


MATH 100: Differential Calculus Supplemental Learning

$$S_3 = \begin{bmatrix} 101 \\ 101 \\ 101 \\ 101 \end{bmatrix}$$

$$b^2 = c \cdot cb$$
$$a^2 = c \cdot ca$$

$$\pi = 3.141592$$
$$\alpha x = -\frac{\alpha x}{2x}$$




There will be **two SL sessions held each week:**

In-Person: Monday, 9:30 a.m. - 11 a.m., LIB 237

(Enter from the Library *West Entrance* and come up a floor to the *Student Learning Hub*)

Online: Wednesday, 12:00 p.m. - 1:00 p.m., on Zoom

Zoom Link: <https://ubc.zoom.us/j/61758025867?pwd=cGV3d05HNjgweUlsNjBEZzA1d0Z6QT09> ➡

Meeting ID: 726 091 5421

Passcode: 129010

Office Hours: Monday, 11:00 a.m. - 11:30 a.m., LIB 237





Algebra Identities

- $\sin(2x) = 2 \sin(x) \cos(x)$

- $\cos^2(x) = \frac{1 + \cos(2x)}{2}$

- $\sin^2(x) = \frac{1 - \cos(2x)}{2}$

- $a^{x+y} = a^x a^y$


- $a^{xy} = (a^x)^y = (a^y)^x$

- $\log_a(xy) = \log_a(x) + \log_a(y)$

- $\log_a(x/y) = \log_a(x) - \log_a(y)$

- $\log_a(x^n) = n \log_a(x)$

- $ax^2 + bx + c = 0 \implies x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$





Quiz 1!

Limits


Friday, September 22nd



**Introduction
to Limits**

**Graphical
Limits**

**Vertical
Asymptotes**




**One-sided
Limits**

**Algebraic
Techniques for
Limits**



**Limits at
Infinity**














1. Calculate the following limits.




(a) $\lim_{x \rightarrow -4} \frac{x^2 + 4x}{x^2 + 2x - 8}$





$$(b) \lim_{x \rightarrow 1} \frac{\frac{1}{x} - 1}{x - 1}$$




$$(c) \lim_{x \rightarrow 0} \frac{\sqrt{1-x} - (x+1)}{x^2 + x}$$



$$(d) \lim_{x \rightarrow 2} \frac{3x^2 - 2x - 8}{x^2 + x - 6}$$


$$(e) \lim_{x \rightarrow 0} (e^x - 1) \sin \left(\frac{1}{x} \right)$$





2. Determine all vertical asymptotes of $f(x) = \frac{x-1}{x^2-5x+6}$. Then determine the infinite behaviour of $f(x)$ on both sides of each asymptote.





3. Determine the values of a and b that makes the function below continuous everywhere

$$f(x) = \begin{cases} ax + b & \text{if } x \leq 1 \\ ax^2 - bx + 1 & \text{if } x > 1 \end{cases}$$





Additional Exercises



Openstax:

- Examples 2.17, 2.18, 2.19 on pages 165/166
- 2.3 Exercises: 96, 97, 101, 102

APEX:

- Exercises 1.3: 7, 9, 12, 14, 29, 30, 35, 36, 38
 - Exercises 1.4: 8, 11, 13, 14, 15, 20
 - Exercises 1.5: 12, 17, 20, 22, 23, 24, 26, 29
 - Exercises 1.6: 19, 20, 22, 24 (only vertical asymptotes)
- 



**Any
Questions????**

