

UMASS Lowell Dept. of Mathematical Sciences

Calculus Readiness Test

(Sample Exam)

You should plan on finishing the exam in less than one hour. Part of the needs of Calculus I are not only to know certain algebraic 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 at the bottom of the test.

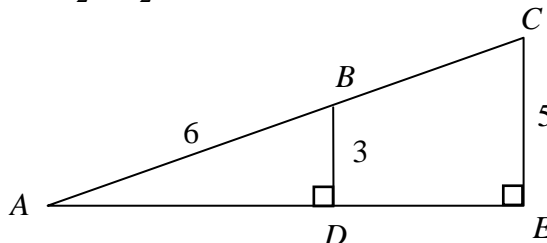
Part 1: Algebra

1. 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.
2. 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.
3. 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.
4. What is the number $(.01)^{-1/2}$ equal to? A) 0.01 B) 10 C) 1000 D) 0.1 E) 100
5. 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.
6. 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.
7. $x^{-3} - y^{-3}$ 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.
8. 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) $(x^2 y - xy^2)^2$ E) None of these.

Part 2: Geometry

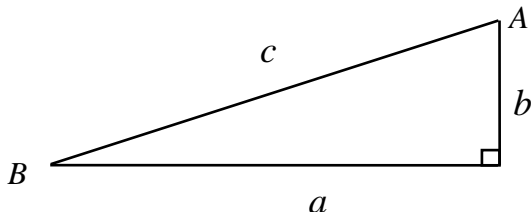
9. Find the equation of the line through the two points (5,3) and (-1,6)
A) $y = \frac{1}{2}x + \frac{11}{2}$ B) $y = -\frac{1}{2}x + \frac{11}{2}$ C) $y = 2x + 8$ D) $y = -2x + 4$ E) None of these.

10. Find AE .
($AB = 6$)



- A) 8 B) $\sqrt{75}$ C) $\sqrt{66}$ D) 9 E) None of these.

Part 3: Trigonometry

11. 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) $\csc x$
12. 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.
13. 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.
14. 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.
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15. 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.

Part 4: Functions, Exponentials, Logarithms

16. 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.
17. If $f(x) = x^2$ and $g(x) = x^3 + 2x$, what is the composition $f(g(x))$?
 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.
18. Solve $\log_{10}(x-1) = 2$ for x .
 A) 1025 B) 21 C) 101 D) 99 E) None of these.
19. 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.
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.

Answers:

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