Spring Semester Final Exam Review

1. Simplify: $\frac{(z^2)^3 \cdot z^7}{z^9}$. *(5.1)*

2. Subtract: $(2x^3 + 8x^2 - 6x) - (2x^3 - x^2 + 1)$. *(5.2)*

3. Subtract: $(5y^2 - 6) - (y^2 + 2)$. *(5.2)*

4. Use the product rule to simplify $(2x^2)(-3x^5)$. *(5.1)*

5. Find the value of $-x^2$ when   *(5.1)*

      a. $x = 2$ b. $x = -2$

6. Add $(11x^3 - 12x^2 + x - 3)$ and $(x^3 - 10x + 5)$. *(5.2)*

7. Multiply: $(10x^2 - 3)(10x^2 + 3)$. *(5.4)*

8. Multiply: $(2x - y)^2$. *(5.3)*

9. Multiply: $(10x^2 + 3)^2$. *(5.4)*

10. Divide $6m^2 + 2m$ by $2m$. *(5.6)*

11. Evaluate. *(5.5)*

       a. 5^{-1} b. 7^{-2}

12. Evaluate each expression for the given value of x. (*5.1*)

       a. $2x^3$; x is 5   b. $\frac{9}{x^2}$; x is -3

13. Find the slope and y-intercept of the line whose equation is $7x - 3y = 2$. *(8.2)*

14. Find the degree of each term. *(5.2)*

       a. $3x^2$ b. -2^3x^5 c. y   d. $12x^2yz^3$ e. 5

15. Subtract: $(2x^3 + 8x^2 - 6x) - (2x^3 - x^2 + 1)$. *(5.2)*

16. Multiply: $(3x + 2)(2x - 5)$. *(5.3)*

17. Multiply: $(3y + 1)^2$. *(5.4)*

18. Simplify by writing each expression with positive exponents only. *(5.5)*

       a. 3^{-2} b. $2x^{-3}$ c. $2^{-1} + 4^{-1}$ d. $(-2)^{-4}$ e. y^{-4}

19. Simplify: $\frac{(5a^7)^2}{a^5}$. *(5.1)*

20. Write each number in scientific notation. *(5.5)*

       a. 367,000,000   b. 0.000003   c. 20,520,000,000   d. 0.00085

21. Multiply: $(3x - 7y)^2$. *(5.4)*

22. Divide $x^2 + 7x + 12$ by $x + 3$ using long division. *(5.6)*

23. Simplify: $\frac{(xy)^{-3}}{(x^5y^6)^3}$. *(5.5)*

24. Find the GCF of each list of terms. *(6.1)*

       a. $x^3, x^7,$ & x^5 b. $y, y^4,$ & y^7

25. FACTOR. *(6.1 – 6.6)*

       a. $z^3 + 7z + z^2 + 7$ *(6.1)*   e. $-4x^2 - 23x + 6$ *(6.3)*

       b. $x^2 + 7x + 12$ *(6.2)*   f. $25a^2 - 9b^2$ *(6.5)*

       c. $2x^3 + 2x^2 - 84x$ *(6.2)*   g. $9xy^2 - 16x$ *(6.5)*

       d. $8x^2 - 22x + 5$ *(6.3)*

26. Solve: $(x - 3)(x + 1) = 0$ *(6.6)*

27. Solve: $x^2 - 13x = -36$ *(6.6)*

28. Simplify. Use positive exponents to write each answer. *(5.5)*

    a. $(a^{-2}bc^3)^{-3}$

    b. $\left(\dfrac{a^{-4}b^2}{c^3}\right)^{-2}$

    c. $\left(\dfrac{3a^8b^2}{12a^5b^5}\right)^{-2}$

29. Multiply. *(5.3)*

    a. $(4a - 3)(7a - 2)$

    b. $(2a + b)(3a - 5b)$

30. Simplify each quotient. *(5.1)*

    a. $\dfrac{x^5}{x^2}$ b. $\dfrac{4^7}{4^3}$ c. $\dfrac{(-3)^5}{(-3)^2}$ d. $\dfrac{s^2}{t^3}$ e. $\dfrac{2x^5y^2}{xy}$

31. Factor. *(6.1)*

    a. $9x^3 + 27x^2 - 15x$

    b. $2x(3y - 2) - 5(3y - 2)$

    c. $2xy + 6x - y - 3$

32. Factor: $x^2 - 2x - 48$. *(6.2)*

33. Solve: $(5x - 1)(2x^2 + 15x + 18) = 0$. *(6.6)*

34. Factor: $2ax^2 - 12axy + 18ay^2$. *(6.3)*

35. Simplify the rational expression: $\dfrac{2x^2}{10x^3 - 2x^2}$. *(7.1)*

36. Solve: $2(a^2 + 2) - 8 = -2a(a - 2) - 5$. *(6.6)*

37. Simplify: $\dfrac{\frac{1}{x} + \frac{2x}{y}}{x^2 - \frac{1}{x^2y}}$ *(7.7)*

38. Factor: $4m^4 - 4m^2 + 1$. *(6.3)*

39. Simplify: $\dfrac{x^2 - 4x + 4}{2 - x}$. *(7.1)*

40. The square of a number plus three times the number is 70. *(6.7)*

41. Subtract: $\dfrac{a+1}{a^2 - 6a + 8} - \dfrac{3}{16 - a^2}$. *(7.4)*

42. Divide: $x^3 - 3x^2 - 10x + 24$ by $x + 3$. *(5.6)*

43. Solve: $\dfrac{x}{2} + \dfrac{8}{3} = \dfrac{1}{6}$. *(7.5)*

44. Solve: $\dfrac{x+3}{x^2 + 5x + 6} = \dfrac{3}{2x + 4} - \dfrac{1}{x+3}$. *(7.5)*

45. The quotient of a number and 6, minus $\dfrac{5}{3}$, if the quotient of the number and 2. Find the number. *(7.6)*

46. Mr. Briley can roof his house in 24 hours. His son can roof the same house in 40 hours. If they work together, how long will it take to roof the house? *(7.6)*

47. Suppose that y varies directly as x. If y is 5 when x is 30, find the constant of variation and the direct variation equation. *(8.4)*

48. Suppose the y varies inversely as x. If y is 8 when x is 24, find the constant of variation and the inverse variation equation. *(8.4)*

49. Use the square root property to solve $(x + 1)^2 = 12$. *(11.1)*

50. Use the square root property to solve $(y - 1)^2 = 24$. *(11.1)*

51. Solve: $x - \sqrt{x} - 6 = 0$. *(11.3)*

52. Use the quadratic formula to solve $m^2 = 4m + 8$. *(11.2)*

53. Graph: y = |x – 2|. State the domain and range, and if it is linear or nonlinear. A t-chart is your work. *(8.2)*

54. Graph: f(x) = -2. State the domain and range, and if it is linear or nonlinear. A t-chart is your work. *(8.1)*

55. Subtract: $\frac{3x^2+2x}{x-1} - \frac{10x-5}{x-1}$. *(7.3)*

56. Add: $1 + \frac{m}{m+1}$. *(7.4)*

57. Simplify each complex fraction. *(7.7)*

    a. $\dfrac{\frac{5}{x+2}}{\frac{10}{x-2}}$
          b. $\dfrac{\frac{x}{y^2}+\frac{1}{y}}{\frac{y}{x^2}+\frac{1}{x}}$

58. Simplify each rational expression. *(7.1)*

    a. $\dfrac{a^3-8}{2-a}$
          b. $\dfrac{3a^2-3}{a^3+5a^2-a-5}$

59. Perform the indicated operations. *(7.4)*

    a. $\dfrac{3}{xy^2} - \dfrac{2}{3x^2y}$
    b. $\dfrac{5x}{x+3} - \dfrac{2x}{x-3}$
    c. $\dfrac{x}{x-2} - \dfrac{5}{2-x}$

60. If the following two triangles are similar, find the unknown length x. *(7.6)*

61. Use synthetic division to divide $4y^3 - 12y^2 - y + 12$ by $y - 3$. *(5.7)*

62. Suppose that u varies inversely as w. If u is 3 when w is 5, find the constant of variation and the inverse variation equation. *(8.4)*

63. Suppose that y varies directly as x. If y = 0.51 when x = 3, find the constant of variation and the direct variation equation. *(8.4)*

64. Divide: $\frac{3x^3y^7}{40} \div \frac{4x^3}{y^2}$. *(7.2)*

65. Divide: $\frac{12x^2y^3}{5} \div \frac{3y^2}{x}$. *(7.2)*

66. Subtract: $\frac{2y}{2y-7} - \frac{7}{2y-7}$. *(7.3)*

67. Subtract: $\frac{-4x^2}{x+1} - \frac{4x}{x+1}$. *(7.3)*

68. Graph the function. *(8.3)*

    a. f(x) = |x| - 2
    b. $g(x) = \sqrt{x} + 3$
    c. H(x) = |x + 3|
    d. $k(x) = \sqrt{x-2}$
    e. J(x) = (x + 2)² + 2
    f. M(x) = - |x + 1| + 1
    g. P(x) = - (x – 2)²
    h. $d(x) = -\sqrt{x+3}$

69. The height of a triangular sail is 2 meters less than twice the length of the base. If the sail has an area of 30 square meters, find the length of its base and the height. *(6.7)*

70. The height of a parallelogram is 5 feet more than three times its base. If the area of the parallelogram is 182 square feet, find the length of its base and height. *(6.7)*

71. Factor the following polynomials. *(6.4)*

   a. $21y^2 + 17t + 2$

   b. $15x^2 + 11x + 2$

   c. $8x^2 - x - 9$

   d. $30x^2 - 23x + 3$

   e. $2x^2 - 7x + 3$

   f. $20x + 25x^2 + 4$

   g. $6x^2 - 11x - 10$

   h. $4y^2 - 2t - 12$

   i. $10a^3 + 17a^2 + 3a$

   j. $5 - 12x + 7x^2$

First 35 problems are due on separate paper with all work shown to earn bonus points on your final exam.

The rest of the problems are due on the second review day for the rest of the bonus points for your final exam.