Pre-Calculus Name:_____ Per. _____
Chapter 0 Review

Directions: Do ALL problems on a separate sheet of lined paper.

1. Draw a detailed diagram of the real number system showing the relationship among all of its subsets (whole, natural, integer, rational, irrational). Include examples of number from each subset.

Determine which numbers in the set are natural, whole, integers, rational, and irrational.

2. $\sqrt{5},\ -7,\ -\frac{7}{3},\ 0,\ 3.12,\ \frac{5}{4},\ -3,\ 12,\ 5$

3. $25,\ -17,\ -\frac{12}{5},\ \sqrt{9},\ 5.86,\ \frac{1}{2}\pi,\ 7,\ -11.1,\ 13$

4. Write $[4,\infty)$ as an inequality.

5. Write $(-\infty,2)$ as an inequality.

6. Write $[-3,12)$ as an inequality.

7. Write $x \le 5$ as an interval.

8. Write $x > -2$ as an interval.

9. Write $-5 < x \le 7$ as an interval.

Simplify

10. $7x^5(x^3)$

11. $(-5x)^3$

12. $(4x^3)^0$

13. $\frac{x^4}{x^6}$

14. $\left(\frac{4}{y}\right)^3$

15. $a^5b^{-4}c^2a^{-3}$

16. $\left(\frac{x}{10}\right)^{-1}$

17. $(-2)^4$

18. -2^4

19. $\frac{12(x+y)^3}{9(x+y)}$

20. $32(-2)^{-5}$

21. $2^{-1}+3^{-1}$

22. $\sqrt[3]{\frac{27}{8}}$

23. $64^{\frac{1}{3}}$

24. $36^{\frac{3}{2}}$

25. $32^{-\frac{3}{5}}$

26. $\left(\frac{9}{4}\right)^{-\frac{1}{2}}$

27. $\left(\frac{1}{\sqrt{32}}\right)^{-\frac{2}{5}}$

28. $\sqrt[3]{16x^5}$

29. $\sqrt[5]{160x^8y^4}$

30. $-2\sqrt{9y}+10\sqrt{y}$

31. $\frac{5}{\sqrt{10}}$

32. $\frac{3}{\sqrt{5}+\sqrt{6}}$

Multiply

33. $(3x-5)(2x+1)$

34. $(x^2+3x-2)(x^2-3x-2)$

35. $(3x+2y)^3$

36. $[(x+y)+1][(x+y)-1]$

Factor

37. $4x^3-6x^2+12x$

38. $25x^2-16y^2$

39. $x^2-13x+42$

40. $5x^3-10x^2+3x-6$

41. $6x^2-x-15$

42. x^3-27

43. $64x^3-y^3$

Simplify.

44. $\frac{3xy}{xy+x}$

45. $\frac{x^2-14x+49}{x^2-49}\div\frac{3x-21}{x+7}$

46. $\frac{2x}{x-5}-\frac{5}{5-x}$

47. $\frac{2}{x^2-x-2}+\frac{10}{x^2+2x-8}$

48. $\frac{(x-4)}{\left(\frac{x}{4}-\frac{4}{x}\right)}$

49. $2x(x-5)^{-3}-4x^2(x-5)^{-4}$

50. $\frac{-x^3(1-x^2)^{-\frac{1}{2}}-2x(1-x^2)^{\frac{1}{2}}}{x^4}$

51. $\frac{\left[\frac{1}{(x+h)^2}-\frac{1}{x^2}\right]}{h}$

52. $\frac{1}{x-2}+\frac{3}{x+3}=\frac{4}{x^2+x-6}$

Solve by factoring.

53. $3+5x-2x^2=0$

Solve by extracting square roots.

54. $(2x-1)^2=18$

Solve the quadratic by completing the square. Use the quadratic formula to solve.

55. $x^2-2x-3=0$ **56.** $9x^2-12x=14$ **57.** $2x^2-x-1=0$ **58.** $4x^2-4x-4=0$

Solve.

59. $\sqrt{5-x}-3=0$ **60.** $(x+3)^{\frac{3}{2}}=8$ **61.** $\left(x^2-x-22\right)^{\frac{3}{2}}=27$ **62.** $|2x-1|=5$

Solve.

63. $4(x+1)<2x+3$ **64.** $-1<2-\frac{x}{3}<1$ **65.** $|x+14|+3>17$ **66.** $3|4-5x|\le 9$

Write use negative exponents. Write two or more terms. Simplify.

67. $\dfrac{x+1}{x(6-x)^{\frac{1}{2}}}$ **68.** $\dfrac{x^3-5x^2+4}{x^2}$ **69.** $\dfrac{(x+1)\left(\frac{1}{2}\right)\left(2x-3x^2\right)^{-\frac{1}{2}}(2-6x)-\left(2x-3x^2\right)^{\frac{1}{2}}}{(x+1)^2}$

Answer Key:

1) See yellow sheet for example **2)** Natural: $5,12$ Whole: $0,5,12$ Integer: $-7,-3,0,5,12$

Rational: $-7,-3,-\frac{7}{3},0,3.12,\frac{5}{4},5,12$ Irrational: $\sqrt{5}$ **3)** Natural: $7,\sqrt{9},13,25$ Whole: $7,\sqrt{9},13,25$

Integer: $-17,\sqrt{9},7,13,25$ Rational: $-17,-11.1,-\frac{12}{5},5.86,7,13,25$ Irrational: $\frac{1}{2}\pi$ **4)** $x\ge 4$

5) $x<2$ **6)** $-3\le x<12$ **7)** $(-\infty,5]$ **8)** $(-2,\infty)$ **9)** $(-5,7]$ **10)** $7x^8$ **11)** $-125x^3$ **12)** 1

13) $\frac{1}{x^2}$ **14)** $\frac{64}{y^3}$ **15)** $\frac{a^2c^2}{b^4}$ **16)** $\frac{10}{x}$ **17)** 16 **18)** -16 **19)** $\frac{4(x+y)^2}{3}$ **20)** -1 **21)** $\frac{5}{6}$ **22)** $\frac{3}{2}$

23) 4 **24)** 216 **25)** $\frac{1}{8}$ **26)** $\frac{2}{3}$ **27)** 2 **28)** $2x\sqrt[3]{2x^2}$ **29)** $2x\sqrt[5]{5x^3y^4}$ **30)** $4\sqrt{y}$ **31)** $\frac{\sqrt{10}}{2}$

32) $-3\left(\sqrt{5}-\sqrt{6}\right)$ **33)** $6x^2-7x-5$ **34)** x^4-13x^2+4 **35)** $27x^3+54x^2y+36xy^2+8y^3$

36) $x^2+2xy+y^2-1$ **37)** $2x\left(2x^2-3x+6\right)$ **38)** $(5x-4y)(5x+4y)$ **39)** $(x-6)(x-7)$

40) $(x-2)\left(5x^2+3\right)$ **41)** $(2x+3)(3x-5)$ **42)** $(x-3)\left(x^2+3x+9\right)$ **43)** $(4x-y)\left(16x^2+4xy+y^2\right)$

44) $\frac{3y}{y+1},x\ne 0$ **45)** $\frac{1}{3},x\ne\pm 7$ **46)** $\frac{2x+5}{x-5}$ **47)** $\frac{6(2x+3)}{(x-2)(x+1)(x+4)}$ **48)** $\frac{4x}{x+4},x\ne 0,4$

49) $\frac{-2x(x+5)}{(x-5)^4}$ **50)** $\frac{x^2-2}{x^3\left(1-x^2\right)^{\frac{1}{2}}}$ **51)** $-\frac{2x+h}{x^2(x+h)^2},h\ne 0$ **52)** $\frac{7}{4}$ **53)** $3,-\frac{1}{2}$ **54)** $\frac{1\pm 3\sqrt{2}}{2}$

55) $3,-1$ **56)** $\frac{2}{3}\pm\sqrt{2}$ **57)** $-\frac{1}{2},1$ **58)** $\frac{1}{2}\pm\frac{\sqrt{5}}{2}$ **59)** -4 **60)** 1 **61)** $\frac{1\pm 5\sqrt{5}}{2}$ **62)** $3,-2$

63) $x<-\frac{1}{2}$ **64)** $3<x<9$ **65)** $x<-28,x>0$ **66)** $\frac{1}{5}\le x\le\frac{7}{5}$ **67)** $(x+1)x^{-1}(6-x)^{-\frac{1}{2}}$

68) $x-5+\frac{4}{x^2}$ **69)** $\dfrac{1-4x}{(x+1)^2\left(2x-3x^2\right)^{\frac{1}{2}}}$