

Algebra 2 Practice Final Problems

SOLVING EQUATIONS SECTION – You must be able to solve linear, absolute value, quadratic, polynomial, exponential, logarithmic, radical and rational equations. You should be able to check your work and use a graph/graphing calculator to show solutions.

Linear (Act 1)

Jim has \$60.00 and makes \$10.50 an hour. Write a function to model and solve for the number of hours he will need to work to have \$270.00 in his account

Absolute Value (Act 1-3)

$$|2x+1| + 3 < 10$$

Quadratics (Act 9)

Solve by Factoring

$$x^2+11x+28=0$$

Solve by Quadratic Formula

$$2x^2-5x-12=0$$

Completing the Square

$$x^2-8x = 7$$

Systems of Equations (check with graphing calculators)

(Act 3)

$$2x+y = 19$$

$$3x - 4y = 12$$

(Act 13)

$$y=x-7$$

$$y=-x^2-2x-7$$

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Polynomials (Act 18)

$$x^3 + 6x^2 + 5x - 12 = 0$$

Exponential (Act 24)

$$2^{x+3} - 4 = 60$$

Logarithmic (Act 24)

$$\log_3(x-4) + 1 = 4$$

Radical (Act 25)

$$\sqrt{x-2} + 1 = 4$$

$$x = \sqrt{3x-12} + 4$$

$$\sqrt[3]{x+2} + 1 = 4$$

Rational (Act 30)

$$\frac{1}{x+3} + \frac{x}{5} = \frac{x+1}{x+3}$$

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Mixed Skills Section

Arithmetic Sequences and Series (Act 19)

7,10,13,16.... Find the 127th term

$$\sum_{n=1}^{20} 2n + 1 =$$

Geometric Sequences and Series (Act 20)

64, 32, 16, 8....

Write the rule to find the nth term

Explicitly:

Recursively:

$$\sum_{n=1}^{\infty} 90\left(\frac{2}{3}\right)^{n-1} =$$

Properties of Logarithms (Act 22)

Simplify

$$\log_4 64$$

$$\log 0.0001$$

$$\log_6 \frac{1}{36}$$

$$\log_8 2$$

(Act 23)

Evaluate $\log_3 200$ using a calculator to the nearest hundredth

Complex Numbers (Act 8)

Simplify

$$(3+2i)(3-2i)$$

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i³⁷

Binomial Theorem (Act 16)

Expand $(x+2)^4$

Polynomial Operations (Act 15)

Simplify

$$(5x^3+3x^2+7) + (2x^3-7x^4+2x^2-3)$$

Divide and state the remainder

$$\frac{x^4 + 3x^2 + 2x + 1}{x - 2}$$

Functions and Operations (Act 5)

$$f(x)=2x+1 \quad g(x)=x^2-3$$

Evaluate

$$(f+g)(3)=$$

$$f(g(3))=$$

(Act 6)

Find $f^{-1}(x)$

Graphing Concepts

Students must know how to graph equations and inequalities that include: linear functions, systems of linear equations/inequalities, piecewise functions, absolute value, quadratic functions (parabolas), polynomial functions including transformations of x^3 , exponential functions, logarithmic functions, radical functions (square and cube root transformations), rational functions, trigonometric functions (sine, cosine, tangent)

Key Vocabulary: Zeroes, intercepts, zeroes/roots, end behavior, domain, range, parent function, transformations (reflect, translate, stretch/shrink), asymptotes

Graph each equation and analyze the features using key vocabulary

Linear System

Graph

$$y < -2x + 4$$

$$x > -4$$

$$y \geq 1$$

Absolute Value

$$f(x) = -2|x - 4| + 3$$

Piecewise

$$f(x) = \begin{cases} -x + 2; & x \leq -2 \\ 4; & -2 < x \leq 0 \\ -x; & x > 0 \end{cases}$$

Quadratic

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

$$f(x) = x^2 - 6x - 4$$

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Polynomial

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

$$f(x) = x^3 + 3x^2 - 4x - 12$$

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

Exponential

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

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

Logarithmic

$$f(x) = \log_2 x$$

$$f(x) = \log_3(x-3)$$

Radical

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

$$f(x) = -\sqrt{x} + 4$$

$$f(x) = \sqrt[3]{x-3} + 1$$

Rational

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

$$f(x) = \frac{2x^2}{x^2 + 4x + 3}$$

Trigonometric

$$f(x) = 2\sin(3x)$$

$$f(x) = -4\cos\left(\frac{2\pi}{3}(x-1)\right) + 2$$

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