Name _____

Review Packet for Incoming Calculus CP

It is essential that all students complete the problems and review the concepts in this packet. All work must be included with the solutions for this packet to be accepted.

SHOW ALL WORK!

Part 1: Algebra
Perform the indicated operations. Write the resulting polynomial in standard form.

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

2. $(x - 3 + y)(x - 3 - y)$

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

4. $-3^2 - (-4x)^2$

Factor each expression completely.

5. $2x^3 - 6x$

6. $(x - 1)^2 - 4$

7. $9x^2 - 12x + 4$

8. $4x^2 - 23x - 6$

9. $9x^2 - 3x + 2$

10. $5x^2 + 26x + 5$

11. $9x^2 - 36$

12. $16 + 6x - x^2$

13. $2x^3 - x^2 - 6x + 3$

Given $f(x) = -x^2 + 3$ and $g(x) = 3x - 2$, simplify each of the following:

14. $f + g$

15. $f - g$

16. $f \cdot g$

17. $f \circ g$

18. $g \circ f$

19. f/g

20. $f^{-1}(x)$

21. $g^{-1}(x)$

22. $f(g(2))$

23. $g(f(-3))$

Solve each quadratic equation ***Twice***:

(a) by factoring (when possible)

(b) by quadratic formula

24. $x^2 + 6x - 16 = 0$

25. $2x^2 + 6x + 7 = 0$

26. $0 = 3x - 2x^2 + 20$

Determine the domain and the range of each function:

27. $f(x) = x^3 - x$

28. $f(x) = x^2 - 3$

29. $f(x) = \frac{1}{x}$

30. $f(x) = |x - 3|$

Find all of the complex zeros of each function:

31. $f(x) = 12x^4 - 5x^2 - 2$

32. $f(x) = 9x^3 - 108x^2 + x - 12$

33. $f(x) = x^5 + x^3 - 2x^2 - 12x - 8$

34. $f(x) = \frac{3}{x}$

35. $f(x) = \frac{x^2-4}{x+1}$

Simplify each expression. Express each answer in standard radical form.

36. $\sqrt{54xy^4}$

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

38. $5\sqrt{x} - 3\sqrt{x}$

39. $2\sqrt{50} + 12\sqrt{8}$

40. $\left(5 + 2\sqrt{3}\right)\left(5 - 2\sqrt{3}\right)$

41. $(2 - \sqrt{3})(3 - \sqrt{6})$

Rationalize the denominator.

42. $\frac{2}{\sqrt{6}}$

43. $\frac{1}{2+\sqrt{3}}$

44. $\frac{5}{2\sqrt{10}-5}$

Simplify each expression. Express all answers with positive exponents.

45. $\frac{25x^8}{10x^4}$

46. $\left(\frac{4}{y}\right)^3\left(\frac{3}{y}\right)^2$

47. $(4x)^{-2}(8x^4)$

48. $(2x^5)^0$

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

50. $(25x^2y^4)^{-\frac{1}{2}}$

Simplify each expression:

51. $\frac{x+1}{(x-1)^2}+\frac{x-2}{x-1}$

52. $\frac{x}{x-1}-\frac{2x-1}{x+1}$

53. $\frac{4x^2+20x}{9-6x-3x^2}\div\frac{x+5}{x^2-9}$

54. $\frac{6x}{3x-1}-\frac{4x}{2x+5}$

55. $\frac{3x+\frac{x}{x+1}}{3x+3}$

Solve each equation.

56. $\frac{x+3}{2x} = \frac{5}{8}$

57. $\frac{5}{x+2} + \frac{x}{2} = \frac{4}{3}$

58. $\frac{x-4}{x+2} + \frac{2}{x-2} = \frac{17}{x^2-4}$

59. $3 + \sqrt{x+1} = 2x$

60. $4\sqrt{x-3} = 8$

Solve each system of equations:

61. $\begin{cases} y = 8 - x \\ \frac{1}{2}y - x = \frac{5}{2} \end{cases}$

62. $\begin{cases} 2x - 3y = 3 \\ 4x + 2y = 14 \end{cases}$

Part 2: Graphing

Graph each equation on a separate sheet of paper.
Label the *x* and *y*-intercepts and all of the important points on each graph.
Identify the Domain and Range

1. $f(x) = -|x - 2|$

2. $f(x) = \sqrt{-x} - 3$

3. $y = -3x^2 + 6x - 9$

4. $f(x) = 2(x + 1)^2 + 3$

5. $f(x) = \frac{x(x-1)}{(x-1)(x+2)}$

6. $f(x) = \frac{1}{x} + 1$

7. $f(x) = x^2 + 3$ and $f^{-1}(x)$

8. $(x - 2)^2 + y^2 = 9$

9. $f(x) = x(x - 3)(x + 2)^2$

10. $f(x) = -x^3(x + 2)(x - 5)$

11. $f(x) = \begin{cases} 2x - 1, & x < 0 \\ \sqrt{x}, & x \geq 0 \end{cases}$

12. $f(x) = \begin{cases} x^2, & x > 0 \\ -2, & x \leq 0 \end{cases}$

13. $f(x) = \begin{cases} -2 & x < 0 \\ x + 1 & 0 \leq x < 10 \\ -\frac{1}{2}x + 16 & x \geq 10 \end{cases}$