

# College Level Mathematics

The college level section of the placement test tests you on skills which would allow you to register for college level classes in college. Results of this portion will enable us to place students in Algebra, Intermediate Algebra, College Algebra, College Trigonometry or Precalculus.

The tests evaluates the students in the following six areas. Your results on this section of the test will determine your placement into MA 064/065, MA 070 and any of the college level math courses offered at the college.

- Algebraic operations- simplification of rational algebraic expressions, factoring and expanding polynomials and manipulating roots and exponents. Approximately 20% of the problems in this section of the test come from this category.
- Solutions of equations and inequalities- solutions of linear and quadratic equations and inequalities, systems of equations and other algebraic equations. Approximately 15% of the problems in this section of the test come from this category.
- Coordinate geometry- plane geometry, coordinate plane, lines conics, sets of points in the plane and graphs of algebraic functions. Approximately 15% of the problems in this section of the test come from this category.
- Applications and other algebraic topics- complex numbers; series and sequences, determinants, permutations and combinations, factorials and word problems. Approximately 10% of the problems in this section of the test come from this category.
- Functions- polynomial, algebraic, exponential and logarithmic functions. Approximately 20% of the problems in this section of the test come from this category.
- Trigonometry- trigonometric functions. Approximately 20% of the problems in this section of the test come from this category.

The following problems are merely suggested practice problems for the college level Mathematics section of the placement test. Some of the may or may not be similar to the problems on the actual test. It is recommended that if you have difficulty completing the problems that you review skills developed in college algebra and trigonometry classes.

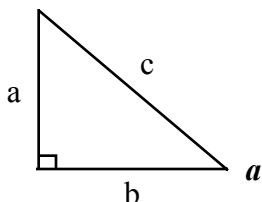
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To be well prepared for the actual adaptive test, it is recommended that you thoroughly review arithmetic, Algebra I, Algebra II, College Algebra and Trigonometry topics. The attached problems are merely suggested for practice and do not necessarily reflect the problems actually on the test.

# College Level Mathematics Practice Test

The following problems are merely suggested practice problems for the College Level section of the placement test. Some of the problems may or may not be similar to the problems on the actual test. Hopefully, these problems will remind you of the topics you need to review before taking the actual test. (We could not supply you with every type of problem you need to be able to solve.) It is recommended that if you have difficulty completing the problems that you review skills developed in a high school college algebra and trigonometry class.

1. In the right triangle illustrated, the ratio of side  $a$  to side  $b$  is which trigonometric ratio for angle  $a$  ?



2. If the 4th and the 9th terms of an arithmetic sequence are 36 and 81, what is the difference between consecutive terms?
3. If  $f(x) = 7x + 2$  and  $f^{-1}$  denotes the inverse function of  $f$ , then find  $f^{-1}(9)$ .
4. If  $\log_7 a = 3$  then find  $\log_7 a^4$ .

5. Find:  $\sum_{n=3}^{10} n$

6. Find:  $\sec \frac{\pi}{6}$

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7. Find the lcd for the following three fractions. Leave your answer in factored form.

$$\frac{1}{a + b} \quad \frac{1}{a^2 - b^2} \quad \frac{1}{a^3 - b^3}$$

8. Solve the following system for x.

$$\begin{cases} y = x^2 \\ y = 2x + 3 \end{cases}$$

9. When the graph of  $y = 3 \cos 2x$  achieves a minimum, find the value of the y-coordinate.

10. Find the range for f(x).

$$f(x) = \sqrt{x - 2}, \forall x \geq 2$$

11. In how many different ways can teams of 2 tennis players be selected from a group of 5 players?

12. Find the following product.

$$\left(3 \sin \frac{3\pi}{2}\right) \left(2 \cos \frac{\pi}{2}\right)$$

13. If two lines intersect at a right angle, find the product of their slopes.

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14. Solve for x.

$$\log_e x = 3$$

15. Where defined, find  $\csc\theta - \sin\theta$ .

16. Write the equation of the line which passes through (-1,2) and has a slope of -2. Leave your answer in slope-intercept form.

17. Find the coefficient of  $x^2$

when  $(3x^2 + 2x)$  is multiplied by  $(x^2 - 4x - 1)$

18. Find the values for which the function is not defined.

$$f(x) = \frac{x^2 - 9}{x^2 - 5x + 6}$$

19. Graph the solution for the following.

$$2x + 3y \leq 12$$

20. Simplify, leaving positive exponents only.

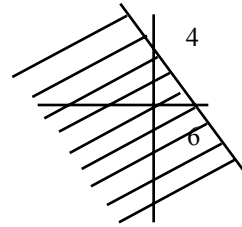
$$\frac{5^{x-1} \cdot 5^{3x}}{5^{4x+1}}$$

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## College Level Mathematics Practice Test Answers

1. Tangent  $a$                       8.  $x = 3, x = -1$                       14.  $e^3$
2. 9                                      9. -3                                      15.  $\cot \theta \cos \theta$
3.  $f^{-1}(9) = 1$                       10.  $f(x) > 0$                       16.  $y = -2x$
4. 12                                      11. 10                                      17. -11
5. 107                                      12. 0                                      18.  $x=2, x=3$
6.  $\frac{2}{\sqrt{3}}$  or  $\frac{2\sqrt{3}}{3}$                       13. -1                                      19.
7.  $(a - b)(a + b)(a^2 + ab + b^2)$



20.  $\frac{1}{5^2}$  or  $\frac{1}{25}$

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