

Algebra 2 Final Review
UNIT 1- Linear Systems

Name: Key

Identify the solution(s) to the system of equations.

1. $\begin{cases} f(x) = 5x + 12 \\ g(x) = -4x - 8 \end{cases}$

2. $\begin{cases} f(x) = x^2 - 2x + 9 \\ g(x) = -x + 2 \end{cases}$

Unit 2- Quadratics

3. Solve by factoring: $x^2 - x - 30 = 0$

4. Solve by factoring: $x^2 + 17x + 42 = 0$

5. Solve using the quadratic formula:
 $-x^2 + 2x - 2 = 0$

6. Solve by completing the square:
 $x^2 + 2x - 9 = 0$

Simplify the radical to simplest form.

7. $-5\sqrt{3} - 3\sqrt{3}$

8. $\sqrt{15}(\sqrt{6} + \sqrt{5})$

9. $\frac{\sqrt{3}}{4\sqrt{5}}$

10. $\sqrt{98k}$

UNIT 3 and 4- Polynomials

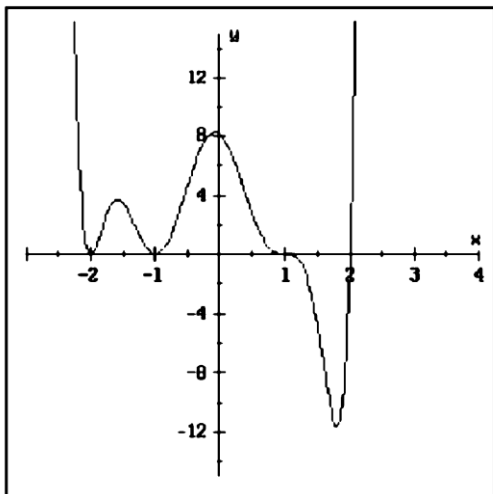
11. Completely determine all real roots for the following: $x^3 + x^2 - 5x + 3$

12. Completely determine all real roots for the following: $x^3 - 11x^2 - 25x - 13$

13. Create a polynomial with the following characteristics: degree 6, negative leading coefficient, 5 terms.

14. Identify the roots: $f(x) = x^2 - 4x + 15$

15. Given the following graph, find the Domain, Range, intervals of increasing/decreasing, zeros, max and min, and x and y intercepts.



Domain _____

Range _____

Intervals of Increase _____

Intervals of Decrease _____

Zeros (x-intercepts) _____

Max (local or absolute) _____

Min (local or absolute) _____

UNIT 5- Rational and Radical Functions

Perform the indicated operation.

$$16. \frac{56}{x^2 - 16} \div \frac{7}{x - 4}$$

$$\frac{8}{x + 4}$$

$$17. \frac{16}{7} \div \frac{4}{13r}$$

$$\frac{52r}{7}$$

$$18. \frac{4n}{n + 6} \cdot \frac{8n + 48}{4n}$$

$$8$$

$$19. \frac{2x}{x^2 - 16} + \frac{6}{x + 4}$$

$$\frac{8x - 24}{(x - 4)(x + 4)}$$

$$20. \frac{8}{b - 7} - \frac{2b}{b^2 - 49}$$

$$\frac{6b + 56}{(b - 7)(b + 7)}$$

$$21. \frac{9}{3d} - \frac{7}{5d^2}$$

$$\frac{15d - 7}{5d^2}$$

$$22. \frac{3}{4k} + \frac{5}{k + 2}$$

$$\frac{23k + 6}{4k(k + 2)}$$

Solve the rational equation.

$$23. \frac{1}{6x} + \frac{1}{6x^2} = \frac{1}{6}$$

$$x^2 - x - 1 = 0$$

$$x = \frac{1 \pm \sqrt{5}}{2}$$

$$24. \frac{a + 6}{4a^2} + \frac{3}{2a^2} = \frac{a + 4}{2a^2}$$

$$a = 4$$

$$25. \frac{7}{b - 8} = \frac{1}{b - 8} - 1$$

$$b = 2$$

$$26. \frac{1}{r - 2} + \frac{1}{r^2 - 7r + 10} = \frac{6}{r - 2}$$

$$r = \frac{26}{5}$$

Solve for the given variable.

$$27. \frac{7}{y+1} \geq 7$$

$$y \leq 0$$

$$28. \frac{1}{b+1} + \frac{1}{b+1} > \frac{8}{15}$$

$$b < 2.75$$

$$29. \frac{2}{w} + 3 \geq \frac{29}{w}$$

$$w \geq 9$$

Solve the equation for x.

$$30. -2\sqrt{x+4} = -16$$

$$x = 60$$

$$31. \sqrt[3]{x+2} + 5 = 12$$

$$x = 341$$

$$32. 2 + \sqrt{x-4} = 7$$

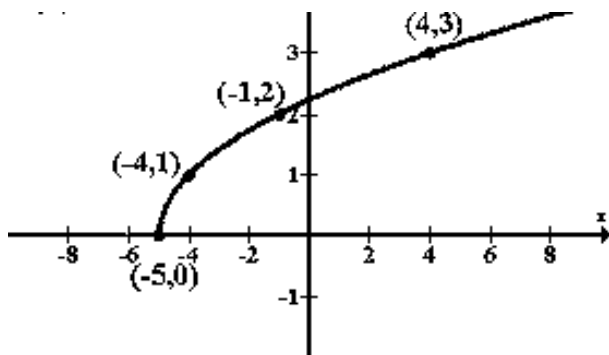
$$x = 29$$

$$33. x - 4 = \sqrt{2x}$$

$$\cancel{x = 2} \quad x = 8$$

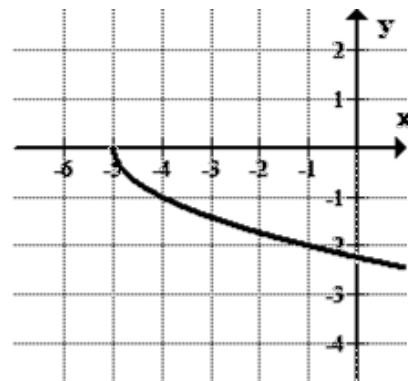
34. Identify the equation of the graph

$$y = \sqrt{x+5}$$



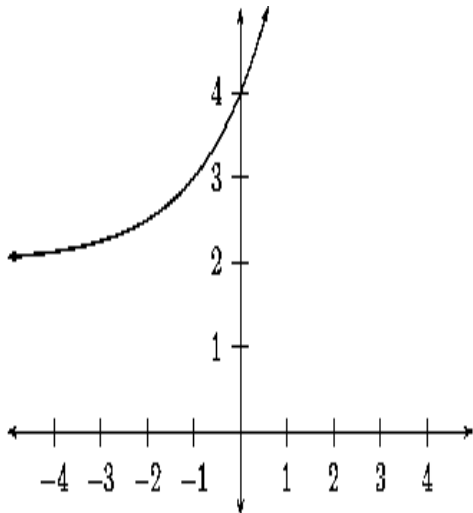
35. Identify the equation of the graph

$$y = -\sqrt{x+5}$$



Unit 6- Exponentials and Logarithms

36. Given the graph below, determine the following characteristics:



Domain: $(-\infty, \infty)$

range: $(2, \infty)$

y-intercept: $(0, 4)$

horizontal asymptote: $y = 2$

37. Write the expression in simplest form.

$$\frac{3x^0y^2z^{-2}}{9x^3y^2}$$

$$\frac{1}{3x^3z^2}$$

38. Write the expression in simplest form.

$$(x^2y^{-1}z^0)^3$$

$$\frac{x^6}{y^3}$$

39. Condense the logarithmic expression.

$$\log 8 + \log x - \log 4 - \log y$$

$$\log \frac{2x}{y}$$

40. Expand the logarithmic expression.

$$\log 5x^2y^3$$

$$\log 5 + 2\log x + 3\log y$$

Solve the equations for x.

41. $5^{x+7} - 3 = 20$

$$x = -5.05$$

42. $6e^{5x} + 12 = 96$

$$x = .53$$

43. $\log_3(x + 7) = 3$

$$x = 20$$

44. $\log_7(3x - 6) = \log_7(15)$

$$x = 7$$

45. Emily starts a savings account with \$5,000. How much money will she have after ten years if the interest is compounded monthly at a rate of 3%? $A = P \left(1 + \frac{r}{n}\right)^{nt}$

$$\$6,746.77$$

Unit 7- Data analysis

46. The temperatures for September are normally distributed with a mean of 94° and standard deviation of 2° . What is the z-score for 91° ?

$$z = \frac{x - \mu}{\sigma}$$

$$z = -1.5$$

47. Snowfall in January is normally distributed with a mean of $4.5''$ and a standard deviation of $.5''$. What percent of the data is below $5.1''$?

$$88.49\%$$

48. The length of similar components produced by a company are approximated by a normal distribution model with a mean of 8 cm and a standard deviation of 0.04 cm. If a component is chosen at random

a) What is the probability that the length of this component is between 7.96 and 8.08 cm?

$$81.85\%$$

b) What is the probability that the length of this component is at least 7.88 cm?

$$.0013 \text{ or } .0015$$