Algebra 2 Name_____

2nd Semester Final Review

Date_____ Period____

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

1) 77, 772, 7722, 77222, ...

2) 3, 5, 8, 12, ...

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

3) $a_{17} = -3191$ and $a_{31} = -5991$

4) $a_{17} = 16$ and $a_{30} = 42$

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

5) $a_{13} = 105,\ d = 9$

6) $a_{22} = 119,\ d = 7$

Evaluate each arithmetic series described.

7) $\sum_{i=1}^{35} (10i - 3)$

8) $\sum_{m=1}^{50} (8m - 15)$

Evaluate each geometric series described.

9) $\sum_{n=1}^{9} 4 \cdot (-2)^{n-1}$

10) $\sum_{n=1}^{10} 3^{n-1}$

Evaluate each infinite geometric series described.

11) $\sum_{i=1}^{\infty} -3^{i-1}$

12) $\sum_{k=1}^{\infty} 9 \cdot \left(\frac{2}{3}\right)^{k-1}$

Simplify.

13) $\sqrt{252x^4y}$

14) $\sqrt{8mn}$

Identify the vertex, focus, axis of symmetry, and directrix of each.

15) $y = x^2 - 18x + 89$

16) $y = \frac{1}{4}x^2 + \frac{3}{2}x + \frac{29}{4}$

17) Find the distance between the points (4, 6) and (-2, 1)

Classify each conic section. For parabolas, identify the vertex and focus. For circles, identify the center and radius. For ellipses and hyperbolas identify the center, vertices, and foci.

18) $x^2 + 6x + y + 6 = 0$

19) $x^2 + 4y^2 + 2x - 32y + 49 = 0$

20) $x^2 + y^2 - 2x - 2y - 23 = 0$

21) $-4x^2 + 5y^2 - 100 = 0$

Solve each system of equations.

22) $x^2 + y^2 - 8x - 4y - 33 = 0$
$x^2 + y^2 - 8x + 12y + 47 = 0$

23) $-x^2 + y - 1 = 0$
$2x + y = 0$

Expand each logarithm.

24) $\log_6 \left(7^3 \sqrt[3]{11}\right)$

25) $\log_5 \left(\frac{3^2}{10}\right)^5$

Condense each expression to a single logarithm.

26) $\log_5 6 + \log_5 11 + 2\log_5 7$

27) $5\log_4 z + \dfrac{\log_4 x}{2}$

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

28) $4^k + 4 = 23$

29) $14^a - 4 = 59.7$

Solve each equation with the quadratic formula.

30) $3x^2 - 3 = 0$

31) $k^2 - k - 90 = 0$

32) A polynomial of degree 3 with rational coefficients has roots -1+6i and 4. What are the other roots?

33) If Mi is the midpoint of the segment RS, find S given R (-2, 4) and M (0, 6).

Identify the center, vertices, co-vertices, and foci of each.

34) $\dfrac{(x-2)^2}{169} + \dfrac{(y+5)^2}{144} = 1$

35) $\dfrac{(x-3)^2}{36} + \dfrac{(y+5)^2}{100} = 1$

Identify the vertices, foci, and asymptotes of each.

36) $\dfrac{(x-8)^2}{144} - \dfrac{(y+6)^2}{81} = 1$

37) $\dfrac{(y+6)^2}{64} - \dfrac{(x+6)^2}{36} = 1$

Simplify.

38) $\left(v^{12}\right)^{\frac{1}{4}}$

39) $\left(x^{4}\right)^{\frac{3}{2}}$

Rewrite each equation in exponential form.

40) $\log_{15} 225 = 2$

41) $\log_{8} \frac{1}{64} = -2$

Rewrite each equation in logarithmic form.

42) $144^{\frac{1}{2}} = 12$

43) $4^{3} = 64$

Given the first term and the common ratio of a geometric sequence find the 8th term and the explicit formula.

44) $a_1 = -4,\ r = -4$

45) $a_1 = 3,\ r = -3$

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

46) $\log_3 10 \approx 2.1$
$\log_3 7 \approx 1.8$
$\log_3 4 \approx 1.3$
Find $\log_3 48$

47) $\log_7 10 \approx 1.2$
$\log_7 12 \approx 1.3$
$\log_7 9 \approx 1.1$
Find $\log_7 \frac{1}{16}$

Expand completely.

48) $(4b + a)^4$

49) $(1 + 4y)^4$

Find each term described.

50) 4th term in expansion of $(n + 4m)^3$

51) 3rd term in expansion of $(x - y)^4$

Use the information provided to write the standard form equation of each circle.

52) Center: $\left(\frac{13}{2}, -7\right)$
Radius: 3

53) Center: $\left(9, \frac{13}{2}\right)$
Radius: 6

Divide using snythetic division.

54) $(k^3 - 10k^2 + 26k - 17) \div (k - 2)$

55) $(2a^3 - 15a^2 - 46a - 46) \div (a - 10)$

56) Things to study:
1. Complex fractions: adding, subtracting, solving and simplifying.
2. Compound Probability
3. Direct Variation
4. Inverse Variation
5. Joint Variation
6.Liscense Plate Problems