PreCalc Test #3 Review

Please complete 2 problems from each section on your review (It will count as a quiz grade). Your review is due the day of the test, (A day October 28th, B day October 29th). You are responsible for this content whether or not you were in this class at the time. See www.CalcChat.com for worked-out solutions to odd numbered exercises.

1.6

Finding Inverse Functions Informally In Exercises 125–128, find the inverse function of f informally. Verify that $f(f^{-1}(x)) = x$ and $f^{-1}(f(x)) = x$.

125. $f(x) = 6x$

126. $f(x) = x + 5$

127. $f(x) = \frac{1}{2}x + 3$

128. $f(x) = \frac{x - 4}{5}$

Algebraic-Graphical-Numerical In Exercises 129 and 130, show that f and g are inverse functions (a) algebraically, (b) graphically, and (c) numerically.

129. $f(x) = 3 - 4x, \quad g(x) = \frac{3 - x}{4}$

130. $f(x) = \sqrt{x + 1}, \quad g(x) = x^2 - 1, x \geq 0$

Using the Horizontal Line Test In Exercises 131–134, use a graphing utility to graph the function and use the Horizontal Line Test to determine whether the function is one-to-one and an inverse function exists.

131. $f(x) = \frac{1}{2}x - 3$

132. $f(x) = (x - 1)^2$

133. $h(t) = \frac{2}{t - 3}$

134. $g(x) = \sqrt{x + 6}$

Finding an Inverse Function Algebraically **In Exercises 135–142, find the inverse function of f algebraically.**

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

136. $f(x) = \frac{7x + 3}{8}$

137. $f(x) = 4x^3 - 3$

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

139. $f(x) = \sqrt{x + 10}$

140. $f(x) = 4\sqrt{6 - x}$

141. $f(x) = \frac{1}{4}x^2 + 1, \quad x \geq 0$

142. $f(x) = 5 - \frac{1}{9}x^2, \quad x \geq 0$

2.1

Library of Parent Functions **In Exercises 1–6, sketch the graph of each function and describe how the graph is related to the graph of $y = x^2$.**

1. $y = x^2 - 2$

2. $y = x^2 + 4$

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

4. $y = -(x + 4)^2$

5. $y = (x + 5)^2 - 2$

6. $y = -(x - 4)^2 + 1$

Identifying the Vertex of a Quadratic Function **In Exercises 7–10, describe the graph of the function and identify the vertex. Then, sketch the graph of the function. Identify any x-intercepts.**

7. $f(x) = \left(x + \frac{3}{2}\right)^2 + 1$

8. $f(x) = (x - 4)^2 - 4$

9. $f(x) = \frac{1}{3}(x^2 + 5x - 4)$

10. $f(x) = 3x^2 - 12x + 11$

Writing the Equation of a Parabola in Standard Form **In Exercises 11 and 12, write the standard form of the quadratic function that has the indicated vertex and whose graph passes through the given point. Use a graphing utility to verify your result.**

11. Vertex: $(1, -4)$; Point: $(2, -3)$

12. Vertex: $(2, 3)$; Point: $(0, 2)$

Applying the Leading Coefficient Test **In Exercises 23–26, use the Leading Coefficient Test to describe the right-hand and left-hand behavior of the graph of the polynomial function.**

23. $f(x) = -x^2 + 6x + 9$

24. $f(x) = \frac{1}{2}x^3 + 2x$

25. $g(x) = \frac{3}{4}(x^4 + 3x^2 + 2)$

26. $h(x) = -x^5 - 7x^2 + 10x$

Finding Zeros of a Polynomial Function **In Exercises 27–32, (a) find the zeros algebraically, (b) use a graphing utility to graph the function, and (c) use the graph to approximate any zeros and compare them with those in part (a).**

27. $g(x) = x^4 - x^3 - 2x^2$

28. $h(x) = -2x^3 - x^2 + x$

29. $f(t) = t^3 - 3t$

30. $f(x) = -(x + 6)^3 - 8$

31. $f(x) = x(x + 3)^2$

32. $f(t) = t^4 - 4t^2$

Long Division of Polynomials **In Exercises 43–50, use long division to divide.**

43. $\dfrac{24x^2 - x - 8}{3x - 2}$

44. $\dfrac{4x^2 + 7}{3x - 2}$

45. $\dfrac{x^4 - 3x^2 + 2}{x^2 - 1}$

46. $\dfrac{3x^4 + x^2 - 1}{x^2 - 1}$

47. $(5x^3 - 13x^2 - x + 2) \div (x^2 - 3x + 1)$

48. $(x^4 + x^3 - x^2 + 2x) \div (x^2 + 2x)$

49. $\dfrac{6x^4 + 10x^3 + 13x^2 - 5x + 2}{2x^2 - 1}$

50. $\dfrac{x^4 - 3x^3 + 4x^2 - 6x + 3}{x^2 + 2}$

Using Synthetic Division **In Exercises 51–56, use synthetic division to divide.**

51. $(0.25x^4 - 4x^3) \div (x + 2)$

52. $(0.1x^3 + 0.3x^2 - 0.5) \div (x - 5)$

53. $(6x^4 - 4x^3 - 27x^2 + 18x) \div \left(x - \frac{2}{3}\right)$

54. $(2x^3 + 2x^2 - x + 2) \div \left(x - \frac{1}{2}\right)$

55. $(3x^3 - 10x^2 + 12x - 22) \div (x - 4)$

56. $(2x^3 + 6x^2 - 14x + 9) \div (x - 1)$

Using the Remainder Theorem **In Exercises 57 and 58, use the Remainder Theorem and synthetic division to evaluate the function at each given value. Use a graphing utility to verify your results.**

57. $f(x) = x^4 + 10x^3 - 24x^2 + 20x + 44$

(a) $f(-3)$ (b) $f(-2)$

58. $g(t) = 2t^5 - 5t^4 - 8t + 20$

(a) $g(-4)$ (b) $g\left(\sqrt{2}\right)$