

## Calculus Placement Test

For placement into:

**Math 140 - Business Calculus**  
**Math 180 - Calculus and Analytic Geometry**

Mt. San Antonio College Mathematics Department wishes that you have a pleasant experience and success with your classes at Mt. SAC, in particular those offered by the Math Department.

The Calculus is a challenging course of study, largely because it demands that the student recall and successfully use the algebraic and trigonometric skills developed in the prerequisite math courses. Recency of these prerequisite math experiences is quite often a factor in the student's ability to quickly recall and apply these skills in developing an understanding of the Calculus. Even with a satisfactory score on the "Placement Test", it is **strongly recommended** that the prospective Calculus student extensively review the appropriate topics in Algebra and Trigonometry prior to taking the class.

The test used for placement into the Calculus or Business Calculus will survey your knowledge of topics generally covered in a typical Precalculus course.

**THE ALGEBRAIC TOPIC AREAS ARE:**

**THE TRIGONOMETRIC TOPIC AREAS ARE:**

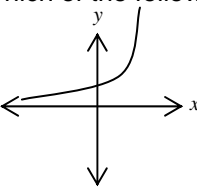
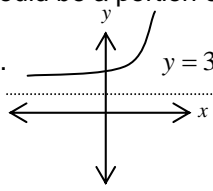
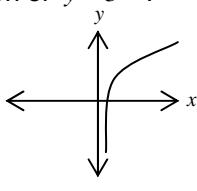
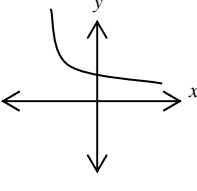
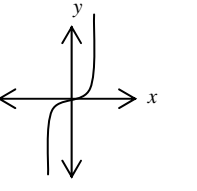
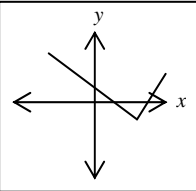
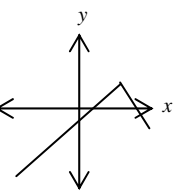
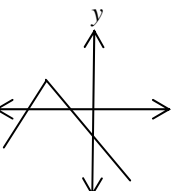
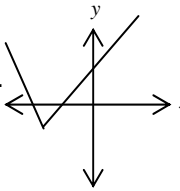
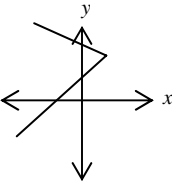
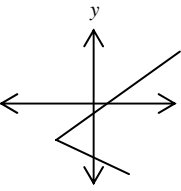
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|---|---|
| <p>I. Basic algebraic operations: Polynomials, Rational Expressions, and Radical Expressions.</p>   | <p>I. The definitions of the six Trigonometric Functions as related to both: (a) Angles in standard position in the Cartesian coordinate plane, and (b) Right Triangles.</p>  |
| <p>II. Functions and Functional Notation; including Logarithms and Exponentials.</p>  | <p>II. Degree and Radian Measures, including the exact values of the six functions with respect to special angles.</p> <p style="text-align: center;">Example: <math>\sin 240^\circ = \frac{\sin 4\pi}{3} = \frac{\sqrt{3}}{2}</math></p> |
| <p>III. Solving Equations and Inequalities. These equations may involve Polynomials, Rational Expressions, Absolute Values, Logs, Exponentials, Radicals, and Systems with several variables.</p> | <p>III. The basic and general graphs of the trig functions.</p>   |
| <p>IV. Graphing in the Cartesian Coordinate Plane</p>   | <p>IV. Fundamental Identities, including the "Basic Eight"; "Sum /Difference of Angles"; "Double and Half Angles".</p>  |
|   | <p>V. Solving Trigonometric Equations.</p>  |

If you wish to consult a reference prior to taking the placement test, you might consult the current Math 160 textbook, available at the Mt. SAC bookstore for purchase, or any college level Precalculus text that includes both algebraic and trigonometric topics.

The test is **90 minutes** long and consists of **60 questions**. **Calculators are NOT permitted**. Your score will be used to help determine your placement according to the following:

| Scores  | Eligibility.  |
|---------|---|
| 0 - 24  | You most likely will not be successful in Math 140/Math 180. Please take the <b>College Level Math Placement Test</b> to determine appropriate placement. |
| 25 - 29 | Math 140  |
| 30 - 60 | Math 140 and/or Math 180  |

On the back of this page are 14 sample questions, whose sole purpose is to give you information concerning the format and typical level of expertise required for the Calculus Placement Test. This sample does **NOT** represent all of the topics on the test. **BEING ABLE TO CORRECTLY ANSWER THESE QUESTIONS DOES NOT NECESSARILY GUARANTEE SUCCESS ON THE ACTUAL TEST.**

|  |  |  |
|--|--|--|
| <p>1. In the system of equations:</p> $\begin{cases} x-3y=-3 \\ 2x+y=8 \end{cases}, y=$ <p>a. -3   b. -2   c. 0</p> <p>d. 2   e. 3</p>   | <p>2. <math>(27x^{-3}y^6)^{\frac{1}{3}} =</math></p> <p>a. <math>\frac{27y^2}{x}</math>   b. <math>\frac{3y^2}{x}</math>   c. <math>\frac{y^2}{3x}</math></p> <p>d. <math>\frac{x}{3y^2}</math>   e. <math>3xy^2</math></p>  | <p>3. <math>\frac{-1}{w+1} - \frac{w+1}{w-1} =</math></p> <p>a. <math>\frac{2-w}{w-1}</math>   b. <math>\frac{-w-2}{w+1}</math>   c. <math>\frac{-w(w+3)}{w^2-1}</math></p> <p>d. <math>\frac{-w(w-3)}{w^2-1}</math>   e. <math>\frac{-w(w-2)}{w^2-1}</math></p>                                 |
| <p>4. <math>\sqrt[5]{\sqrt{3^{-25}}} =</math></p> <p>a. <math>\frac{1}{9\sqrt{3}}</math>   b. <math>\frac{1}{3\sqrt{9}}</math>   c. <math>-9\sqrt{3}</math></p> <p>d. <math>\frac{1}{3^{20}}</math>   e. <math>\frac{1}{3}</math></p>  | <p>5. If <math>f(x) = \frac{3}{x+1}</math>, for what value of <math>x</math> does <math>f(x) = 2</math> ?</p> <p>a. 1   b. <math>\frac{5}{2}</math>   c. <math>\frac{1}{2}</math></p> <p>d. 2   e. <math>\frac{2}{5}</math></p>  | <p>6. The inequality <math>x^2 - 9 &gt; 0</math> is equivalent to:</p> <p>a. <math>x &gt; 3</math>   b. <math>x &lt; -3</math>   c. <math>-3 &lt; x &lt; 3</math></p> <p>d. <math>x &gt; 0</math> or <math>x &lt; 3</math>   e. <math>x &lt; -3</math> or <math>x &gt; 3</math></p>              |
| <p>7. Which of the following could be a portion of the graph of <math>y = 3^x</math> ?</p> <p>a. </p> <p>b. </p> <p>c. </p> <p>d. </p> <p>e. </p>  |  |  |
| <p>8. The circumference of a circle is directly proportional to the length of its radius, and its area is directly proportional to the square of the length of its radius. If the circumference of a circle is multiplied by 6, then its area is multiplied by:</p> <p>a. <math>\frac{1}{6}</math>   b. 6   c. <math>\frac{1}{36}</math></p> <p>d. 36   e. 12</p>  | <p>9. If the point <math>P(2, -5)</math> is on the terminal side of angle <math>\theta</math> when <math>\theta</math> is in standard position, then <math>\sin \theta =</math></p> <p>a. <math>\frac{2}{\sqrt{21}}</math>   b. <math>-\frac{5}{2}</math>   c. <math>-\frac{5}{\sqrt{21}}</math></p> <p>d. <math>-\frac{5}{\sqrt{29}}</math>   e. <math>\frac{2}{\sqrt{29}}</math></p> | <p>10. One of the roots of <math>2y^2 + 3y - 11 = 0</math> is:</p> <p>a. <math>\frac{-3 + \sqrt{97}}{4}</math>   b. <math>\frac{3 - \sqrt{79}}{4}</math>   c. <math>\frac{3 + \sqrt{79}}{2}</math></p> <p>d. <math>\frac{-3 + \sqrt{79}}{2}</math>   e. <math>\frac{3 - \sqrt{97}}{2}</math></p> |
| <p>11. The graph of <math>y = f(x)</math> is shown in the figure to the right. Which of the following is a graph of <math>y = f(-x)</math> ? </p> <p>a. </p> <p>b. </p> <p>c. </p> <p>d. </p> <p>e. </p> |  |  |
| <p>12. <math>\frac{a^{-2} - b^{-2}}{a^{-1} + b^{-1}} =</math></p> <p>a. <math>a^{-1} - b^{-1}</math>   b. <math>\frac{1}{a-b}</math>   c. <math>a-b</math></p> <p>d. <math>\frac{b-a}{ab}</math>   e. <math>-\left(\frac{ab}{a-b}\right)</math></p>  | <p>13. If <math>0 \leq \theta \leq \frac{\pi}{2}</math> and <math>\sec^2 \theta = 2</math>, then <math>\theta =</math></p> <p>a. 0   b. <math>\frac{\pi}{6}</math>   c. <math>\frac{\pi}{4}</math></p> <p>d. <math>\frac{\pi}{3}</math>   e. <math>\frac{\pi}{2}</math></p>  | <p>14. If <math>\ln t = \frac{1}{3} \ln r - \ln s</math>, then <math>t =</math></p> <p>a. <math>\frac{\sqrt[3]{r}}{s}</math>   b. <math>\frac{rs}{3}</math>   c. <math>\frac{1}{3}r-s</math></p> <p>d. <math>\sqrt[3]{r-s}</math>   e. <math>\frac{s}{3r}</math></p>                             |