

University of Massachusetts Lowell
Department of Mathematical Sciences
Calculus Readiness Test
(Sample Exam)

Directions: You should plan on finishing the exam in under 1 hour. Part of the needs of Calculus 1 are not only to know certain algebra and trigonometry topics, but be able to fairly quickly have them at your fingertips. The thread of calculus can easily be lost if you are struggling with the necessary background mathematics. Once you have taken your practice test, check your answers with the correct ones given on the reverse side of this sheet.

Once you have taken your practice test, check your answers with the correct ones given below, and then check the topical list to determine your deficiencies.

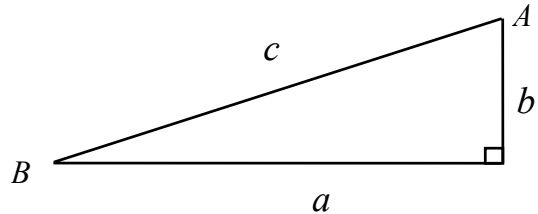
1. If $0^\circ \leq x < 90^\circ$, then $\tan x \cos x$ simplifies to:
A) $\sin x$ B) $\cos x$ C) $\cot x$ D) $\sec x$ E) $\csc x$
2. The expression $\frac{(x^4 y^{-3})^2}{x^3 y^5}$ simplifies to:
A) $\frac{x^3}{y^6}$ B) $\frac{x^5}{y^{11}}$ C) $\frac{x^2}{y^{16}}$ D) $x^9 y^{-6}$ E) None of these.
3. If $f(x) = 2^x$, and a and b are any positive numbers, then $f(a+b)$ is equivalent to:
A) $f(a) \cdot f(b)$ B) $\frac{f(a)}{f(b)}$ C) $f(a^b)$ D) $f(a) + f(b)$ E) None of these.
4. The domain of $g(x) = \frac{1}{\sqrt{3-x}}$ is:
A) $[3, \infty)$ B) $(3, \infty)$ C) $(-\infty, 3]$ D) $(-\infty, 3)$ E) None of these.
5. The angle 150° in radian measure is given by:
A) $\frac{5\pi}{12}$ B) $\frac{6}{5\pi}$ C) 75π D) $\frac{5\pi}{6}$ E) None of these.
6. Solve for x : $6.4x - 3.2 = 4.4x + 1.2$
A) $x = -2.2$ B) $x = 2$ C) $x = -1$ D) $x = 1.1$ E) None of these.
7. One solution to the equation $3x^2 + x - 5 = 0$ is:
A) $\frac{-1+i\sqrt{61}}{6}$ B) $\frac{1+i\sqrt{61}}{6}$ C) $\frac{-1+\sqrt{61}}{6}$ D) $\frac{1-\sqrt{61}}{6}$ E) None of these.
8. What is the number $(.01)^{-\frac{1}{2}}$ equal to?
A) .01 B) 10 C) 1000 D) .1 E) 100

9. If $f(x) = x^2$ and $g(x) = x^3 + 2x$, what is the composition $(f \circ g)(x)$?
- A) $x^5 + 2x^3$ B) $(x^3 + 2x)^2$ C) $x^6 + 4x^2$ D) $\frac{x^3 + 2x}{x^4}$ E) None of these.

10. Solve $\log_{10}(x-1) = 2$ for x .
- A) 1025 B) 21 C) 101 D) 99 E) None of these.

11. The function $f(x) = \cot x$ is not defined for:
- A) $x = 0$ B) $x = \frac{\pi}{4}$ C) $x = \frac{\pi}{2}$ D) $x = \frac{\pi}{3}$ E) None of these.

12. In the right triangle shown, $a = 8$ and $c = 10$, find $\tan A$
- A) $\frac{5}{3}$ B) $\frac{3}{5}$ C) $\frac{3}{4}$
D) $\frac{4}{3}$ E) None of these.



13. One solution to the equation $\frac{x-4}{5x+15} = \frac{1}{x+3}$ is:
- A) 3 B) 1 C) -3 D) $2\sqrt{5} + 2$ E) None of these.

14. The expression $\frac{\frac{1}{b^2} + a^2}{\frac{1}{a^2} + b^2}$ simplifies to: (Ignore the domain change when simplified.)

- A) $\frac{1+a^4}{1+b^4}$ B) $\frac{b^2+a^2}{a^2 b^2}$ C) $\frac{b^2}{a^2}$ D) $\frac{a^2}{b^2}$ E) None of these.

15. Find the equation of the line through the two points $(5,3)$ and $(-1,6)$.
- A) $y = \frac{1}{2}x + \frac{11}{2}$ B) $y = -\frac{1}{2}x + \frac{11}{2}$ C) $y = 2x + 8$
D) $y = -2x + 4$ E) None of these.

16. If $f(x) = 5x - 2$, the inverse function is:
- A) $f^{-1}(x) = \frac{1}{5}x + 2$ B) $f^{-1}(x) = \frac{x+2}{5}$ C) $f^{-1}(x) = \frac{1}{5}x - \frac{1}{2}$ D) $f^{-1}(x) = 2x - 5$
E) None of these.

17. $x^{-3} - y^{-3}$ is equivalent to:
- A) $(x-y)^{-3}$ B) $\frac{x^3 y^3}{x^3 - y^3}$ C) $\frac{1}{(x-y)^3}$ D) $\frac{y^3 - x^3}{x^3 y^3}$ E) None of these.

18. The expression $x^4 y - xy^4$ may be factored as:
- A) $(x-y)(x^2 - y^2)(x^2 + y^2)$ B) $xy(x-y)^3$ C) $xy(x-y)(x^2 + xy + y^2)$

D) $(x^2 y - x y^2)^2$

E) None of these.

19. The exact value of $\cos \frac{4\pi}{3}$ is

A) $\frac{\sqrt{3}}{2}$

B) $-\frac{\sqrt{3}}{2}$

C) $\frac{1}{2}$

D) $-\frac{1}{2}$

E) None of these.

20. The expression $\log_2 2x - 2\log_2 y + \log_2 z$ is equivalent to:

A) $\log_2 \left(\frac{2xz}{y^2} \right)$

B) $\log_2 \left(\frac{xz}{y} \right)$

C) $\log_2 (2x - y^2 + z)$

D) $\frac{\log_2 2x \log_2 z}{2\log_2 y}$

E) None of these.

Scroll Down for Correct Answers

Correct Solutions:

- 1) A 2) B 3) A 4) D 5) D 6) E 7) C 8) B 9) B 10) C
11) A 12) D 13) E 14) D 15) B 16) B 17) D 18) C 19) D 20) A

Question	Related Topics
1)	Basic definitions of trigonometric functions
2)	Laws of exponents
3)	Exponential functions, laws of exponents
4)	Functions, solution of inequalities
5)	Relationship between radians and degrees
6)	Linear Equations
7)	Quadratic Equations
8)	Exponents, roots
9)	Composition of functions
10)	Converting logarithmic equations to exponential equations
11)	Basic definitions of trigonometric functions and their domains
12)	Triangle trigonometry, Pythagorean Theorem
13)	Solutions of Rational Equations
14)	Simplifying compound fractions
15)	Slope, Equations of a line
16)	Finding inverses of functions.
17)	Exponents, Adding fractions
18)	Factoring, Difference of cubes,(should also know difference of squares and sum of cubes)
19)	Evaluation of trigonometric functions.
20)	Laws of logarithms