

Calculus Readiness Self Test

Use this test to see if your algebra/trigonometry background is sufficient for Math 165: Calculus I. The test covers material from high school Algebra I and II (or College Algebra/PreCalculus) as well as Trigonometry.

Suggested use: Maximum time allowed is 90 minutes. Do not use a calculator. Do not refer to a textbook. A score of at least 10 correct in the algebra portion and at least 5 correct in the trigonometry portion would suggest sufficient preparation for Calculus.

Problems you get wrong should at least look familiar and you should be able to see how to do such problems by referring to a textbook.

Algebra

- 1) The length, width, and height of a shoe box with no cover are L , W , H respectively. What is the surface area of the outside of the open box in terms of L , W , and H ?
- 2) Simplify $\frac{a^2b^{-5}}{a^3b^2}$.
- 3) Determine the domain of the function $f(x) = \frac{x+1}{\sqrt{x-2}}$.
- 4) Solve: $\frac{1}{2}x + \frac{3}{4} = \frac{2}{3}(x-6)$.
- 5) Determine the center and radius of the circle with equation $x^2 + 2x + y^2 - 4y = 4$.
- 6) Find an equation for the line through the points $(1, 2)$ and $(-3, 4)$.
- 7) Find the coordinates of the point where the lines $2x + y = 3$ and $3x - 2y = 4$ intersect.
- 8) Simplify $25^{\frac{1}{2}}8^{-\frac{2}{3}}$.
- 9) If $f(x) = 2x + 1$ and $g(x) = x^2 - 2$, determine the formula for the composition $f \circ g(x)$.
- 10) Solve the equation $5x^2 - 3x - 2 = 0$.
- 11) Solve the equation $\log_5(x+1) = 2$
- 12) Solve the equation $\frac{x}{x+1} = \frac{2}{2x-1}$.
- 13) Find a formula for the inverse function of $f(x) = 2x - 7$.
- 14) Factor $ab^3 - a^3b$.
- 15) Determine the coefficient of x^5 when $(x+2)^7$ is expanded.
- 16) Determine the distance between the points $(2, -3)$ and $(5, 7)$.
- 17) Determine $f(t+1)$ if $f(x) = \frac{x+1}{x-1}$.
- 18) Solve the inequality $2x + 3 \leq 5x - 7$.
- 19) Solve the equation $|3x + 2| = 11$.
- 20) Solve the inequality $|5x - 3| \leq 10$.

Trigonometry

- 1) Express $\tan x \cos x$ as a single trigonometric function.
- 2) Determine the exact value of $\cos \frac{\pi}{3}$.
- 3) Determine the exact value of $\sin^2 \frac{11\pi}{13} + \cos^2 \frac{11\pi}{13}$.
- 4) If $\cos t = .123$, determine the value of $\cos(t + 2\pi)$.
- 5) For what values of θ is $\tan \theta$ undefined?
- 6) Determine the value of $\sec x$ if $\tan x = \frac{5}{6}$ and $0 < x < \frac{\pi}{2}$.
- 7) Determine the radian measure of an angle of 150° .
- 8) A right triangle has legs of lengths 3 and 7. Determine the exact value of the sine of the smallest angle in that triangle.
- 9) Determine all values x for which $\cos x = \frac{\sqrt{3}}{2}$.
- 10) Solve the equation $\sin x = \cos x$.

Solutions

Algebra

$$(1) LW + 2LH + 2WH \quad (2) \frac{1}{ab^7} \quad (3) 2 < x \quad (4) x = \frac{57}{2}$$

$$(5) \text{Center: } (-1, 2), \text{ radius: } 3 \quad (6) x + 2y = 5 \quad (7) \left(\frac{10}{7}, \frac{1}{7}\right) \quad (8) \frac{5}{4}$$

$$(9) f \circ g(x) = 2x^2 - 3 \quad (10) x = 1, -\frac{2}{5} \quad (11) x = 24 \quad (12) x = 2, -\frac{1}{2}$$

$$(13) f^{-1}(x) = \frac{x+7}{2} \quad (14) ab(b-a)(b+a) \quad (15) 84 \quad (16) \sqrt{109}$$

$$(17) f(t+1) = \frac{t+2}{t} \quad (18) x \geq \frac{10}{3} \quad (19) x = 3, -\frac{13}{3} \quad (20) \left[-\frac{7}{5}, \frac{13}{5}\right]$$

Trigonometry

$$(1) \sin x \quad (2) \frac{1}{2} \quad (3) 1 \quad (4) .123$$

$$(5) \frac{k\pi}{2}, k = \text{any odd integer} \quad (6) \frac{\sqrt{61}}{6}$$

$$(7) \frac{5\pi}{6} \quad (8) \sin \theta = \frac{3}{\sqrt{58}}$$

$$(9) x = \frac{\pi}{6} + 2k\pi, x = \frac{11\pi}{6} + 2k\pi, k = \text{any integer} \quad (10) x = \frac{\pi}{4} + k\pi, k = \text{any integer}$$