

# Preparing For University Calculus

For those of you who plan on getting a degree in science or engineering, you will need to take university calculus. Calculus courses at university can be very fast-paced compared to high school. Even though professors will review some concepts from high school at the beginning of the semester, there are certain concepts that professors will expect you to know and understand. In order to help you prepare for university calculus, try the following questions:

1. Expand  $(5y - 3x)^2$ .

2. Simplify the following:

a) 
$$\frac{(x^3 y^{-5})^3}{x^{-2} y^7}$$

b) 
$$\frac{x^2 \sqrt{x}}{\frac{1}{x^2}}$$

c) 
$$\frac{\frac{2}{x+y} - \frac{2}{x}}{y}$$

3. Simplify by rationalizing  $\frac{x}{\sqrt{x} - 5}$

4. Find the equation of the line through the points  $(-5, 0)$  and  $(3, 1)$ .

5. Solve  $|5x + 2| < 3$  for  $x$ .

**6.** Solve each equation for  $x$ :

a)  $x^{-2} = 100$

b)  $4^0 + 2^x = 9$

c)  $\sqrt{x+4} = 9$

d)  $\frac{5x-9}{x} = \frac{1}{2}$

**7.** What are the solutions of  $\frac{x^2 - 7x + 10}{x^2 - 5x + 4} = 0$ ?

**8.** Find exact value without using a calculator for the following:

a)  $\sin\left(\frac{\pi}{3}\right)$

b)  $\log_2(8)$

c)  $5 \sin^2\left(\frac{\pi}{4}\right) + 5 \cos^2\left(\frac{\pi}{4}\right)$

**9.** Find the points of intersection of  $y = x^2$  and  $y = x + 2$ .

**10.** If the hypotenuse of a right triangle is 10, and one side has length 8, how long is the other side?

**11)** If  $f(x) = x^2 + 2x - 5$ , find  $\frac{f(x+h) - f(x)}{h}$ .

**12)** Find the domain of the following functions:

a)  $f(x) = \sqrt{x - 3}$

b)  $f(x) = \frac{1}{x^2 - 1}$

**13.** Which equation best fits the given curve?

a)  $y = \sqrt{x}$

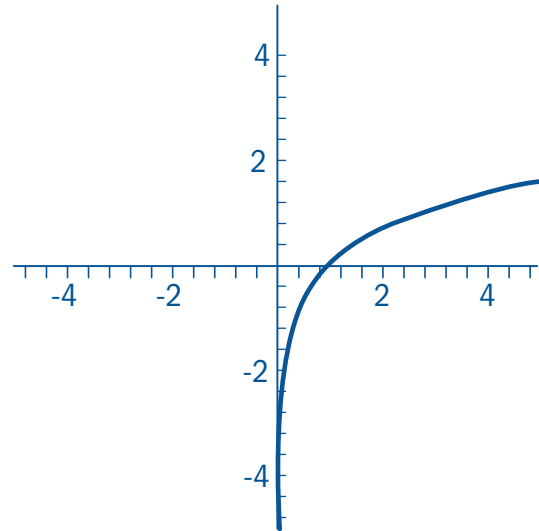
b)  $y = \sin(x)$

c)  $y = x^2$

d)  $y = \ln(x)$

e)  $y = e^x$

f)  $y = \frac{1}{x}$



**14)** If  $f(x) = x^2$  and  $g(x) = 2x + 3$  then find  $f(g(1))$ .

**15)** If the area of a triangle is  $100 \text{ cm}^2$  and its base is equal to twice its height, what is its base?

If you were unable to do some of these questions, don't despair. Ontario Tech has various resources that can help. Please refer to [nool.ca](https://nool.ca) to review high school math and to improve your math skills in general. As an Ontario Tech student, you can also take advantage of the academic assistance offered by Student Learning Centre. Throughout the year, the Student Learning Centre runs workshops on various mathematical skills. In addition, students can access one-on-one sessions with the Academic Subject Specialist or a Peer Tutor. For more information, visit [ontariotechu.ca/studentlearning](https://ontariotechu.ca/studentlearning)

## Answers:

1)  $25y^2 - 30xy + 9x^2$

2 a)  $x^{11}y^{-22}$

b)  $x^{9/2}$

c)  $\frac{-2}{x(x+y)}$

3)  $\frac{x^{3/2} + 5x}{x - 25}$

4)  $y = \frac{1}{8}x + \frac{5}{8}$

5)  $-1 < x < \frac{1}{5}$

6 a)  $x = \pm \frac{1}{10}$

b)  $x = 3$

c)  $x = 77$

d)  $x = 2$

7)  $x = 5$  or  $x = 2$

8 a)  $-\sqrt{\frac{3}{2}}$     b) 3    c) 5

9)  $x = -1$  or  $x = 2$

10) 6

11)  $\frac{(x+h)^2 + 2(x+h) - 5 - (x^2 + 2x - 5)}{h}$

12 a)  $x \geq 3$

b)  $x \neq \pm 1$

13)  $y = \ln(x)$

14) 25

15) 20

## Student Learning Centre

Call: 905.721.8668 ext. 6578

Email: [studentlearning@ontariotechu.ca](mailto:studentlearning@ontariotechu.ca)

Website: [ontariotechu.ca/studentlearning](http://ontariotechu.ca/studentlearning)

Downtown Oshawa Location: 61 Charles St.

North Oshawa Location: Student Life Building



This document is licensed under Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). For more information visit [creativecommons.org/licenses/by-nc/4.0/](http://creativecommons.org/licenses/by-nc/4.0/)