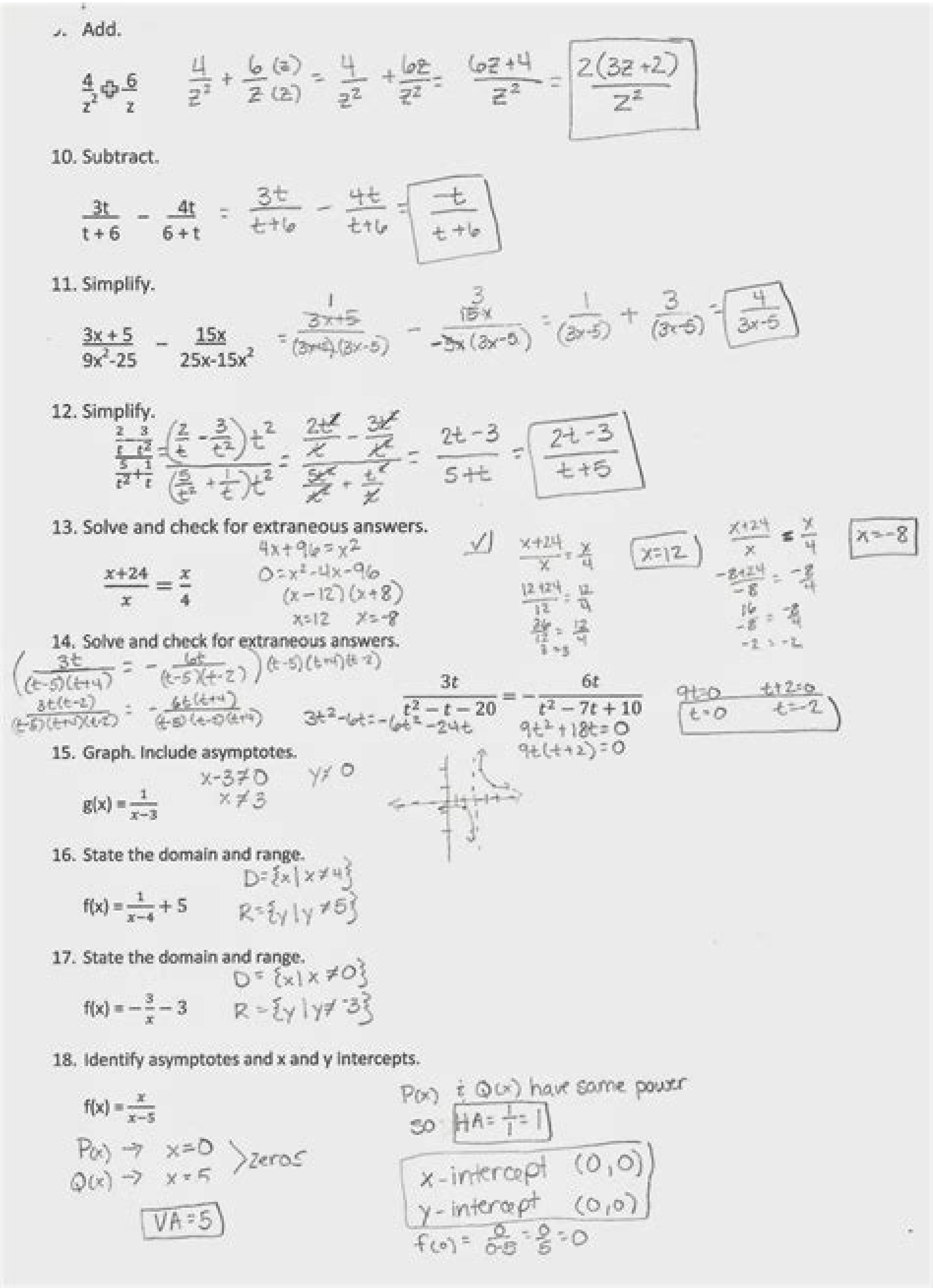
College Algebra Practice Test With Answers



Add.

$\frac{4}{z^2} + \frac{6}{z}$ $\qquad \frac{4}{z^2} + \frac{6(z)}{z(z)} = \frac{4}{z^2} + \frac{6z}{z^2} = \frac{6z+4}{z^2} = \boxed{\frac{2(3z+2)}{z^2}}$

10. Subtract.

$\frac{3t}{t+6} - \frac{4t}{6+t} = \frac{3t}{t+6} - \frac{4t}{t+6} = \boxed{\frac{-t}{t+6}}$

11. Simplify.

$\frac{3x+5}{9x^2-25} - \frac{15x}{25x-15x^2} = \frac{\cancel{3x+5}^{\,1}}{\cancel{(3x+5)}(3x-5)} - \frac{\cancel{15x}^{\,3}}{-\cancel{5x}(3x-5)} = \frac{1}{(3x-5)} + \frac{3}{(3x-5)} = \boxed{\frac{4}{3x-5}}$

12. Simplify.

$\frac{\frac{2}{t}-\frac{3}{t^2}}{\frac{5}{t^2}+\frac{1}{t}} = \frac{\left(\frac{2}{t}-\frac{3}{t^2}\right)t^2}{\left(\frac{5}{t^2}+\frac{1}{t}\right)t^2} = \frac{\frac{2t^{\cancel{2}}}{\cancel{t}} - \frac{3\cancel{t^2}}{\cancel{t^2}}}{\frac{5\cancel{t^2}}{\cancel{t^2}} + \frac{t^{\cancel{2}}}{\cancel{t}}} = \frac{2t-3}{5+t} = \boxed{\frac{2t-3}{t+5}}$

13. Solve and check for extraneous answers.

$\frac{x+24}{x} = \frac{x}{4}$

$4x+96 = x^2$

$0 = x^2-4x-96$

$(x-12)(x+8)$

$x=12 \quad x=-8$

✓ $\frac{x+24}{x} = \frac{x}{4}$

$\frac{12+24}{12} = \frac{12}{4}$

$\frac{36}{12} = \frac{12}{4}$

$3=3$

$\boxed{x=12}$

$\frac{x+24}{x} = \frac{x}{4}$

$\frac{-8+24}{-8} = \frac{-8}{4}$

$\frac{16}{-8} = \frac{-8}{4}$

$-2 = -2$

$\boxed{x=-8}$

14. Solve and check for extraneous answers.

$\frac{3t}{t^2-t-20} = -\frac{6t}{t^2-7t+10}$

$\left(\frac{3t}{(t-5)(t+4)} = -\frac{6t}{(t-5)(t-2)}\right)(t-5)(t+4)(t-2)$

$\frac{3t(t-2)}{(t-5)(t+4)(t-2)} = -\frac{6t(t+4)}{(t-5)(t-2)(t+4)}$

$3t^2-6t = -6t^2-24t$

$9t^2+18t=0$

$9t(t+2)=0$

$9t=0 \qquad t+2=0$

$\boxed{t=0 \qquad t=-2}$

15. Graph. Include asymptotes.

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

$x-3 \neq 0$

$x \neq 3$

$y \neq 0$

16. State the domain and range.

$f(x) = \frac{1}{x-4} + 5$

$D = \{x \mid x \neq 4\}$

$R = \{y \mid y \neq 5\}$

17. State the domain and range.

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

$D = \{x \mid x \neq 0\}$

$R = \{y \mid y \neq -3\}$

18. Identify asymptotes and x and y intercepts.

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

$P(x) \rightarrow x=0$
$Q(x) \rightarrow x=5$
> zeros

$\boxed{VA=5}$

P(x) & Q(x) have same power

so $\boxed{HA = \frac{1}{1} = 1}$

x-intercept (0,0)
y-intercept (0,0)

$f(0) = \frac{0}{0-5} = \frac{0}{5} = 0$

College algebra practice test with answers is an essential resource for students aiming to strengthen their understanding of algebraic concepts and improve their problem-solving skills. College algebra serves as a foundation for more advanced mathematics and is crucial in various fields such as engineering, economics, and the sciences. In this article, we will provide a comprehensive practice test with solutions, covering key topics in college algebra. This will not only help students prepare for exams but also enhance their mathematical reasoning and analytical skills.

Key Topics in College Algebra

Before diving into the practice test, it's important to outline the essential topics typically covered in a college algebra course. Understanding these concepts will assist students in navigating the practice test effectively.

1. Functions

- Definition and types (linear, quadratic, polynomial)
- Domain and range
- Function notation and evaluation
- Inverse functions

2. Linear Equations and Inequalities

- Graphing linear equations
- Solving systems of equations
- Solving and graphing linear inequalities

3. Polynomials

- Polynomial operations (addition, subtraction, multiplication, division)
- Factoring polynomials
- The Remainder Theorem and the Factor Theorem

4. Rational Expressions

- Simplifying rational expressions
- Solving rational equations
- Applications of rational expressions

5. Exponential and Logarithmic Functions

- Properties of exponents
- Logarithmic properties and equations
- Applications of exponential and logarithmic functions

6. Conic Sections

- Parabolas, circles, ellipses, hyperbolas
- Graphing conic sections

7. Sequences and Series

- Arithmetic and geometric sequences
- Summation notation
- Finding the nth term

Practice Test

Now that we have established the key topics, let’s move on to the practice test. The following questions will cover a range of concepts in college algebra.

Question 1: Functions

Given the function $f(x) = 2x^2 - 3x + 5$:

- a) Determine the value of $f(2)$.
- b) Find the domain of the function.

Question 2: Linear Equations

Solve the system of equations:

1. $2x + 3y = 6$
2. $4x - y = 5$

Question 3: Polynomials

Factor the polynomial $x^2 - 5x + 6$.

Question 4: Rational Expressions

Simplify the rational expression $\frac{x^2 - 9}{x^2 - 6x + 9}$.

Question 5: Exponential Functions

Solve the equation $3^x = 81$.

Question 6: Logarithmic Functions

If $\log_2 (x) = 5$, find the value of x.

Question 7: Conic Sections

Identify the type of conic section represented by the equation $x^2 + 4y^2 = 16$ and sketch its graph.

Question 8: Sequences

Find the 10th term of the arithmetic sequence where the first term is 3 and the common difference is 5.

Answers to Practice Test

Here are the answers and explanations for each of the questions in the practice test.

Answer 1: Functions

- a) To find $f(2)$:

$$
f(2) = 2(2)^2 - 3(2) + 5 = 2(4) - 6 + 5 = 8 - 6 + 5 = 7
$$

- b) The domain of a polynomial function is all real numbers, so the domain is $(-\infty, \infty)$.

Answer 2: Linear Equations

To solve the system:

1. From the first equation: $3y = 6 - 2x$ → $y = 2 - \frac{2}{3}x$
2. Substitute y into the second equation:

$$
4x - (2 - \frac{2}{3}x) = 5 \implies 4x - 2 + \frac{2}{3}x = 5
$$

Combine like terms and solve for x:

$$
(4 + \frac{2}{3})x = 7 \implies \frac{14}{3}x = 7 \implies x = \frac{7 \cdot 3}{14} = \frac{3}{2}
$$

Substitute x back to find y:

$$
y = 2 - \frac{2}{3}(\frac{3}{2}) = 2 - 1 = 1
$$

Thus, the solution is $(x, y) = \left(\frac{3}{2}, 1 \right)$.

Answer 3: Polynomials

To factor $x^2 - 5x + 6$:

$$
x^2 - 5x + 6 = (x - 2)(x - 3)
$$

Answer 4: Rational Expressions

To simplify $\frac{x^2 - 9}{x^2 - 6x + 9}$:
- Factor the numerator and denominator:

$$
\frac{(x - 3)(x + 3)}{(x - 3)(x - 3)} = \frac{x + 3}{x - 3} \quad (x \neq 3)
$$

Answer 5: Exponential Functions

To solve $3^x = 81$:
- Recognize that $81 = 3^4$, so $x = 4$.

Answer 6: Logarithmic Functions

To find x when $\log_2 (x) = 5$:

$$
x = 2^5 = 32
$$

Answer 7: Conic Sections

The equation $x^2 + 4y^2 = 16$ can be rewritten as:

$$
\frac{x^2}{16} + \frac{y^2}{4} = 1
$$

This is an ellipse. The graph is centered at the origin with semi-major axis 4 along the y-axis and semi-minor axis 4 along the x-axis.

Answer 8: Sequences

The nth term of an arithmetic sequence is given by:

$$
a_n = a + (n - 1)d
$$

For $a = 3$, $d = 5$, and $n = 10$:

$$
a_{10} = 3 + (10 - 1)(5) = 3 + 45 = 48
$$

Conclusion

The above college algebra practice test with answers serves as a valuable tool for students looking to reinforce their understanding of algebraic concepts. By practicing these types of questions, students can build confidence in their problem-solving abilities and prepare effectively for exams. Regular practice not only enhances mathematical skills but also improves critical thinking and analytical reasoning, which are essential for success in higher education and various professional fields. Make use of this resource and consider exploring additional practice materials to further solidify your algebra knowledge.

Frequently Asked Questions

What are common topics covered in a college algebra practice test?

Common topics include linear equations, functions, inequalities, polynomials, rational expressions, and systems of equations.

Where can I find a reliable college algebra practice test with answers?

Reliable sources include educational websites like Khan Academy, university tutoring centers, and online platforms like Quizlet or Study.com.

How can practicing with college algebra tests improve my math skills?

Practicing with tests helps reinforce concepts, improve problem-solving speed, and increase familiarity with test formats and types of questions.

Are there any free resources for college algebra practice tests?

Yes, many websites offer free practice tests, including the College Board, Khan Academy, and various educational YouTube channels.

What is the benefit of reviewing answers after a practice test?

Reviewing answers helps identify areas of weakness, understand mistakes, and solidify knowledge by clarifying correct solutions.

How often should I take college algebra practice tests?

It's beneficial to take practice tests regularly, ideally once a week, to track progress and adjust study strategies as needed.

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