Algebra 2 CP

ISLO Exam
REVIEW

Student's Name: _____

Teacher's Name: _____

The exam will cover the following sections from the textbook.

Chapter 6:	6.3 – 6.6
Chapter 7:	7.1 – 7.7
Chapter 8:	8.1 – 8.6

Note: School policy mandates a penalty for cheating on an exam to be a grade of zero for that exam. The term cheating includes "intent to cheat". Calculators may be checked for the inclusion of extraneous material. No papers should be placed in the calculators. The programs may be checked and erased. Any information there may be considered "intent to cheat". Before the exam, clear your calculator of any formulas, notes, or any such items, which could be perceived as "useful", or providing an unfair advantage. The best solution is to RESET and clear the calculator memory. There may be spot checks regarding programs and memory. In addition, NO CELL PHONES are permitted in the testing area. Any other electronic devices may be perceived as "intent to cheat". Keep all such devices out of the testing area.

1. Find an equation in factored form with integral coefficients with solutions $x = 4 \pm 5i$ and 3
2. Find an equation in factored form with integral coefficients with solutions $x = -2 \pm \sqrt{3}$ and -1
3. Use synthetic substitution to evaluate $f(x) = 7x^3 + 3x^2 - 7x + 3$ when $x = 3$.
   a. $f(x) = 216$
   b. $f(x) = 63$
   c. $f(x) = 195$
   d. $f(x) = 198$
4. Divide: $(3x^4 - 5x^3 + 2x^2 + 3x - 2) \div (3x - 2)$ using long division
5. Divide: $(x^4 + 4.5x^3 + 3x^2 - 0.5x)$ by $(x - 0.5)$ using synthetic division
6. Divide: $(x^4 + 4x^3 - x - 4) \div (x^3 - 1)$ using long division
7. Divide: $(x^4 - 5x^2 + 4x + 12)$ by $(x + 2)$ using synthetic division
8. Solve $x^4 + x^3 = 4x^2 + 4x - 5$ by using your graphing calculator. Round your answer to the nearest thousandths.
9. Solve: $81x^3 - 192 = 0$
10. Solve: $x^3 + 3x^2 - 4x - 12 = 0$
11. Solve: $9x^2(x^2 - 1) = 18$
12. Solve: $4x^3 - 16x^2 + 12x = 0$

For questions 13-17, simplify the expression.

13. $\sqrt[4]{32x^8y^{15}z^{12}}$
14. $\frac{\sqrt[3]{2x^5}}{\sqrt[3]{3}}$
15. $\left(5 - 2\sqrt{6}\right)\left(3 + 4\sqrt{6}\right)$
16. $\sqrt{6x^2y^4} * \sqrt{8xy^2}$
17. $\sqrt[3]{\frac{12x^4y^6}{8}}$
18. Convert $m^{.8}$ to radical form.

For questions 19-27 simplify the following expressions. Write your answer with positive exponents.

19. $\frac{4}{-\sqrt{2}+\sqrt{3}}$
20. $8\sqrt{5} - 2\sqrt{4} + 8\sqrt{45}$
    a. $28\sqrt{5}$
    b. $32\sqrt{5} - 4 + 8\sqrt{45}$
    c. $32\sqrt{5} - 4$
    d. $14\sqrt{54}$

21. $5\sqrt[3]{64x^7} - x\sqrt[3]{8x^4}$

22. $\frac{1}{x^{\frac{2}{5}}}$

23. $64^{-\frac{1}{3}} + 81^{\frac{1}{4}}$

24. $\left(\frac{w^5}{w^{-2}}\right)^{\frac{1}{4}}$

25. $\left(9x^{\frac{2}{3}}y\right)^{\frac{1}{2}}$

26. $\sqrt[3]{6x^3y^7} * \sqrt[3]{4x^5}$

27. $7\sqrt[3]{16} - \sqrt[3]{128}$

28. Is $2^3 \cdot 2^4$ equal to 4^7? Justify your answer.

29. Solve: $\sqrt{x^2+5} = 3 - x$

30. Solve: $\sqrt[3]{2x-6} + 8 = 10$

31. Solve: $(x-1)^{\frac{2}{3}} = 49$

32. Solve: $\sqrt{3x+1} = x - 1$. How many of the solutions are extraneous?

33. Let $f(x) = x^2 - 4$ and $g(x) = -3x^2$. Find $f\big(g(x)\big)$.

    a. $-3x^4 + 12$ b. $-3x^4 + 24x^2 - 48$

    c. $9x^4 - 4$ d. $-3x^4 - 4$

34. Let $f(x) = 2x - 3$ and $g(x) = 6x^2 + x - 15$. Find the following and identify their domains:

    a. $f(x) \cdot g(x)$

    b. $\frac{f(x)}{g(x)}$

    c. $\frac{g(x)}{f(x)}$

35. Let $f(x) = x^2 - 16$ and $g(x) = 2x + 8$. Find the following and identify their domains:

    a. $\frac{f(x)}{g(x)}$

    b. $\frac{g(x)}{f(x)}$

36. Let $f(x) = (x-3)^2$ and $g(x) = -\frac{2}{x}$. Find $(g \circ f)(x)$

37. Let $f(x) = 16 - x^2$ and $g(x) = 4 - x$. Find $f(x) - g(x)$.

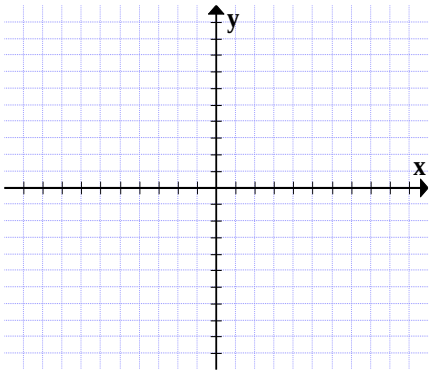
38. Let $g(x) = -5x^2$. Find $g\big(g(-1)\big)$.

    a. -5 b. -1 c. 125 d. -125

39. Let $f(x) = (3x-4)^2$. Find f^{-1} and state its domain and range. Is f^{-1} a function?

40. Let $f(x) = x^2 - 9$ and $g(x) = x^2 + 2x - 15$. Find $\left(\frac{f}{g}\right)(x)$ and its domain.

41. Find the inverse of $y = x^2 - 3$. Graph both the function and inverse, and identify each domain and range.



42. Find the inverse of the function $f(x) = 2x + \frac{2}{3}$. Then find $f^{-1}(f(5))$.

43. Identify the domain and range of the function $f(x) = \sqrt{x+1}$

44. The projected worth (in millions of dollars) of a large company is modeled by the equation $y = 256(1.04)^x$. The variable x represents the number of years since 1997. What is the projected annual percent of growth, and what should the company be worth in 2007?

45. A company had a total debt of $320,000 in 1980. Between 1980 and 1987 it was able to reduce its debt 15% each year. Write an exponential model for the situation. Approximate the company's debt in 1987 to the nearest $1000.

46. Find the value of $1000 deposited for 10 years in an account paying 6% annual interest compounded monthly.

47. Find the domain, range, and horizontal asymptote for the function $f(x) = \left(\frac{1}{3}\right)^{x+5} - 2$

48. If $5500 is deposited in an account at the bank and earns 9% annual interest, compounded continuously, what is the amount in the account, rounded to the nearest dollar, after 6 years?

49. Write an exponential function of the form $y = ab^x$ whose graph passes through the given points $(9,5)$ and $(5,2)$. Round all values to the nearest hundredth.

50. Iodine-131 is used to find leaks in water pipes. It has a half-life of 8.14 days. Write the exponential decay function for a 200-mg sample. Find the amount of iodine-131 remaining after 72 days.

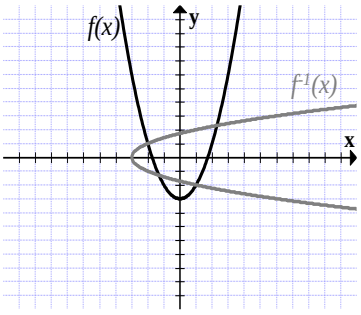
*For questions 48 and 49, r and s represent integers. Determine whether the statement is **sometimes**, **always**, or **never** true.*

51. A root of the equation $4x^3 + rx^2 + sx + 1 = 0$ is 2.
52. $5 + \sqrt{7}$ and $\sqrt{6}$ are roots of the equation $4x^3 + rx^2 + sx + 1 = 0$.
53. Solve the following equation completely: $0 = x^3 + 7x^2 + 11x - 3$
54. Given the equation $y = -\frac{1}{2} \cdot 2^x + 3$, find the domain and range as well as the horizontal asymptote.
55. Evaluate: $log_4 8$
56. Rewrite the following exponential equation as a log equation: $p = r^q$
57. Rewrite as a single log: $\log 4 + 3 \log A - \frac{1}{2} \log B$
58. Expand: $\log_5 \frac{a^2}{bd}$
59. Expand: $\log \sqrt{\frac{4r}{s^2}}$
60. Evaluate: $\log_4 30$. Round to the nearest hundredth.
61. Solve: $9^{.5x} = 70$. Round to the nearest hundredth.
62. Solve: $e^{\frac{x}{9}} - 8 = 5$. Round to the nearest hundredth.
63. An initial investment of $400,000 is made into an account with 3% interest compounded continuously. How long will it take for the investment to be valued at $450,000?
64. Solve: $\ln(7x - 1)^2 = 4$. Round your answer to the nearest 1/100th.
65. Simplify the rational expression. State any restrictions on the variable. $\frac{x^2-49}{x+7}$
66. Simplify the rational expression. State any restrictions on the variable. $\frac{x^2+8x+16}{x^2-2x-24}$

Answer Key

1. $(x^2 - 8x + 41)(x - 3) = 0$
2. $(x^2 + 4x + 1)(x + 1) = 0$
3. D
4. $x^3 - x^2 + 1$
5. $x^3 + 5x^2 + 5.5x + 2.25 + \frac{1.125}{x-0.5}$
6. $x + 4$
7. $x^3 - 2x^2 - x + 6$
8. $x = 0.825, 1.709$
9. $x = \frac{4}{3}, \frac{-2 \pm 2i\sqrt{3}}{3}$
10. $x = \pm 2, -3$
11. $x = \pm\sqrt{2}, \pm i$
12. $x = 0, 3, 1$
13. $2x^2y^3|z^3|\sqrt[4]{2y^3}$
14. $\frac{x\sqrt[3]{18x^2}}{3}$
15. $-33 + 14\sqrt{6}$
16. $4x|y^3|\sqrt{3x}$
17. $\frac{xy^2\sqrt[3]{12x}}{2}$
18. $\sqrt[5]{m^4}$
19. $4\sqrt{2} + 4\sqrt{3}$
20. C
21. $18x^2\sqrt[3]{x}$
22. $\frac{x^{\frac{3}{5}}}{x}$
23. $\frac{13}{4}$
24. $w^{\frac{7}{4}}$
25. $3x^{\frac{1}{3}}y^{\frac{1}{2}}$
26. $2x^2y^2\sqrt[3]{3x^2y}$
27. $10\sqrt[3]{2}$
28. No. $2^3 * 2^4 = 2^7$. $4^7 = (2^2)^7 = 2^{14}$
29. $x = \frac{2}{3}$
30. $x = 7$
31. $x = 344, -342$
32. $x = 5;\ Extraneous: x = 0$
33. C
34.
    a. $12x^3 - 16x^2 - 33x + 45$ D: $(-\infty, \infty)$
    b. $\frac{1}{3x+5};\ x \neq -\frac{5}{3}, \frac{3}{2}$ D: $\left(-\infty, -\frac{5}{2}\right) \cup \left(-\frac{5}{2}, \frac{3}{2}\right) \cup \left(\frac{3}{2}, \infty\right)$
    c. $3x + 5; x \neq \frac{3}{2}$ D: $\left(-\infty, \frac{3}{2}\right) \cup \left(\frac{3}{2}, \infty\right)$
35.
    a. $\frac{x-4}{2};\ x \neq -4$ D: $(-\infty, -4) \cup (-4, \infty)$
    b. $\frac{2}{x-4};\ x \neq \pm 4$ D: $(-\infty, -4) \cup (-4,4) \cup (4, \infty)$
36. $-\frac{2}{(x-3)^2};\ x \neq 3$ D: $(-\infty, 3) \cup (3, \infty)$
37. $-x^2 + x + 12$
38. d
39. $f^{-1}(x) = \frac{\pm\sqrt{x}+4}{3}$
    D: $[0, \infty)$, R: $(-\infty, \infty)$
    Not a function
40. $\frac{x+3}{x+5}$, $(-\infty, -5) \cup (-5, -3) \cup (-3, \infty)$

41.



$f^{-1}(x) = \pm\sqrt{x+3}$

$f(x) \rightarrow \ D: (-\infty, \infty),\ R: (-3, \infty)$

$f^{-1}(x) \rightarrow\ D: (-3, \infty),\ R: (-\infty, \infty)$

42. $\frac{1}{2}x - \frac{1}{3};\ f^{-1}\big(f(5)\big) = 5$

43. $D: [-1, \infty)\ R: [0, \infty)$

44. $4\%;\ \ 378.94\ million$

45. $y = 320{,}000(0.85)^x;\ \ \$103{,}000$

46. $\$1819.40$

47. $D: (-\infty, \infty),\ R: (-2, \infty)$

$Asymptote: y = -2$

48. $\$9438$

49. $y = 0.636(1.257)^x$

50. $A = 200\left(\frac{1}{2}\right)^{\frac{72}{8.14}};\ \ 0.435mg$

51. Never

52. Never

53. $x = -3, -2 \pm \sqrt{5}$

54. $D: (-\infty, \infty),\ R: (-\infty, 3)$

$Asymptote: y = 3$

55. $\frac{3}{2}$

56. $log_r p = q$

57. $log\frac{4A^3}{\sqrt{B}}$

58. $2log_5 a - log_5 b - log_5 d$

59. $log\ 2 - \frac{1}{2}log\ r - log\ s$

60. 2.45

61. 3.87

62. 23.08

63. $3.93\ years$

64. 1.20

65. $x - 7,\ x \neq -7$

66. $\frac{x+4}{x-6}, x \neq 6, -4$