Algebra I Spring Final Exam Review   NAME_____

- *The review for is <u>due on the day of the final exam</u>.*
- *Review will not be graded unless answers are written on separate paper with answers circled.   <u>Review MUST be legible (I can read it and easily find your answers)</u>You must show all work.*
- ★ *In order to be eligible to retest the final exam, this review must be complete, accurate, and turned in as per instructions*
- *Final Exam: 46 multiple choice 4 gridded*

1. What is the solution of the system of equations?
   $y = 3x + 7$
   $y = x - 9$

2. Find the value of b that makes the system of equations have the solution (3, 5).
   $y = 3x - 4$
   $y = bx + 2$

3. The length of a rectangle is 3 centimeters more than 3 times the width. If the perimeter of the rectangle is 46 centimeters, find the dimensions of the rectangle.

   Solve the system of equations using substitution.
4. $y = 2x + 3$
   $y = 3x + 1$

5. Write an equation that represents exponential growth.   Write an equation that represents exponential decay.

6. The sum of two numbers is 82. Their difference is 24. Write a system of equations that describes this situation. Solve by elimination to find the two numbers.

7. Sharon has some one-dollar bills and some five-dollar bills. She has 14 bills. The value of the bills is $30. Solve a system of equations using elimination to find how many of each kind of bill she has.

   Solve the system using elimination.
8. $2x - 2y = -8$
   $x + 2y = -1$

9. How much money will you have in 12 years if you invest $10,000 at a 6% interest rate?

10. Simplify $(-6x^5y^3z^{-4})(-4x^7y^4z^6)$
11. Graph the inequality $4x + 6y \geq 10$

12. Write the following inequality in slope-intercept form.
    $5x - 5y \geq 70$

13. Identify the initial amount a and the growth factor b in the exponential function.
    $A(x) = 680 \cdot 4.3^x$

14. Suppose the population of a town is 2,700 and is growing 4% each year.
    a. Write an equation to model the population growth.
    b. Predict the population after 12 years.

15. Write the polynomial in standard form. Then name the polynomial based on its degree and number of terms.
    $2 - 11x^2 - 8x + 6x^2$

16. Simplify: $\dfrac{a^6 b^9 c^3}{a^3 b^{12} c^3}$

17. Classify the expression. $6x^3 - 9x + 3$

18. Write the perimeter of the figure.

3x + 2   6x

5x

not to scale
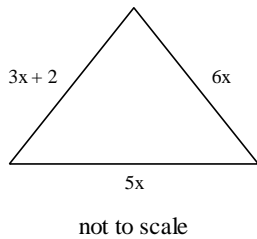
19. Simplify $(-7x - 5x^4 + 5) - (-7x^4 - 5 - 9x)$

20. Simplify: $(4u^3 + 4u^2 + 2) + (6u^3 - 2u + 8)$

21. Simplify: $2n(n^2 + 3n + 4)$

Factor the polynomial.

22. $2x^3 + 4x^2 + 8x$

23. $54c^3 d^4 + 9c^4 d^2$

24. Find the GCF of the terms of the polynomial.

$8x^6 + 32x^3$

25. The Johnsons want to cover their backyard with new grass. Their backyard is rectangular, with a length of $3x - 5$ feet and a width of $4x - 10$ feet. However, their rectangular swimming pool, along with its surrounding patio, has dimensions of $x + 8$ by $x - 2$ feet. What is the area of the region of the yard that they want to cover with new grass?

Simplify – multiply the binomials:

26. $(4x + 3)(2x + 5)$

27. $(2n + 2)(2n - 2)$

28. $(j + 7)(j - 7)$

29. Find the missing coefficient. $(5d - 7)(5d - 6) = 25d^2 + \ \square\, d + 42$

30. Complete the factorization and find the missing constant $\qquad y^2 + 15y + 56 = (y + 7)(y + \ \square\ )$

Factor the expression.

31. $w^2 + 18w + 77$

32. $x^2 - 10xy + 24y^2$

33. $15x^2 - 16xy + 4y^2$

34. $6x^2 + 5x + 1$

35. $20x^2 + 22x - 12$

36. $64r^2 - 49$

37. Find the equation of the axis of symmetry, and the coordinates of the vertex of the graph of the function, and state the direction that the parabola opens (upward or downward) <u>explain</u>. $y = 4x^2 + 5x - 1$

38. A ball is thrown into the air with an upward velocity of 36 ft/s. Its height h in feet after t seconds is given by the function $h = -16t^2 + 36t + 9$.
    a. In how many seconds does the ball reach its maximum height? Round to the nearest hundredth if necessary.
    b. What is the ball's maximum height?

    Solve the equation using the zero-product property.
39. $(2x + 2)(5x - 5) = 0$

    Solve the equation by factoring. (could ask: What are the roots?   What are the zeros?

40. $z^2 - 6z - 27 = 0$

41. $3z^2 + 3z - 6 = 0$

42. $c^2 - 4c = 0$

43. Write an equation for exponential decay.   The initial amount is 250, the rate of decay is 8%

44. Simplify: 5^{-3} 45. Simplify: $x^2 \cdot x^7$ 46. Simplify: $x^2 + 3x^2 - 5x$

47. Two variables, x and y are inversely related.   When x=3 and y=.25, what is the value of x when y=.05?

48. Given y varies directly with x.   What is **k** when x=8 and y=28?

49. A scientist counts 35 bacteria present in a culture and finds that the number of bacteria triples each hour. The function $35 \cdot 3^x$ models the number of bacteria after x hours.   How many bacteria are there at 9 hours?

50. What is the prime factorization of 420?

Spring Final Exam Review
Answer Section

1. ANS: $(-8, -17)$
2. ANS: 1
3. ANS: length = 5 cm; width = 18 cm
4. ANS: $(2, 7)$
5. *growth*: $y = 2(1.7^x)$ *decay*: $y = 125\left(\frac{1}{2}^x\right)$
6. ANS:
    $x + y = 82$
    $x - y = 24$
    53 and 29
7. ANS: 4 five-dollar bills, 10 one-dollar bills
8. ANS: $(-3, 1)$
9. $20121.96
10. ANS: $24x^{12}y^7z^2$

11. ANS:

12. ANS: $y \le x - 14$
13. ANS: 680, 4.3
14. ANS: $y = 2,700 \cdot 1.04^x$; about 4,323 people

15. ANS: $-5x^2 - 8x + 2$; quadratic trinomial
16. ANS: $\dfrac{a^3}{b^3}$
17. ANS: cubic trinomial
18. ANS: $14x + 2$
19. ANS: $2x^4 + 2x + 10$
20. ANS: $10u^3 + 4u^2 - 2u + 10$
21. ANS: $2n^3 + 6n^2 + 8n$
22. ANS: $2x(x^2 + 2x + 4)$
23. ANS: $9c^3d^2(6d^2 + c)$
24. ANS: $8x^3$
25. ANS: $11x^2 - 56x + 66$ ft^2
26. ANS: $8x^2 + 26x + 15$
27. ANS: $4n^2 - 4$

28. ANS: $j^2 - 49$
29. ANS: -65
30. ANS: 8
31. ANS: $(w + 7)(w + 11)$
32. ANS: $(x - 6y)(x - 4y)$
33. ANS: $(3x - 2y)(5x - 2y)$
34. ANS: $(3x + 1)(2x + 1)$
35. ANS: $2(5x - 2)(2x + 3)$
36. ANS: $(8r - 7)(8r + 7)$
37. $x = -\frac{5}{8}$,   vertex: $\left(-\frac{5}{8}, -2\frac{9}{16}\right)$, graph opens upward because leading coefficient is positive.
38. ANS: 1.13 s; 29.25 ft
39. ANS: $x = -1$ or $x = 1$
40. ANS: $z = -3$ or $z = 9$
41. ANS: $z = 1$ or $z = -2$
42. ANS: $c = 0$ or $c = 4$
43. $A = 250(.92^x)$
44. $\dfrac{1}{125}$
45. x^9
46. $4x^2 - 5x$
47. $y = \dfrac{.75}{x} \therefore x = 15$
48. $y = 3.5x \therefore k = 3.5$
49. 688905 bacteria

50.. ANS: $2 \times 2 \times 3 \times 5 \times 7$