Review Guide #2 for Algebra 2 Final Exam Part 1 and 2

Period____

Solve each equation.

1) $-6 \cdot 12^{r-3} - 1 = -44$

2) $-7 \cdot 6^{-4n} + 4 = -44$

3) $-6 \cdot 2^{m-2} + 8 = -11$

4) $-6 \cdot 9^{-4x} - 9 = -76$

5) $\log_7 -2n = \log_7 (-4n - 8)$

6) $\log -2x = \log (-4x - 9)$

7) $\log_4 24 = \log_4 (-b + 2)$

8) $\log_{13} (5v - 6) = \log_{13} (2v + 2)$

9) $\log_{11} (x^2 - 25) = \log_{11} (3x + 3)$

10) $\log_{14} (-4v + 3) = \log_{14} (v^2 - 57)$

11) $\log_9 (45 + 2x^2) = \log_9 (3x^2 - 4x)$

12) $\log (3a^2 - 14a) = \log (-45 + 2a^2)$

13) $-7 \log_{11} -9n = -7$

14) $\log_5 7p + 5 = 9$

15) $3 \log_4 2x = 0$

16) $\log_{12} (k + 1) + 4 = 5$

17) $5 \log_7 (4m - 5) = 15$

18) $\log (3n - 1) + 9 = 8$

19) $-8 \log_{11} (6x - 1) - 3 = -11$

20) $10 \log_5 (10b + 9) - 9 = -29$

21) $6 \log_8 (8n + 10) + 6 = 6$

22) $-3 \log_4 (3r - 8) + 3 = -9$

23) $\log_2 5x^2 - \log_2 10 = 1$

24) $\log_6 2 - \log_6 (x - 10) = 1$

25) $\log_6 (x + 5) - \log_6 x = 3$

26) $\log_4 3x + \log_4 5 = 2$

27) $\log_7 2x^2 - \log_7 2 = 2$

28) $\log 3 - \log -3x = 2$

29) $\log_8 (x + 1) - \log_8 (x + 5) = 1$

30) $\log_5 (x - 2) + \log_5 (x + 2) = 1$

31) $\log_4 10 + \log_4 (1 - 3x) = 3$

32) $\log_9 (3 - 2x) + \log_9 2 = \log_9 12$

33) $32^k = 16$

34) $16^{n-1} = \frac{1}{64}$

35) $5^{-2r-1} = 125$

36) $125^{3r} = \frac{1}{625}$

37) $\log_{11} (6 - 3x) = \log_{11} (-5x - 2)$

38) $\log_8 (6 - 4n) = \log_8 (-3n + 7)$

Solve each system by elimination.

39) $3x + 4y = 0$
$-2x + 2y = -14$

40) $-3x - 9y = 18$
$-8x - 10y = -8$

41) $-4x - 2y + 2z = 0$
$5x - 3y + 3z = -22$
$3x + 5y + 6z = -19$

42) $-x - 4y - z = 16$
$-2x + 3y - 2z = 2$
$-3x + 3y - 3z = -24$

43) $-3x + 3y - z = -1$
$5x + y - 6z = -23$
$2x - 6y - 6z = -30$

44) $-6x + 6y - 6z = 18$
$4x + 4y + 4z = 12$
$-6x + y - 6z = 3$

45) Rob's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 7 adult tickets and 6 child tickets for a total of $114. The school took in $233 on the second day by selling 14 adult tickets and 13 child tickets. Find the price of an adult ticket and the price of a child ticket.

46) When you reverse the digits in a certain two-digit number you increase its value by 27. Find the number if the sum of its digits is 11.

47) A plane traveled 580 miles to Des Moines and back. The trip there was with the wind. It took 5 hours. The trip back was into the wind. The trip back took 10 hours. What is the speed of the plane in still air? What is the speed of the wind?

Rewrite each equation in exponential form.

48) $\log_{400} 20 = \frac{1}{2}$

49) $\log_9 81 = 2$

50) $\log_{16} 256 = 2$

51) $\log_{25} \frac{1}{5} = -\frac{1}{2}$

Rewrite each equation in logarithmic form.

52) $13^{-1} = \frac{1}{13}$

53) $5^1 = 5$

54) $9^2 = 81$

55) $2^6 = 64$

Evaluate each expression.

56) $\log_3 243$

57) $\log_6 216$

58) $\log_2 \frac{1}{64}$

59) $\log_2 8$

Use a calculator to approximate each to the nearest thousandth.

60) $\log_4 2.1$

61) $\log_2 7$

62) $\log_4 1.7$

63) $\log_6 6.6$

Expand each logarithm.

64) $\log_4 \sqrt[3]{x \cdot y \cdot z}$

65) $\log_5 \left(xy^4\right)^2$

66) $\log_6 \left(u^2 v^5\right)$

67) $\log_4 \left(3^6 \cdot 2^4\right)$

Condense each expression to a single logarithm.

68) $12 \log_3 x - 4 \log_3 y$

69) $\log_9 3 + \log_9 2 + 5 \log_9 7$

70) $3 \log_9 u + 4 \log_9 v$

71) $18 \log_9 2 - 3 \log_9 7$

Use the properties of logarithms and the values below to find the logarithm indicated. Do NOT use a calculator to evaluate the logs.

72) $\log_4 10 \approx 1.7$
$\log_4 6 \approx 1.3$
$\log_4 9 \approx 1.6$
Find $\log_4 \frac{81}{4}$

73) $\log_5 6 \approx 1.1$
$\log_5 11 \approx 1.5$
$\log_5 9 \approx 1.4$
Find $\log_5 \frac{5}{36}$

74) $\log_7 10 \approx 1.2$
$\log_7 9 \approx 1.1$
$\log_7 12 \approx 1.3$
Find $\log_7 900$

75) $\log_3 4 \approx 1.3$
$\log_3 10 \approx 2.1$
$\log_3 11 \approx 2.2$
Find $\log_3 1331$

Solve each equation. Round your answers to the nearest ten-thousandth.

76) $3 \cdot 20^{2k} - 1 = 88$

77) $3 \cdot 8^{5x} + 3 = 67$

78) $3 \cdot 4^{3a} - 1 = 11$

79) $4 \cdot 6^{n+4} + 7 = 44$

80) $3 \cdot 10^{p+1} - 9 = -1$

81) $-6 \cdot 5^{-n} - 5 = -44$

Determine if the sequence is arithmetic. If it is, find the common difference, the 52nd term, and the explicit formula.

82) 22, 14, 6, −2, ...

83) 4, 16, 36, 64, ...

84) 5, −15, −35, −55, ...

85) −24, −14, −4, 6, ...

Given the second term and the common difference of an arithmetic sequence find the 52nd term and the explicit formula.

86) $a_2 = 19,\ d = 6$

87) $a_2 = 58,\ d = 20$

88) $a_2 = 193,\ d = 200$

89) $a_2 = -12,\ d = 7$

Given a term in an arithmetic sequence and the common difference find the 52nd term and the explicit formula.

90) $a_{26} = 51,\ d = 2$

91) $a_{39} = 141,\ d = 4$

92) $a_{20} = 3768,\ d = 200$

93) $a_{20} = -165,\ d = -10$

94) $a_{17} = -105,\ d = -5$

Evaluate the related series of each sequence (You MUST Show The Formula Used for CREDIT).

95) 15, 20, 25, 30, 35, 40

Evaluate the related series of each sequence.

96) −4, 16, −64, 256, −1024

97) 4, 8, 16, 32, 64

98) 5, 7, 9, 11, 13, 15, 17

99) 5, 9, 13, 17

Evaluate the related series of each sequence (You MUST Show The Formula Used for CREDIT).

100) $a_1 = 23,\ a_n = 104,\ n = 10$

101) $27 + 34 + 41 + 48...,\ n = 10$

102) $\sum_{m=1}^{5} (2m + 7)$

Evaluate each arithmetic series described.

103) $\sum_{m=1}^{45} (4m - 14)$

104) $\sum_{m=1}^{45} (7m - 8)$

105) $\sum_{n=1}^{14} (6n + 2)$

106) $\sum_{m=1}^{7} (5m - 11)$

107) $a_1 = -2,\ a_n = 22,\ n = 7$

108) $a_1 = 32,\ d = 10,\ n = 11$

109) $a_1 = 2,\ d = 2,\ n = 30$

110) $(-19) + (-22) + (-25) + (-28)...,\ n = 10$

111) $10 + 15 + 20 + 25...,\ n = 17$

112) $22 + 26 + 30 + 34...,\ n = 18$

Determine the number of terms *n* in each arithmetic series.

113) $a_1 = 7,\ a_n = 47,\ S_n = 162$

114) $a_1 = 20,\ a_n = 56,\ S_n = 190$

115) $2 + 4 + 6 + 8...,\ S_n = 72$

116) $2 + 6 + 10 + 14...,\ S_n = 98$

Determine if the sequence is geometric. If it is, find the common ratio, the 8th term, and the explicit formula.

117) 1, −3, 9, −27, ...

118) 1, 6, 36, 216, ...

119) 2, 6, 18, 54, ...

Given two terms in a geometric sequence find the common ratio and the term named in the problem.

120) $a_6 = 128$ and $a_3 = 16$
Find a_{10}

121) $a_5 = -32$ and $a_4 = -16$
Find a_{12}

122) $a_5 = 625$ and $a_2 = 5$
Find a_9

Given a term in a geometric sequence and the common ratio find the term named in the problem.

123) $a_6 = 96,\ r = 2$
Find a_{11}

124) $a_6 = 32,\ r = 2$
Find a_{12}

125) $a_5 = 81,\ r = 3$
Find a_{12}

Evaluate each geometric series described.

126) $2 + 8 + 32 + 128..., \ n = 6$

127) $-2 + 10 - 50 + 250..., \ n = 7$

128) $-1 + 6 - 36 + 216..., \ n = 7$

Determine the number of terms *n* in each geometric series.

129) $a_1 = 4,\ r = -3,\ S_n = -80$

130) $a_1 = 3,\ r = 2,\ S_n = 21$

131) $a_1 = -1,\ r = -6,\ S_n = -31$

Given two terms in an arithmetic sequence find the common difference, the 52nd term, and the explicit formula.

132) $a_{16} = -149$ and $a_{35} = -320$

133) $a_{16} = 123$ and $a_{35} = 313$

Given the first term and the common difference of an arithmetic sequence find the 52nd term and the explicit formula.

134) $a_1 = 30,\ d = 20$

135) $a_1 = 5,\ d = -10$

136) $a_1 = 36,\ d = -4$

Evaluate each infinite geometric series described.

137) $\sum_{m=1}^{\infty} \frac{1}{2} \cdot \left(\frac{1}{4}\right)^{m-1}$

138) $\sum_{n=1}^{\infty} 6 \cdot \left(\frac{1}{3}\right)^{n-1}$

139) $-24 - 12 - 6 - 3...$

140) $4 + 8 + 16 + 32...$

Determine the common ratio of the infinite geometric series.

141) $a_1 = -1.3,\ S = -6.5$

142) $a_1 = -\frac{1}{5},\ S = -\frac{2}{5}$

Answers to Review Guide #2 for Algebra 2 Final Exam Part 1 and 2

1) $\log_{12}\frac{43}{6}+3$
2) $-\frac{\log_6\frac{48}{7}}{4}$
3) $\log_2\frac{19}{6}+2$
4) $-\frac{\log_9\frac{67}{6}}{4}$
5) $\{-4\}$
6) $\left\{-\frac{9}{2}\right\}$
7) $\{-22\}$
8) $\left\{\frac{8}{3}\right\}$
9) $\{7\}$
10) $\{-10\}$
11) $\{-5, 9\}$
12) $\{9, 5\}$
13) $\left\{-\frac{11}{9}\right\}$
14) $\left\{\frac{625}{7}\right\}$
15) $\left\{\frac{1}{2}\right\}$
16) $\{11\}$
17) $\{87\}$
18) $\left\{\frac{11}{30}\right\}$
19) $\{2\}$
20) $\left\{-\frac{112}{125}\right\}$
21) $\left\{-\frac{9}{8}\right\}$
22) $\{88\}$
23) $\{2, -2\}$
24) $\left\{\frac{31}{3}\right\}$
25) $\left\{\frac{1}{43}\right\}$
26) $\left\{\frac{16}{15}\right\}$
27) $\{7, -7\}$
28) $\left\{-\frac{1}{100}\right\}$
29) No solution.
30) $\{3\}$
31) $\left\{-\frac{9}{5}\right\}$
32) $\left\{-\frac{3}{2}\right\}$
33) $\left\{\frac{4}{5}\right\}$
34) $\left\{-\frac{1}{2}\right\}$
35) $\{-2\}$
36) $\left\{-\frac{4}{9}\right\}$
37) $\{-4\}$
38) $\{-1\}$
39) $(4, -3)$
40) $(6, -4)$
41) $(-2, 1, -3)$
42) No solution
43) $(0, 1, 4)$
44) Infinitely many solutions
45) adult ticket: \$12, child ticket: \$5
46) 47
47) plane: 87 mph, wind: 29 mph
48) $400^{\frac{1}{2}} = 20$
49) $9^2 = 81$
50) $16^2 = 256$
51) $25^{-\frac{1}{2}} = \frac{1}{5}$
52) $\log_{13}\frac{1}{13} = -1$
53) $\log_5 5 = 1$
54) $\log_9 81 = 2$
55) $\log_2 64 = 6$
56) 5
57) 3
58) −6
59) 3
60) 0.535
61) 2.807
62) 0.383
63) 1.053
64) $\frac{\log_4 x}{3}+\frac{\log_4 y}{3}+\frac{\log_4 z}{3}$
65) $2\log_5 x + 8\log_5 y$
66) $2\log_6 u + 5\log_6 v$
67) $6\log_4 3 + 4\log_4 2$
68) $\log_3\frac{x^{12}}{y^4}$
69) $\log_9\left(6\cdot 7^5\right)$
70) $\log_9\left(v^4u^3\right)$
71) $\log_9\frac{2^{18}}{7^3}$
72) 2.2
73) −1.2
74) 3.5
75) 6.6
76) 0.5658
77) 0.2943
78) 0.3333
79) −2.7584
80) −0.574
81) −1.163
82) Common Difference: $d = -8$
$a_{52} = -386$
Explicit: $a_n = 30 - 8n$
83) Not arithmetic
84) Common Difference: $d = -20$
$a_{52} = -1015$
Explicit: $a_n = 25 - 20n$
85) Common Difference: $d = 10$
$a_{52} = 486$
Explicit: $a_n = -34 + 10n$

86) $a_{52} = 319$
Explicit: $a_n = 7 + 6n$

87) $a_{52} = 1058$
Explicit: $a_n = 18 + 20n$

88) $a_{52} = 10193$
Explicit: $a_n = -207 + 200n$

89) $a_{52} = 338$
Explicit: $a_n = -26 + 7n$

90) $a_{52} = 103$
Explicit: $a_n = -1 + 2n$

91) $a_{52} = 193$
Explicit: $a_n = -15 + 4n$

92) $a_{52} = 10168$
Explicit: $a_n = -232 + 200n$

93) $a_{52} = -485$
Explicit: $a_n = 35 - 10n$

94) $a_{52} = -280$
Explicit: $a_n = -20 - 5n$

95) 165

96) −820

97) 124

98) 77

99) 44

100) 635

101) 585

102) 65

103) 3510

104) 6885

105) 658

106) 63

107) 70

108) 902

109) 930

110) −325

111) 850

112) 1008

113) 6

114) 5

115) 8

116) 7

117) Common Ratio: $r = -3$
$a_8 = -2187$
Explicit: $a_n = (-3)^{n-1}$

118) Common Ratio: $r = 6$
$a_8 = 279936$
Explicit: $a_n = 6^{n-1}$

119) Common Ratio: $r = 3$
$a_8 = 4374$
Explicit: $a_n = 2 \cdot 3^{n-1}$

120) Common Ratio: $r = 2$
$a_{10} = 2048$

121) Common Ratio: $r = 2$
$a_{12} = -4096$

122) Common Ratio: $r = 5$
$a_9 = 390625$

123) $a_{11} = 3072$

124) $a_{12} = 2048$

125) $a_{12} = 177147$

126) 2730

127) −26042

128) −39991

129) 4

130) 3

131) 3

132) Common Difference: $d = -9$
$a_{52} = -473$
Explicit: $a_n = -5 - 9n$

133) Common Difference: $d = 10$
$a_{52} = 483$
Explicit: $a_n = -37 + 10n$

134) $a_{52} = 1050$
Explicit: $a_n = 10 + 20n$

135) $a_{52} = -505$
Explicit: $a_n = 15 - 10n$

136) $a_{52} = -168$
Explicit: $a_n = 40 - 4n$

137) $\frac{2}{3}$

138) 9

139) −48

140) No sum

141) 0.8

142) $\frac{1}{2}$