

Brock University
Department of Mathematics
Mathematics Skills Test Instruction Pages

Note: Read all instructions before attempting your first test.

How to log-in to WebWork

The Mathematics Skills Tests are all available through the WebWork system. To log-in to this system, direct your browser to <https://webwork.brocku.ca/webwork2/MathSkills>, and log-in using your user name and password. This is the same user name and password you would use to log-in to my.brocku.ca, as well as your Brock University email account.

How to open a skills test

Once you have logged-in to WebWork, you will see a link for each skills test. These links are:

- Take Algebra test
- Take Functions Conic Sections test
- Take Transcendental Functions test

It is strongly recommended that you take the skills tests in the order listed above.

Click on the link for the skills test you wish to take. You will be automatically taken into a test page, and the test will start immediately. Once you have started a test, you will have 60 minutes to complete it.

How to enter answers during a skills test

Final answers should be entered in the solution space provided underneath each question. Make sure you are entering the appropriate answer in the corresponding solution space. **Marks will not be returned for answers that have been entered in the wrong space.** Read the instructions to each question carefully, to ensure answers are being entered in the proper format.

Exact Values: Unless otherwise instructed, all answers must be entered as an exact value. An exact value is a mathematical expression (or number) that has not been approximated; approximations occur by calculating and/or rounding a decimal number. Exact solutions may involve terms left as fractions, or left as a square root or logarithmic function. The following table illustrates examples of exact versus approximate values.

EXACT VALUE	APPROXIMATE VALUE
$\frac{1}{3}$	0.333333333333
$\sqrt{2}$	1.41421
$\log(5)$	0.699
$e^{1/2}$	1.64872

Approximate Values: Approximate values are answers in decimal form, which have been rounded to a specified number of decimal places. If a question requires an approximate answer, it will be indicated in the instructions. Approximate values must be entered correctly to **4 decimal places**.

Functions, Fractions, and Other Notation: The Mathematics Skills Test Notation Guide provides instructions on the notation required for entering mathematical expressions, functions, and other notation in WeBWork. Please have this guide accessible when completing each skills test.

How to preview a skills test

Once you have entered all your answers, you **MUST** preview your test before submitting it. To do this, click on the PREVIEW TEST button at the bottom of the page. The preview option allows you to check that all answers have been entered correctly. Any typos such as spelling mistakes, additional brackets, or incorrect syntax will be flagged, and will allow you the opportunity to make any necessary corrections. **Failure to preview your test before submission could result in lost marks.**

How to complete and grade a skills test

After previewing your skills test, it can be submitted for grading by choosing the GRADE TEST button at the bottom of the page. Your test will be graded immediately, and a final mark will be returned to you. You will also receive an email indicating that you have passed the test. **If you do not receive an email, it means that you have not passed the test.**

FOR EACH SKILLS TEST, YOU MUST HAVE A GRADE OF 70% OR HIGHER TO PASS. ONCE YOU HAVE ACHIEVED THIS GRADE, FUTURE ATTEMPTS AT THE TEST ARE NOT NECESSARY.

DUE DATE

The deadline for completion of all Mathematics Skills Tests, with a minimum score of 70% on each one, is **FRIDAY, JANUARY 10, 2014, at 11:59pm EST.**

FREQUENTLY ASKED QUESTIONS

1) *Does the order in which I take the tests matter?*

The order in which you take the tests does not matter. However, it is recommended that you take them in the order of (1) Algebra Test (2) Functions & Conic Sections Test (3) Transcendental Functions Test.

2) *How long does each test take? Can I pause a test once I have started it?*

Each test is timed for a maximum allowance of 60 minutes. It is possible for you to finish a test in less than 60 minutes. A test cannot be paused once it has been started. Make sure you have allotted enough time to complete the test once you have opened it.

3) *What happens if time runs out and I have not finished my test?*

At the end of the time limit, you will be prompted to grade your test. You will have a short grace period in which to click the Grade Test button, after which your test will not be accepted and you will receive a mark of 0. Tests that are not completed within the allotted time will still be counted towards your total number of attempts.

4) *What happens if my computer freezes, if I lose my internet connection, or if I close my browser during a test?*

Once a test is opened, it will remain open and running online even if you leave the test screen (by closing your browser, or moving to another webpage). If you restart your browser and/or log back in to WeBWork, you will see any tests that are still open, and how much time is remaining. Tests with time still remaining can be reopened and completed, however any answers previously entered will be lost. If there is no time remaining, the test will be closed, and you will receive a mark of 0.

5) *How many times can I take each test? If I take a test more than once, what mark will be recorded?*

You can take each test only 6 times. If you take a test multiple times, the highest mark you obtain will be recorded. Once you have received a mark of 70% or more on a test, it is not necessary to take that test again.

6) *Can we see what questions we got wrong, and are solutions provided?*

You will be able to see which questions you got wrong, however, correct answers and/or solutions are not provided.

7) *Where can I go if I need help taking a test, or if I need help with the test material?*

For technical assistance with the test, you can contact Lorna Deeth, Mathematics Development Programs Coordinator, by email (ldeth@brocku.ca) or by phone (extension 5269). For assistance with test material, please check the Mathematics Learning Centre schedule for available office hours and scheduled tutorials.

MATHEMATICS SKILLS TEST

QUICK START GUIDE

- 1) Go to <https://webwork.brocku.ca/webwork2/MathSkills> .
- 2) Log in using your Brock account.
- 3) Click on Take Algebra test.
or Take Functions Conic Sections test.
or Take Transcendental Functions test.
- 4) Enter answers to all questions within 60 minutes.
- 5) Click on Preview Test.
- 6) Make any corrections flagged by Preview Test.
- 7) Click on Grade Test.

Mathematics Skills Test Notation Guide

FUNCTION / EXPRESSION	WebWork Syntax
$\frac{a}{b}$	a/b
$\frac{-a}{b}$	-a/b
x	x
x^2	x^2
$\frac{x+a}{x+b}$	(x+a)/(x+b)
$ax^2 + bx + c$	ax^2 + bx + c
$a(x+b)^2 + c$	a(x+b)^2 + c
$(ax+b)(cx+d)$	(ax+b)(cx+d)
\sqrt{x}	sqrt(x)
$\sqrt{x+a}$	sqrt(x+a)
$\sqrt{x} + a$	sqrt(x) + a
$\frac{\sqrt{x}}{b}$	sqrt(x)/b
$ x $	abs(x)
$(-\infty, \infty)$	(-infinity, infinity)
$(-\infty, a) \cup (b, \infty)$	(-infinity, a) U (b, infinity)
$[a, b] \cup (c, d]$	[a, b] U (c, d]
$\log_{10}(a)$	log(a)
$\ln(a)$	ln(a)
$\frac{\log_{10}(a)}{\log_{10}(b)}$	log(a)/log(b)
$\frac{\ln(a)}{\ln(b)}$	ln(a)/ln(b)
π	pi
$\frac{a\pi}{b}$	api/b
$A \sin(Bx + C)$	Asin(Bx + C)
$\sin^2 x$	(sin(x))^2

Algebra Test Sample Problems

1. Find the equation of the line that passes through the point $(2,-5)$ and is parallel to the line $2x - 4y = 3$.
2. Find the distance between the points $(4,3)$ and $(-3,2)$.

3. Factor $2x^2 + 5x - 12$.

4. Simplify the following expressions:

a) $\left(\frac{3x^{3/2}y^4}{x^2y^{1/2}}\right)^{-3}$ Write your simplified expression without negative exponents.

b) $\left(\frac{\frac{y-x}{x-y}}{\frac{1}{y} + \frac{1}{x}}\right)$

c) $\frac{x}{x-2} + \frac{2x+1}{x^2-4}$

5. Solve the following inequalities. Write your answer using interval notation.

a) $-3 \leq 2x - 3 < 5$

b) $x^2 - 5x + 6 > 0$

c) $|2x - 1| \leq 3$

6. Using long division, find the quotient and remainder of $\frac{x^3 - 4x - 10}{x^2 - x - 6}$.

7. Find all real solutions of the equation $\frac{2x}{x+1} = \frac{2x-1}{x}$.

Functions and Conic Sections Test Sample Problems

- Find the domain of the function $f(x) = \frac{x}{\sqrt{3x-4}}$.
- Given $f(x) = \sqrt{x-2}$ and $g(x) = \frac{1}{x-1}$. Find
 - $\left(\frac{f}{g}\right)(x)$
 - $(f \circ g)(x)$
 - $(g \circ f)(4)$
- Given the graph of $f(x) = \sqrt{x}$, write the equations that would generate graphs that correspond to the following transformations:
 - shifting upward 3 units
 - shifting right 2 units
 - stretching vertically by a factor of 4
 - reflecting graph about x -axis
- Complete the following definitions.
 - A function, $f(x)$, is called an *even* function if $f(-x) = \underline{\hspace{2cm}}$.
 - A function, $f(x)$, is called an *odd* function if $f(-x) = \underline{\hspace{2cm}}$.
- Find the inverse of $f(x) = x^3 - 2$.
- Find the centre and radius of the circle $x^2 + y^2 - 4x + 10y - 13 = 0$.
- Identify the type of curve (circle, parabola, ellipse, hyperbola) represented by each equation.
 - $9y^2 - x^2 = 9$
 - $x = 4 - y^2$
 - $(x-2)^2 + y^2 = 4$
 - $x^2 + 4y^2 = 16$

Transcendental Functions Test Sample Problems

1. Find the exponential function $f(x) = Ca^x$ that goes through the points $(-1,3)$ and $\left(1, \frac{4}{3}\right)$.
2. Express $3\ln(x+2) - \frac{1}{2}[\ln x + \ln(x-1)]$ as a single logarithm.
3. Solve the following equations for x . Leave your answers in exact form.
 - a) $e^{7-4x} = 6$
 - b) $\ln(x^2 - 1) = 3$
4. Sketch the graphs of the functions $e^x, e^{-x}, \ln x, \sin x, \cos x, \tan x$.
5. Find the exact trigonometric ratios for the angle $\theta = \frac{4\pi}{3}$.
6. Given $\cos \theta = \frac{-1}{3}, \frac{\pi}{2} < \theta < \pi$, find the remaining trigonometric ratios.
7. Complete the following trigonometric identities.
 - a) $\sin(x+y) = ?$
 - b) $\frac{1}{2}(1 - \cos 2x) = ?$
 - c) $\sin 2x = ?$
 - d) $? = 2\cos^2 x - 1$
8. Find all values of x in the interval $[0, 2\pi]$ that satisfy the equation $\sin 2x = \cos x$.
9. Find the amplitude, period and phase shift of the function $f(x) = 7\cos\left(x - \frac{\pi}{4}\right)$. In which direction (left or right) is the graph of $\cos x$ shifted?