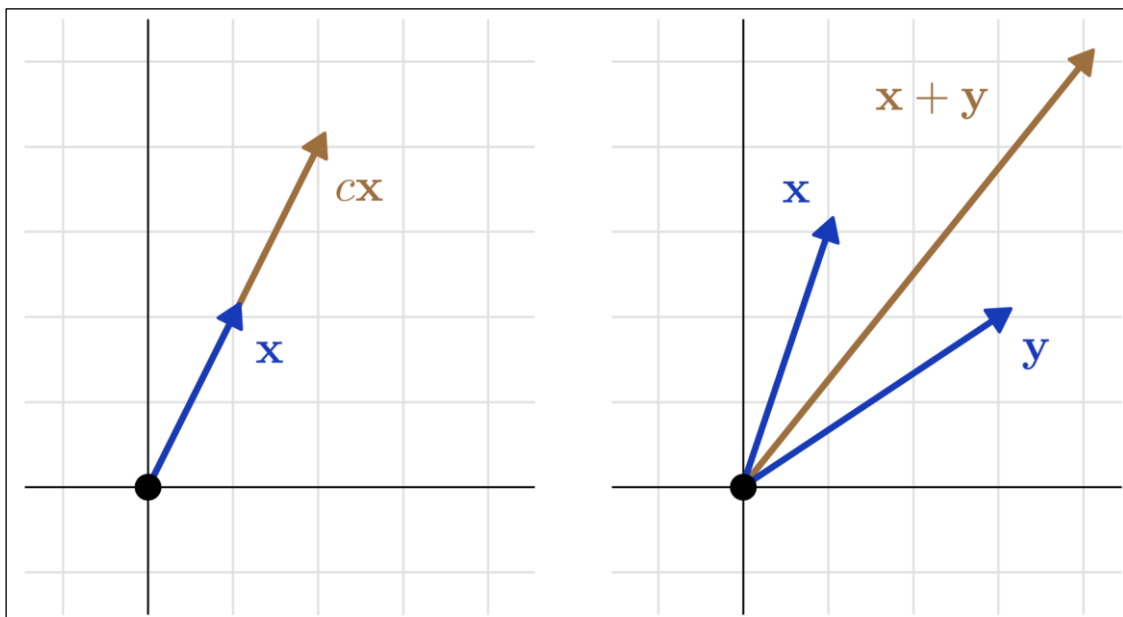
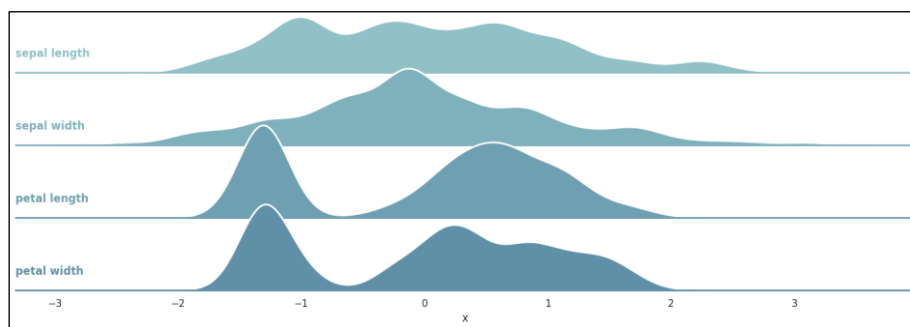
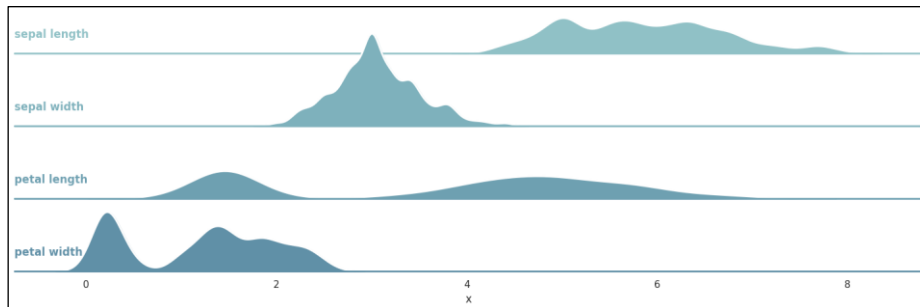
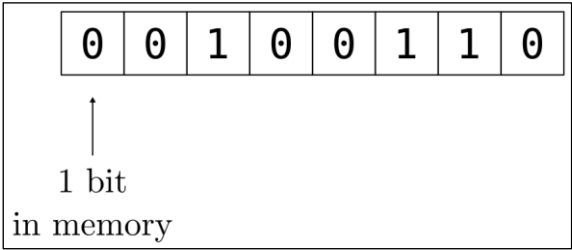
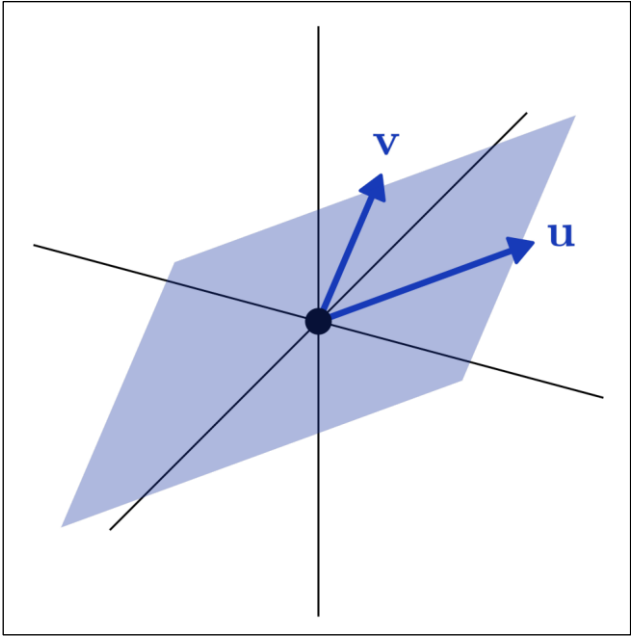
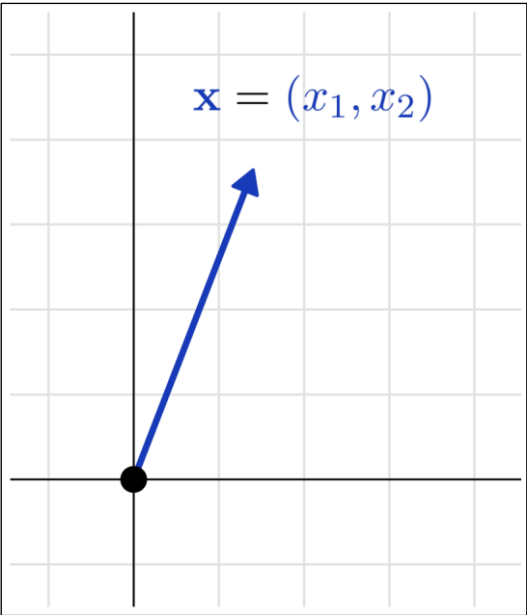
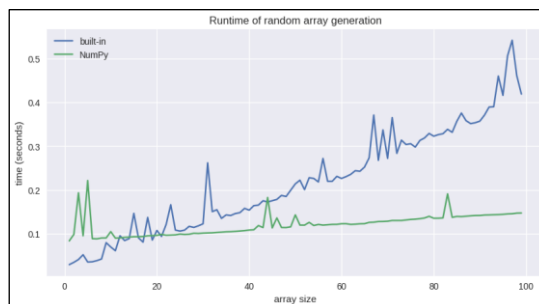
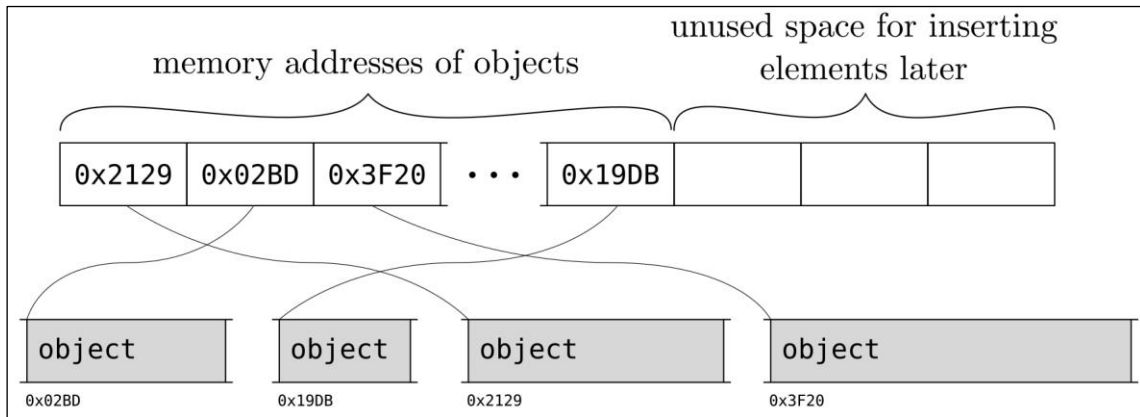
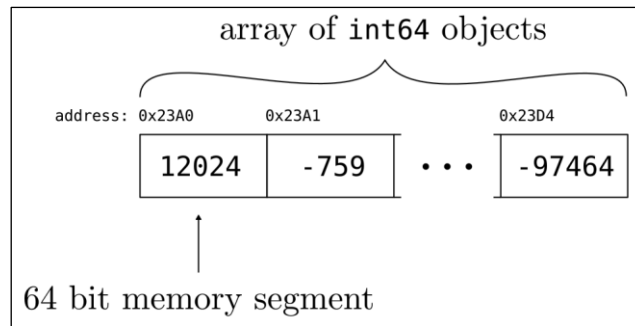


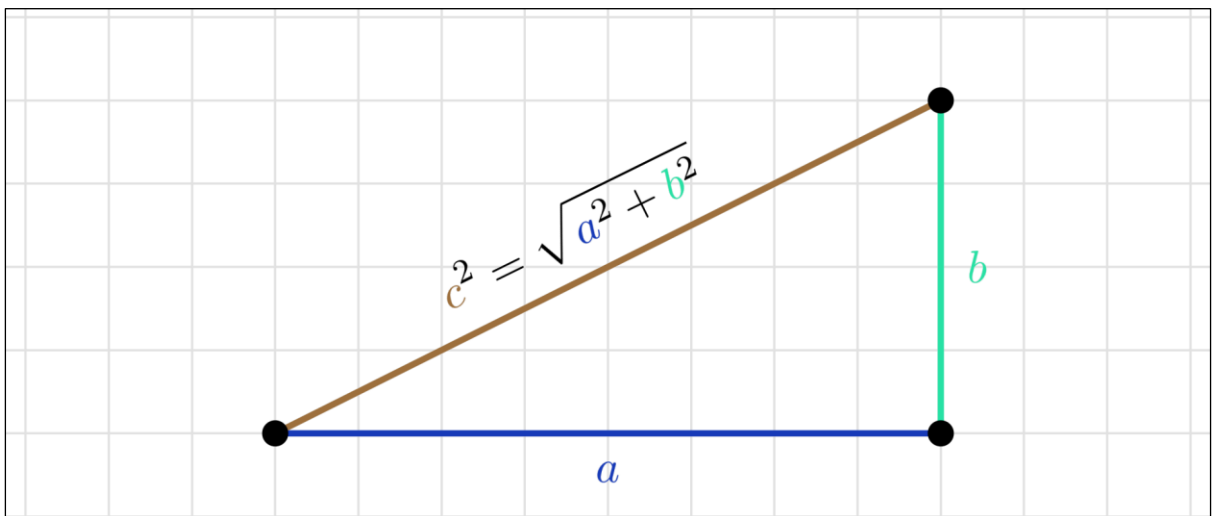
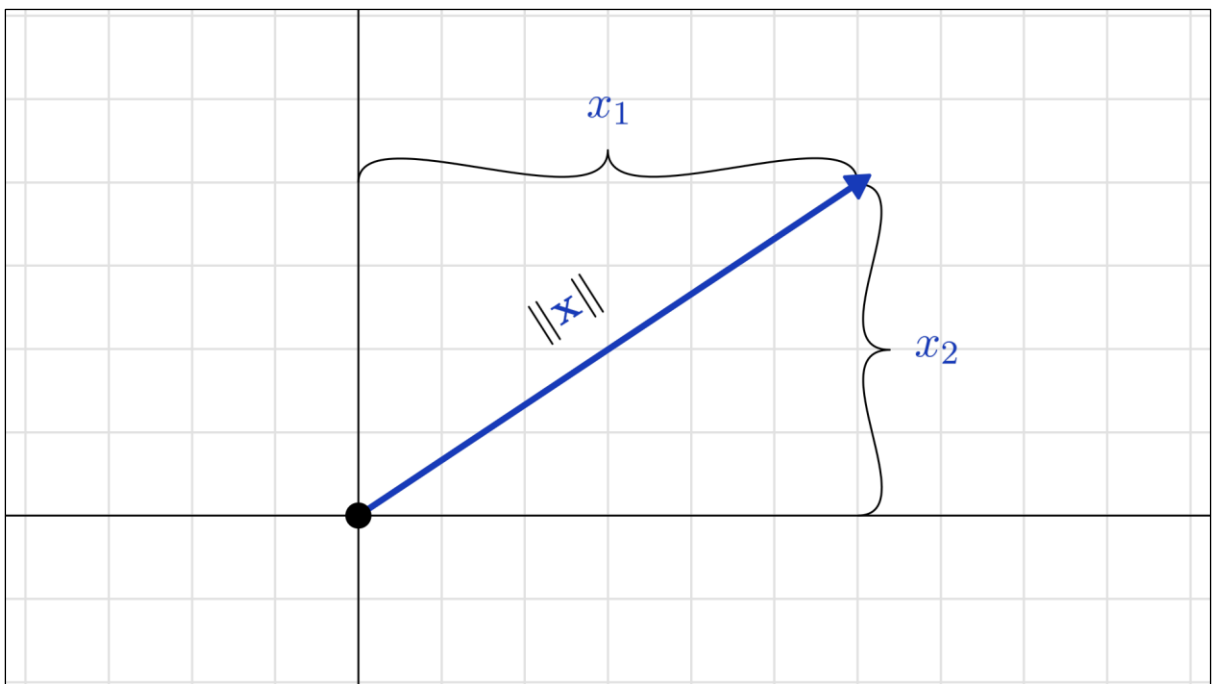
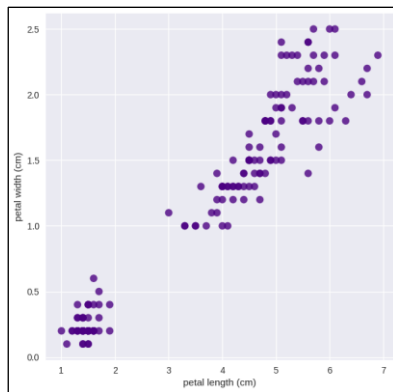
Chapter 1: Vectors and Vector Spaces

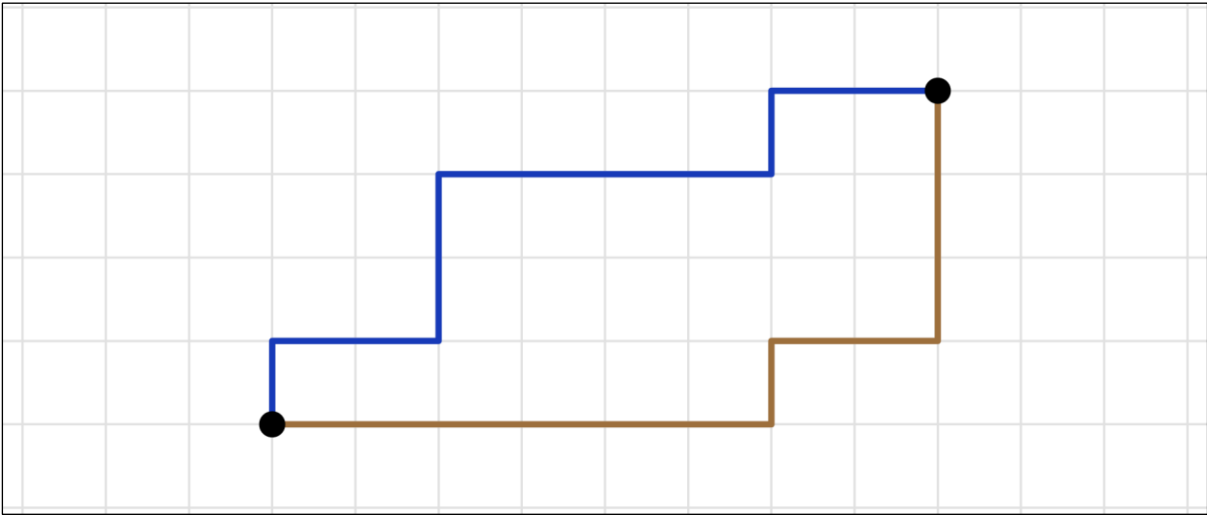
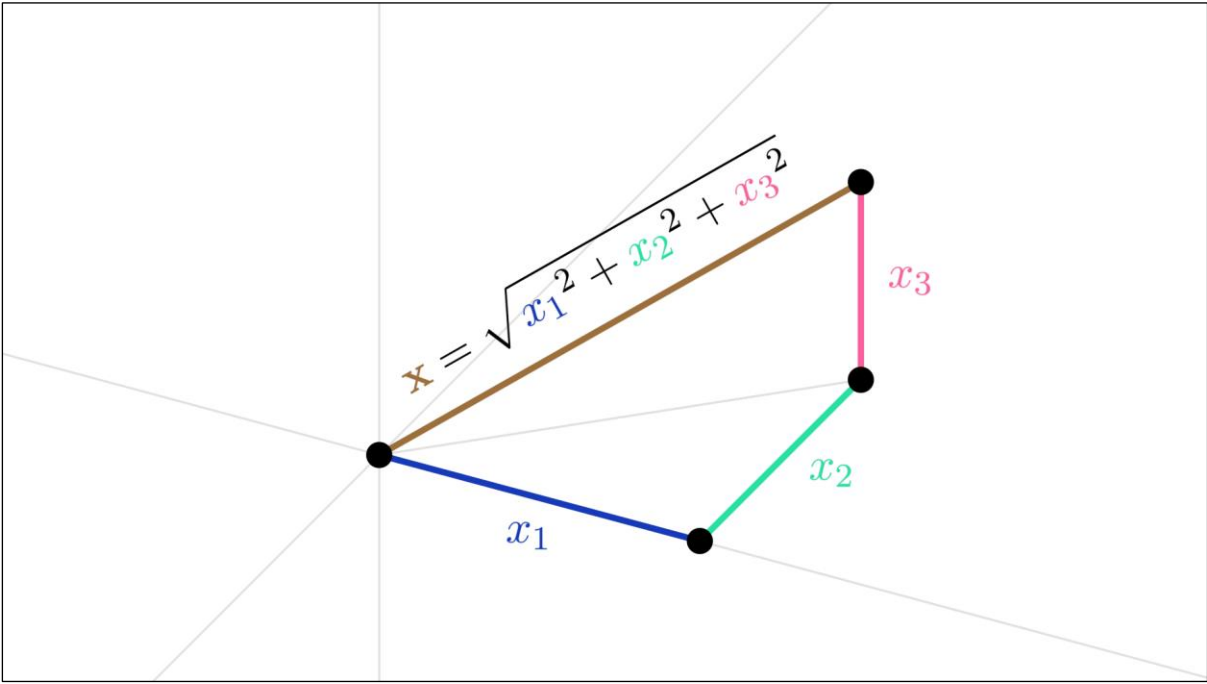


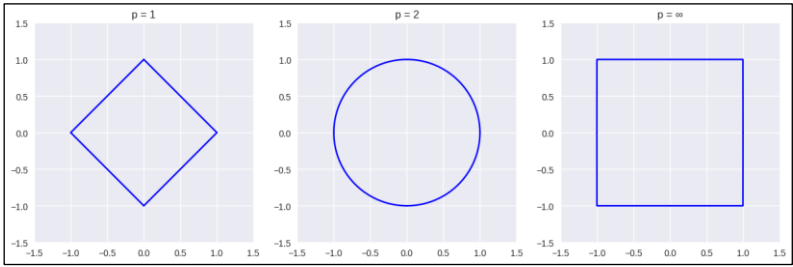
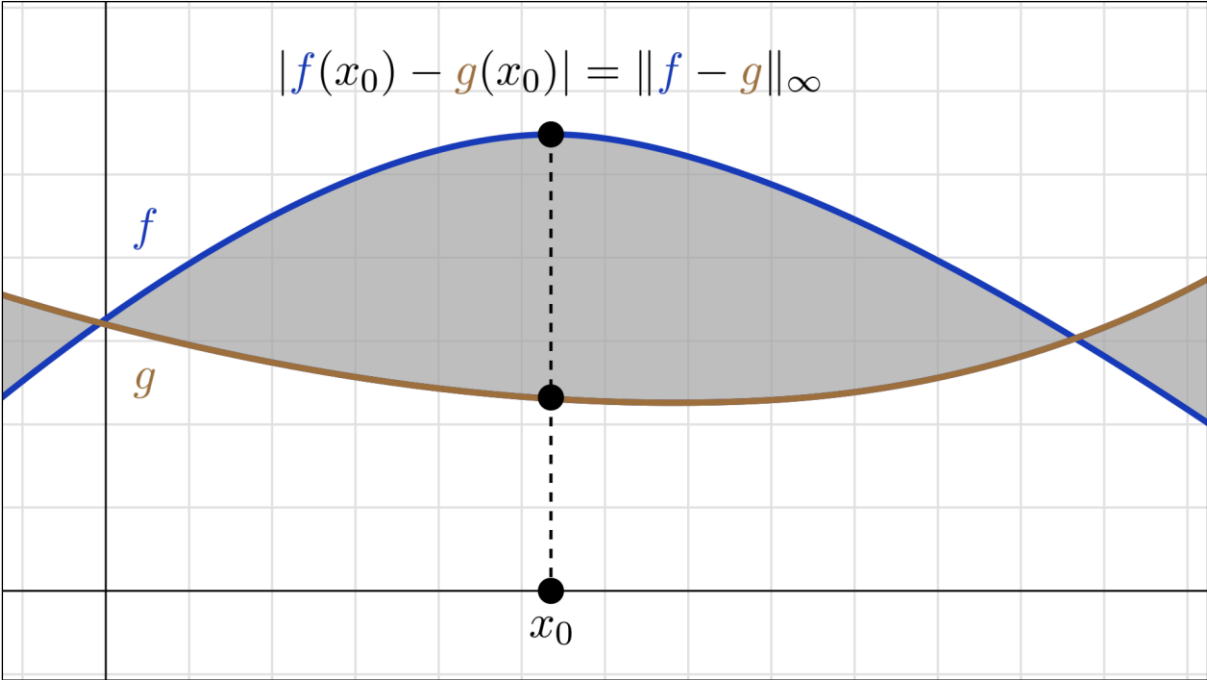
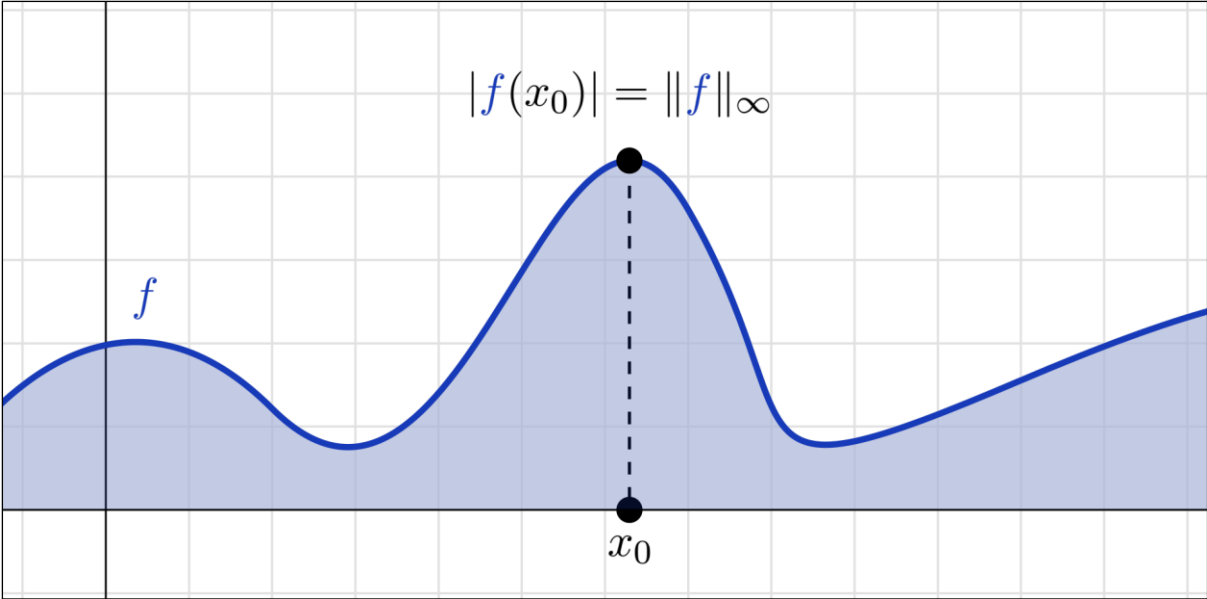


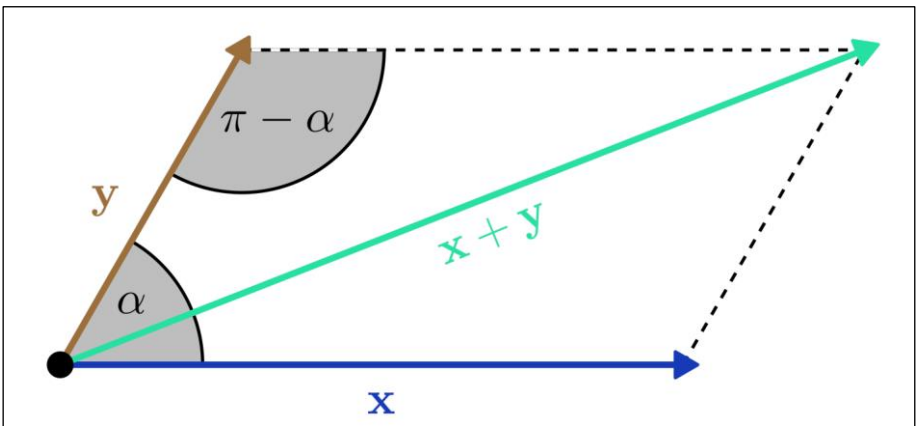
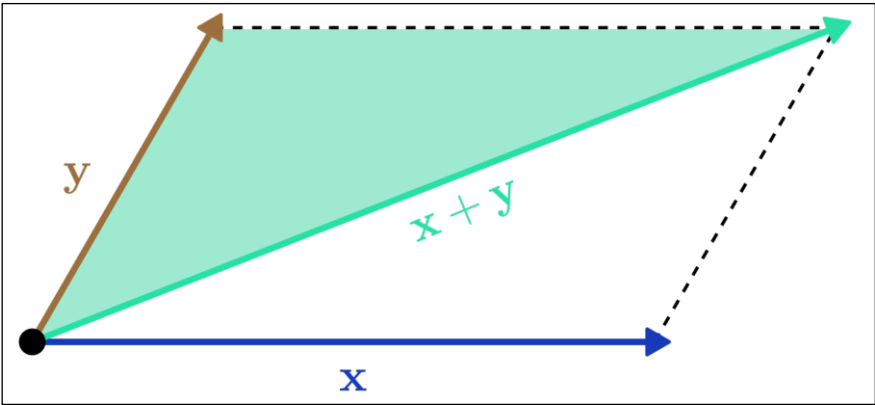
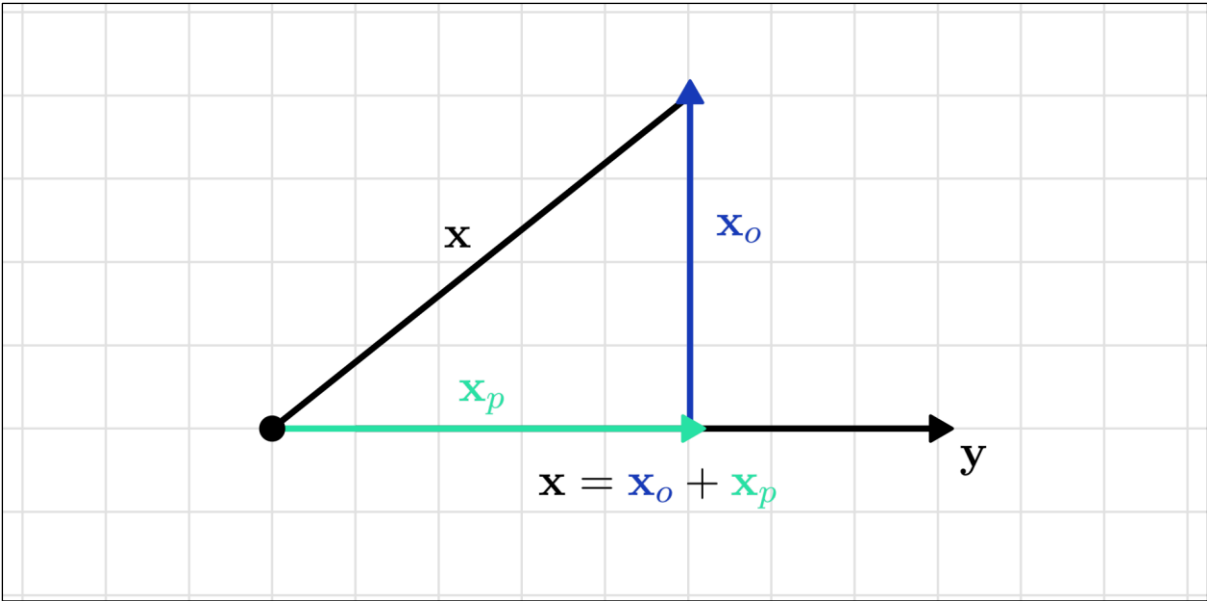


Chapter 2: The Geometric Structure of Vector Spaces

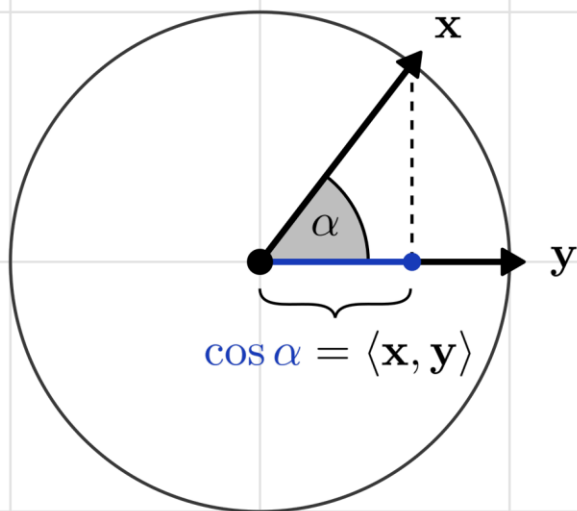




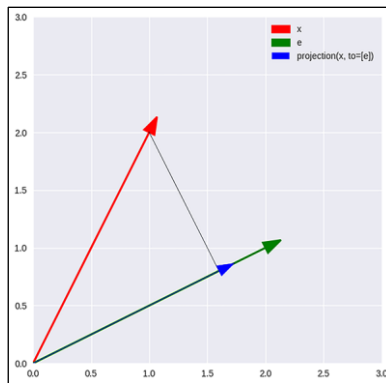




$$\|\mathbf{x}\| = \|\mathbf{y}\| = 1$$

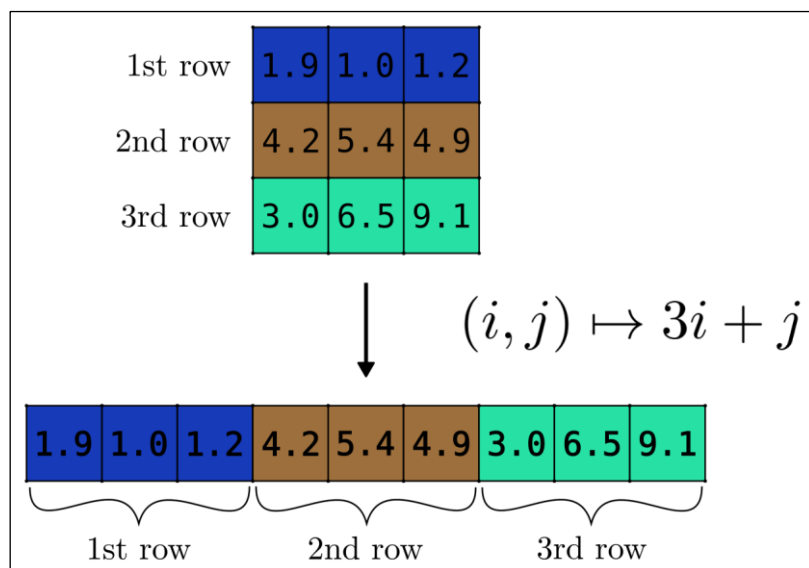


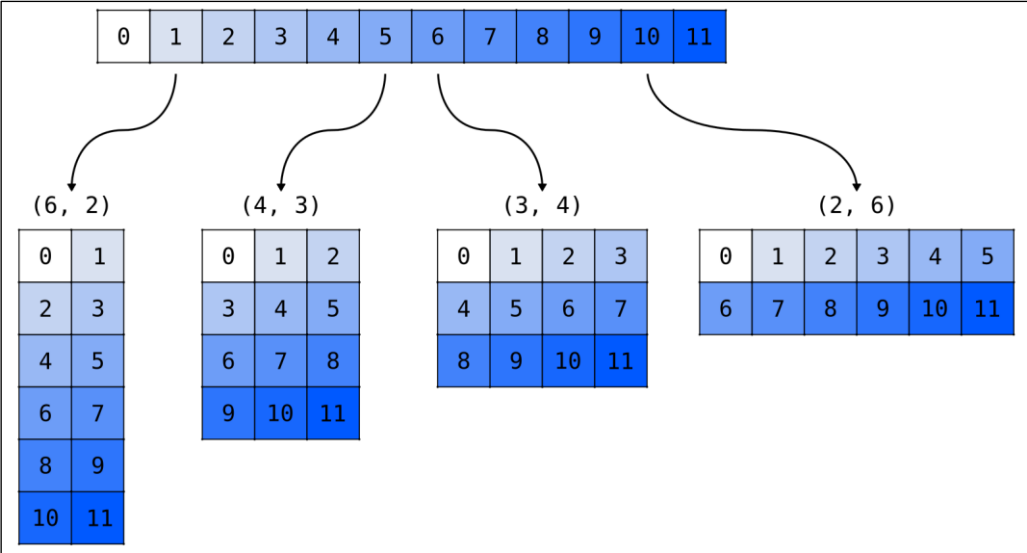
Chapter 3: Linear Algebra in Practice



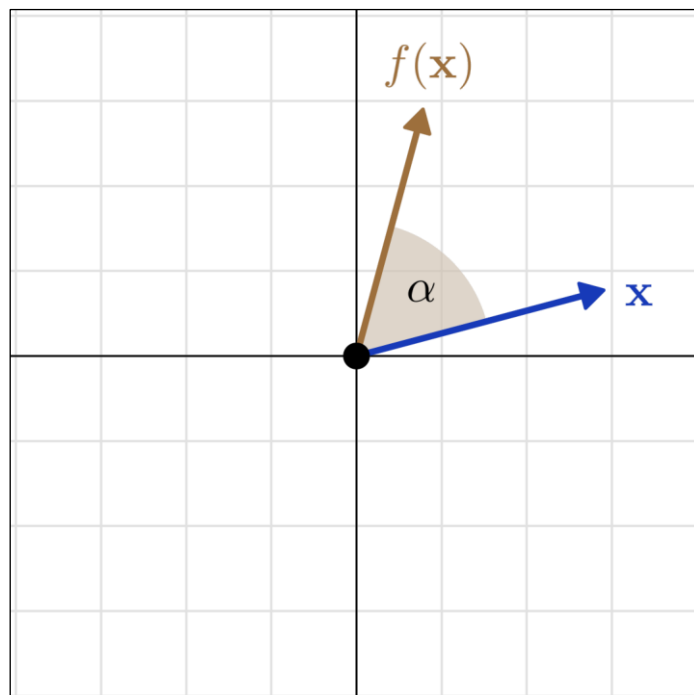
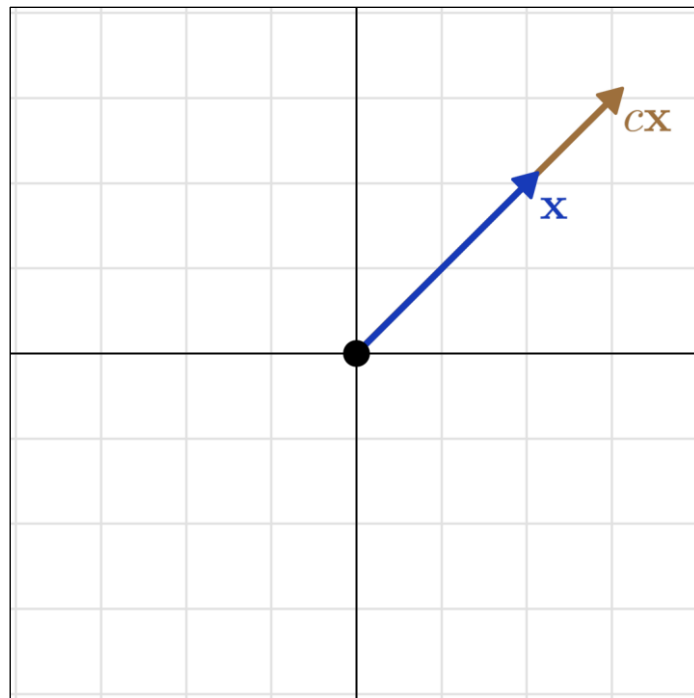
$$\begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} \\ a_{2,1} & a_{2,2} & a_{2,3} \end{bmatrix} \begin{bmatrix} b_{1,1} \\ b_{2,1} \\ b_{3,1} \end{bmatrix} \begin{bmatrix} b_{1,2} \\ b_{2,2} \\ b_{3,2} \end{bmatrix} = \begin{bmatrix} c_{1,1} & c_{1,2} \\ c_{2,1} & c_{2,2} \end{bmatrix}$$

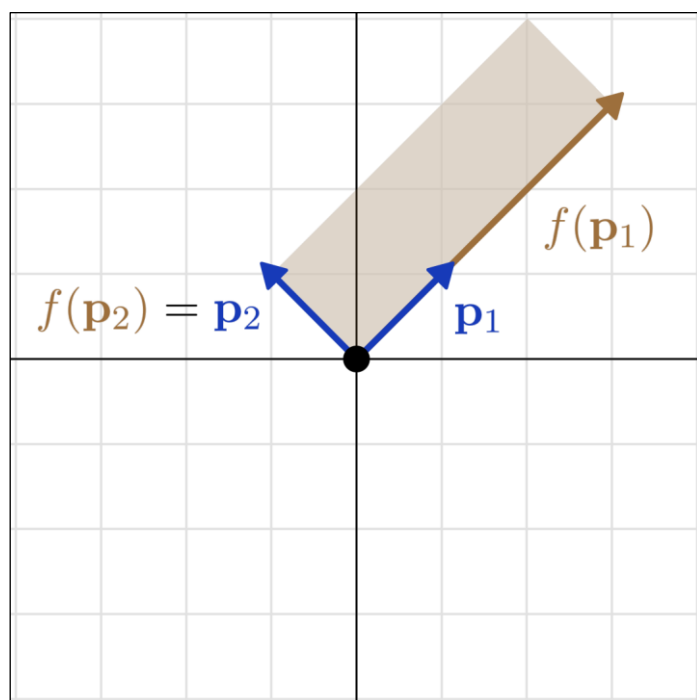
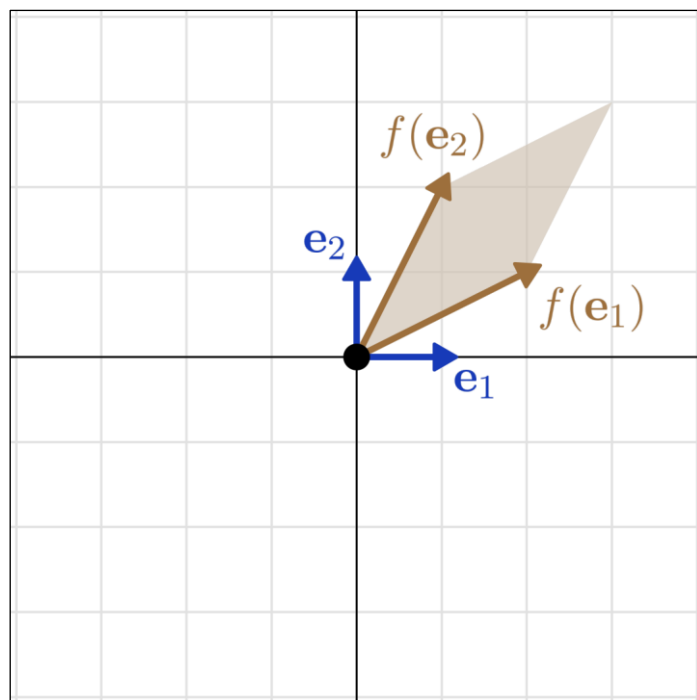
$$c_{2,1} = a_{2,1}b_{1,1} + a_{2,2}b_{2,1} + a_{2,3}b_{3,1}$$

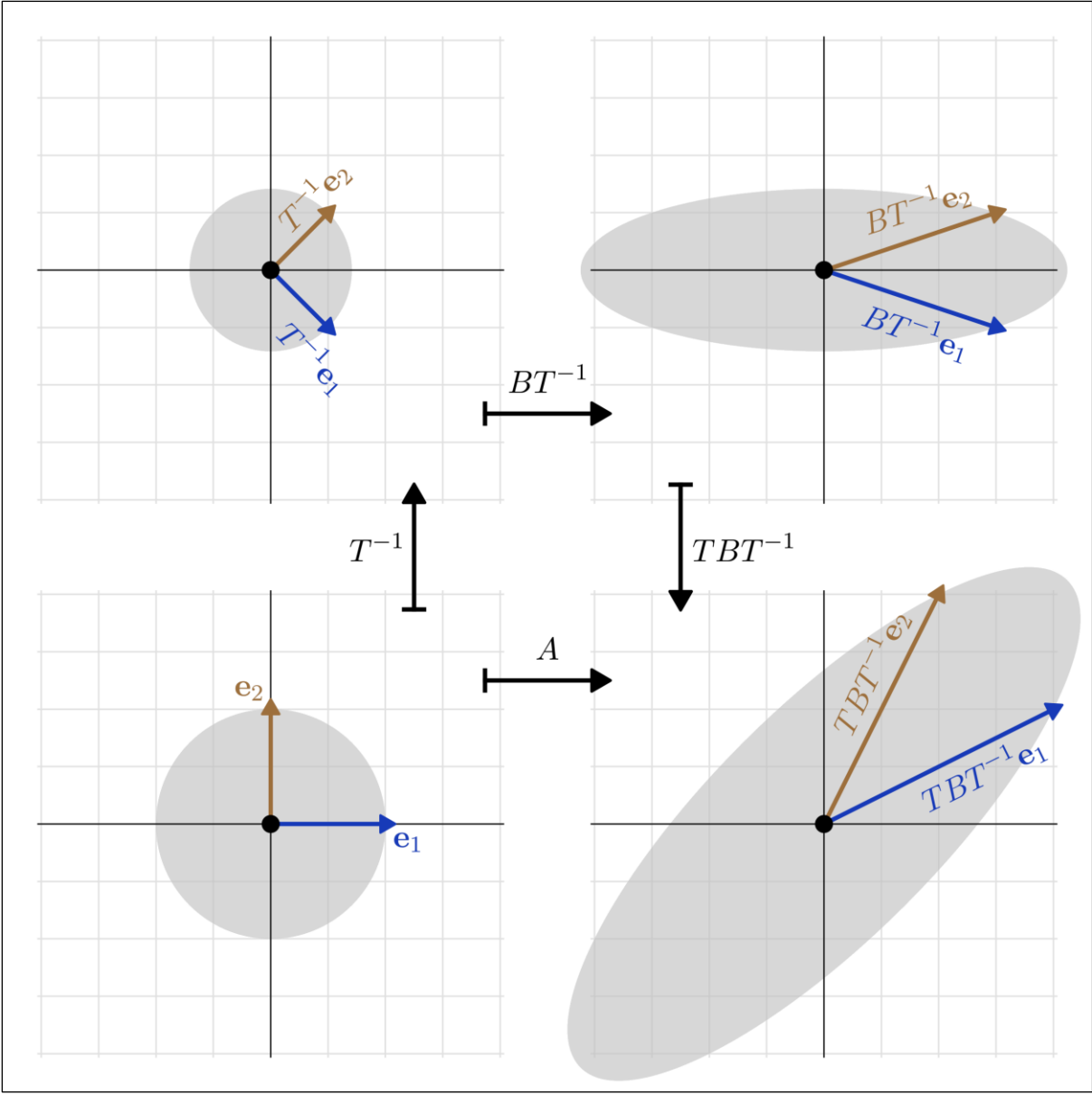


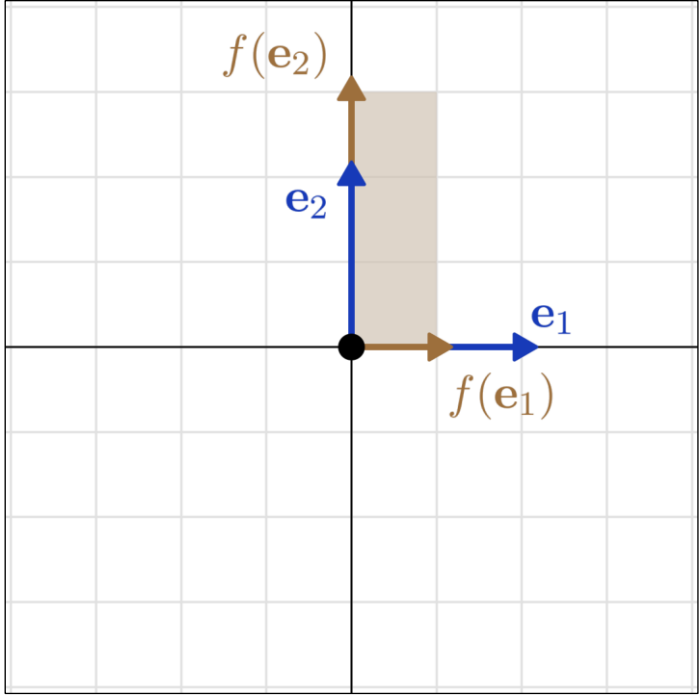
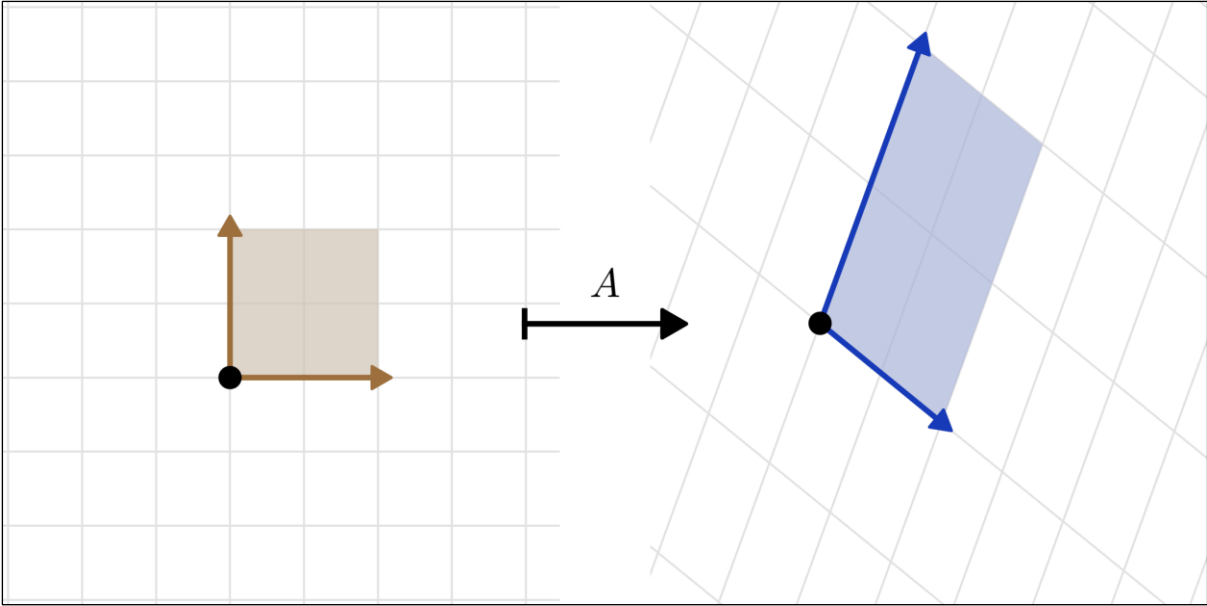


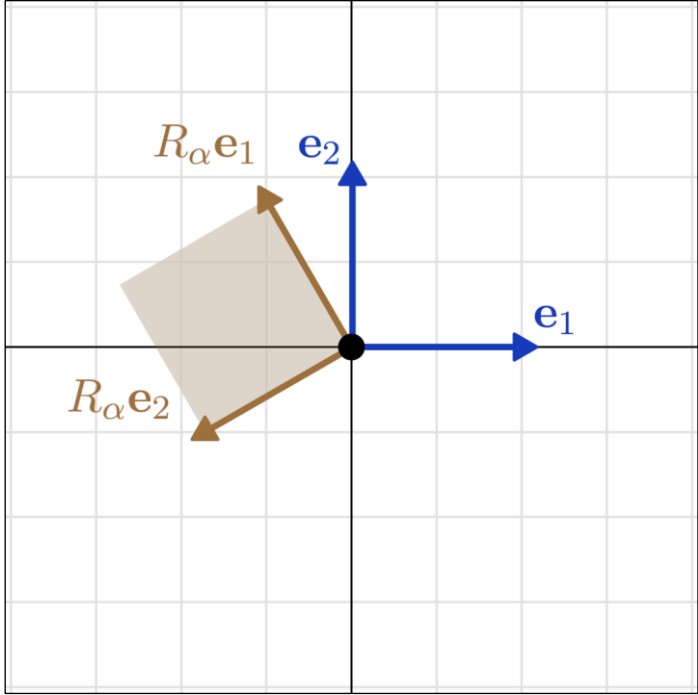
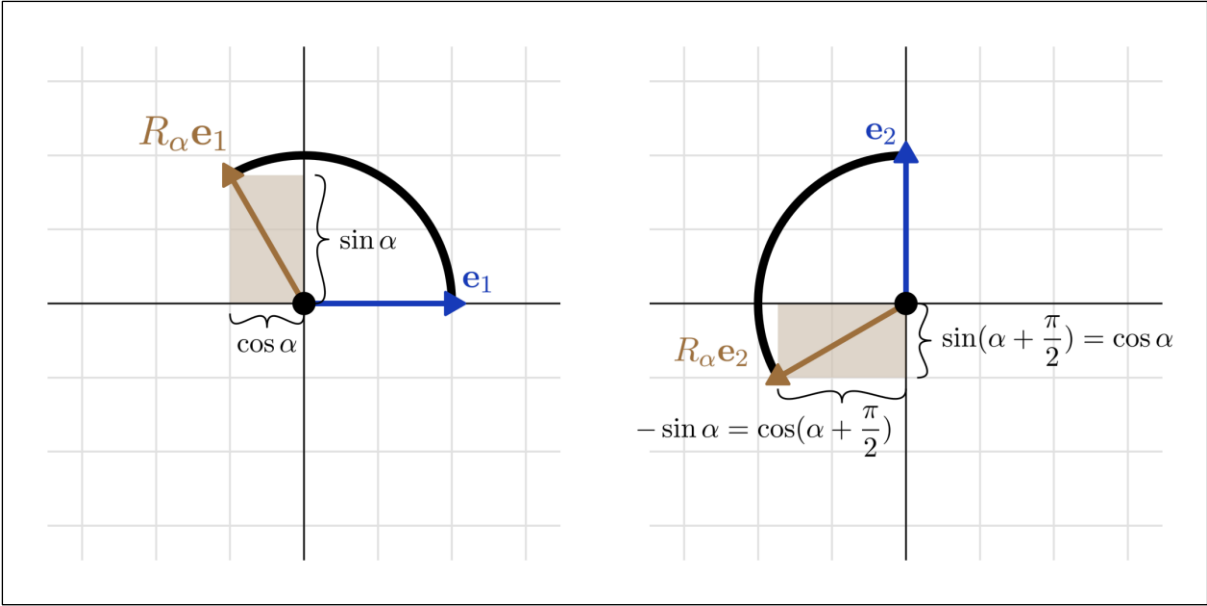
Chapter 4: Linear Transformations

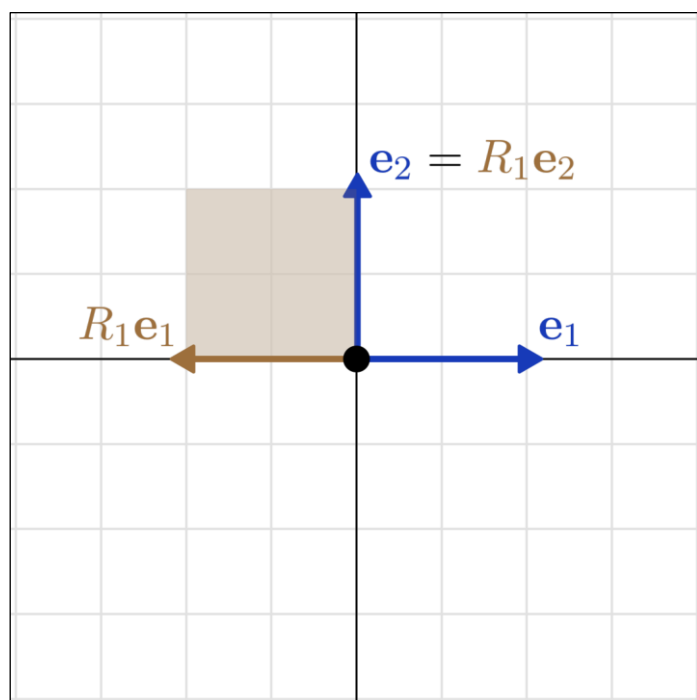
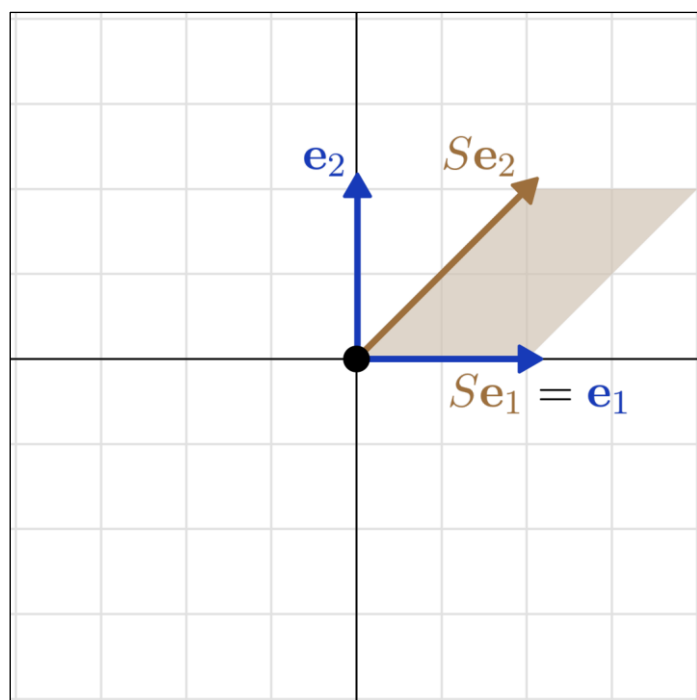


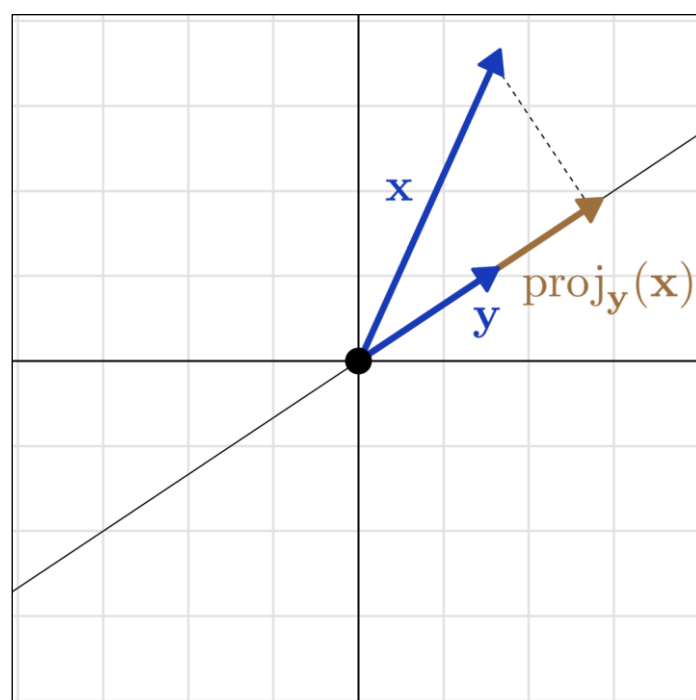
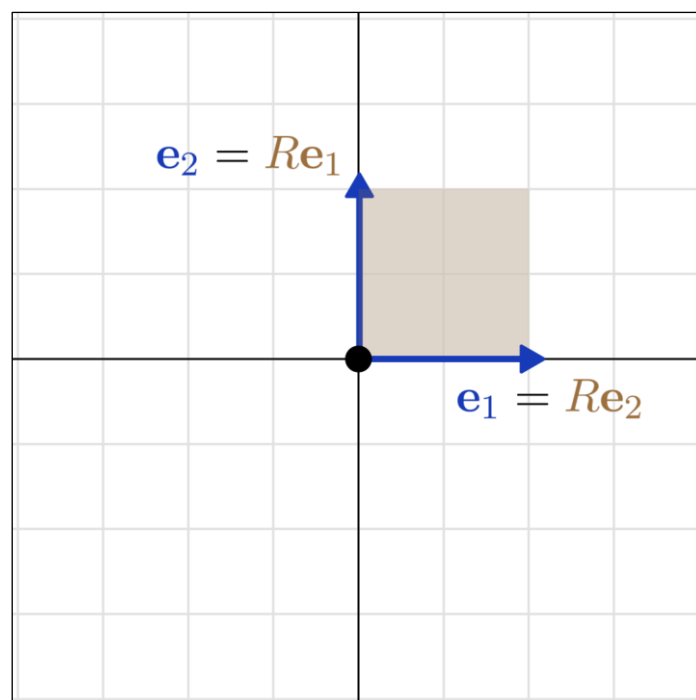


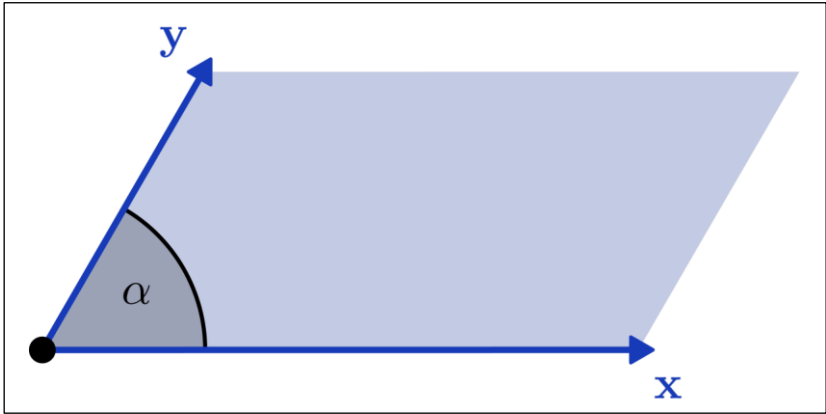
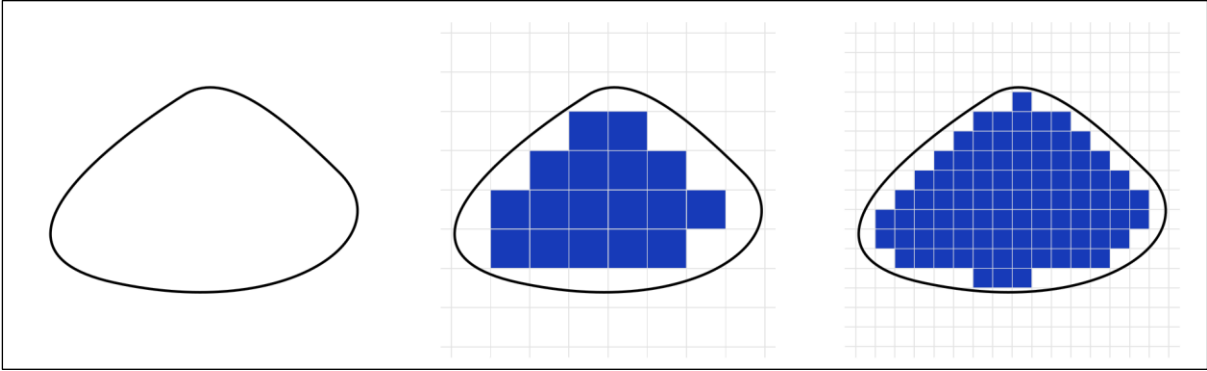
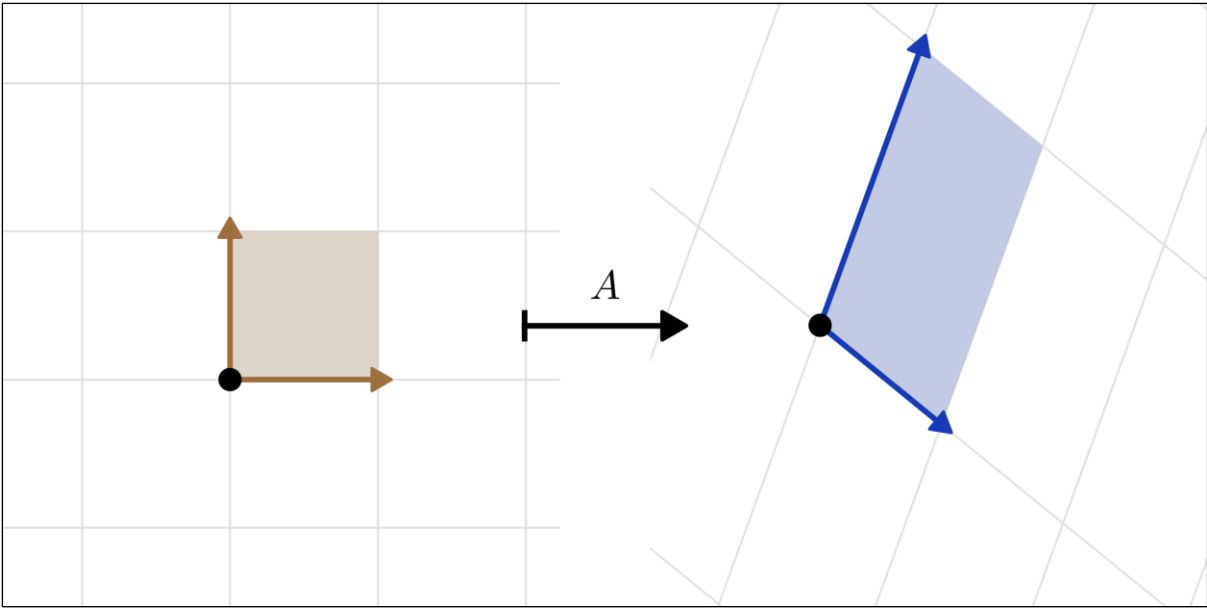


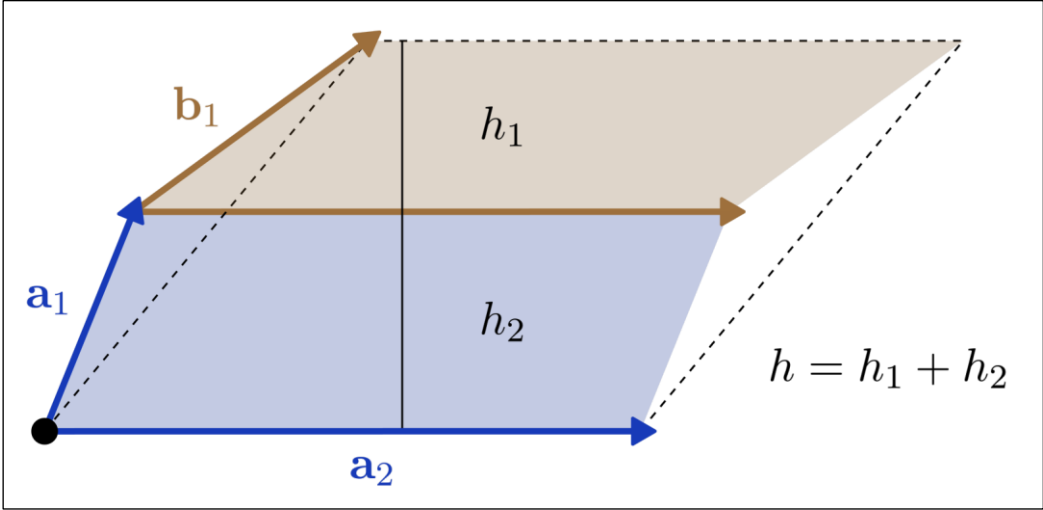
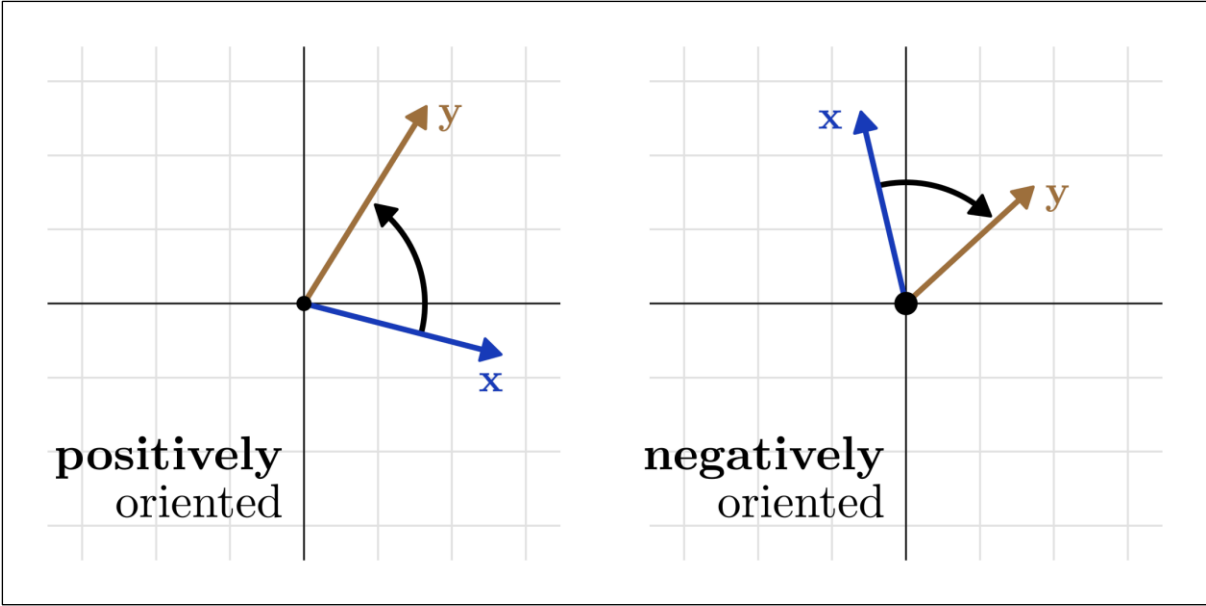












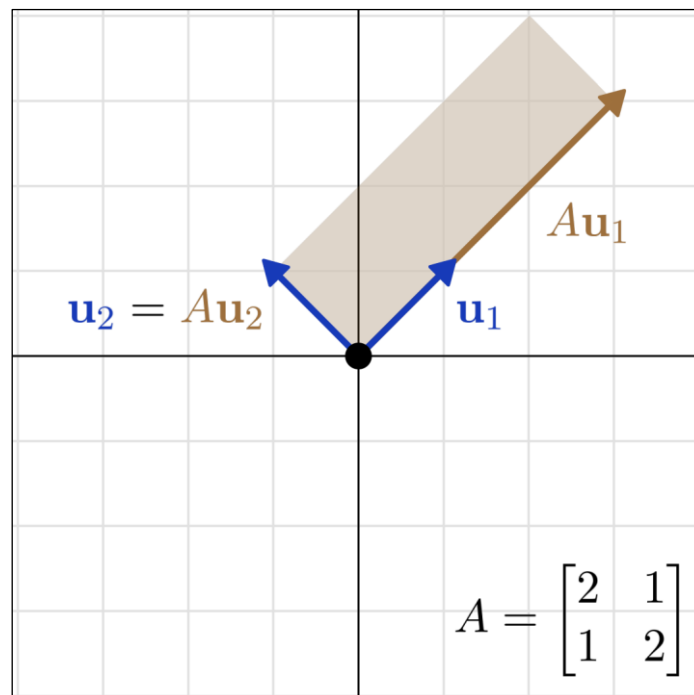
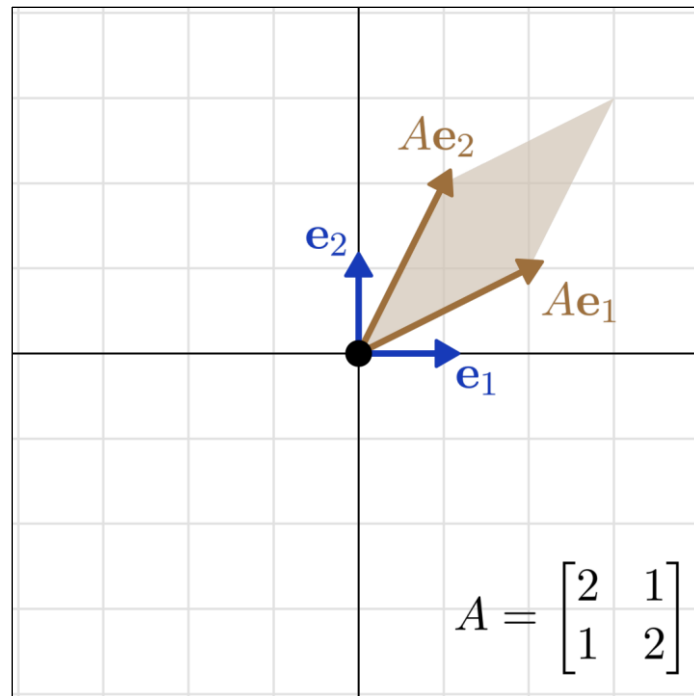
a_{11}	a_{12}	a_{13}	a_{14}	a_{15}
a_{21}	a_{22}	a_{23}	a_{24}	a_{25}
a_{31}	a_{32}	a_{33}	a_{34}	a_{35}
a_{41}	a_{42}	a_{43}	a_{44}	a_{45}
a_{51}	a_{52}	a_{53}	a_{54}	a_{55}

↔

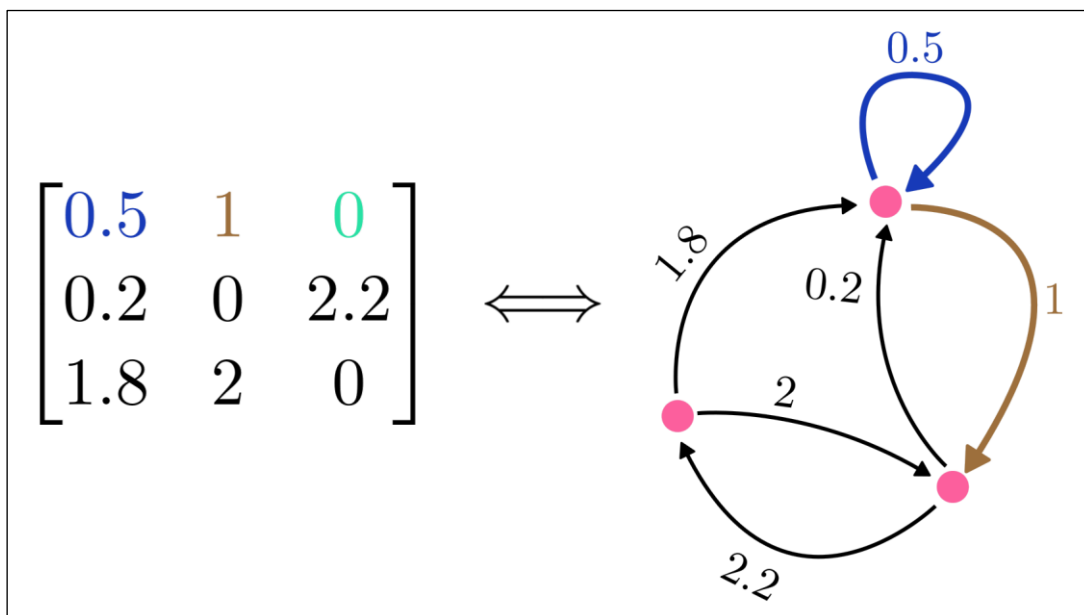
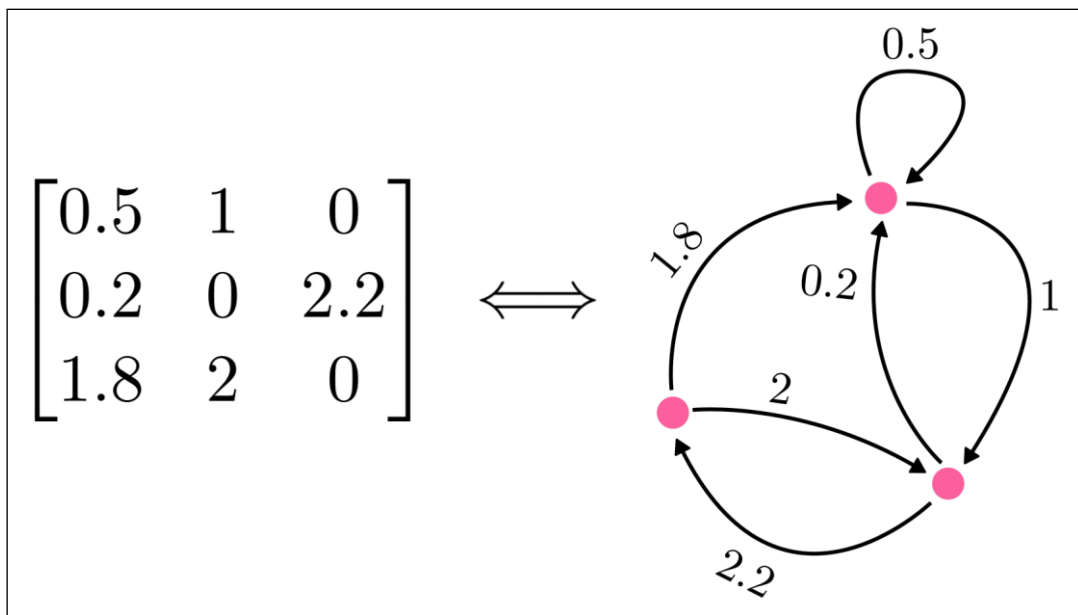
	$\mathbf{a}_1$			
$\mathbf{a}_2$				
			$\mathbf{a}_3$	
		$\mathbf{a}_4$		
				$\mathbf{a}_5$

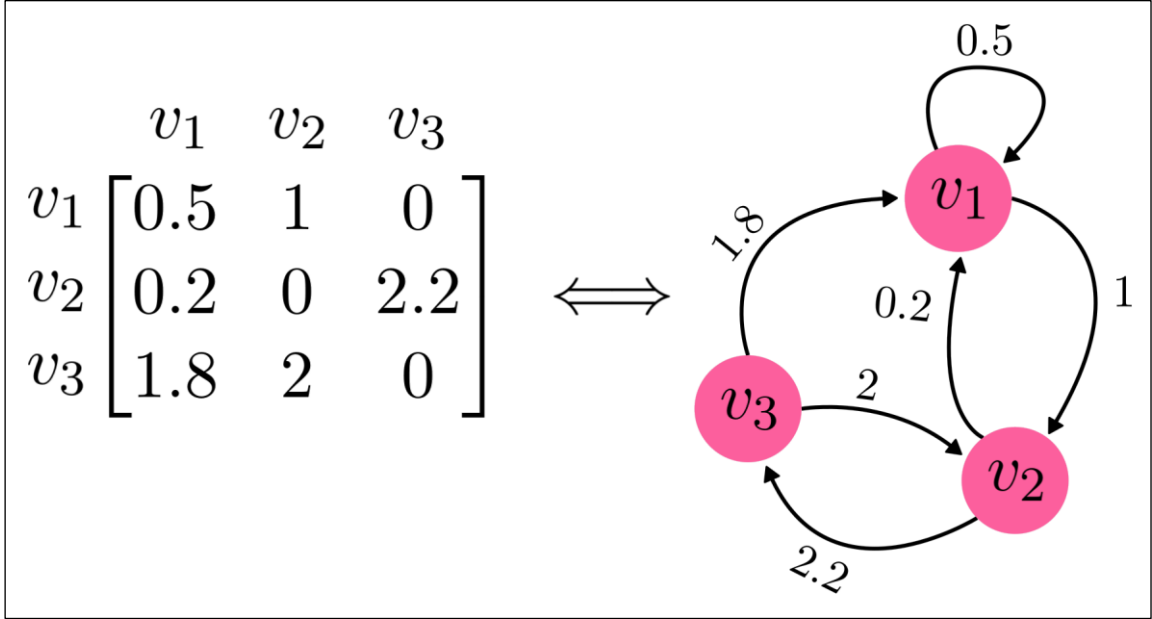
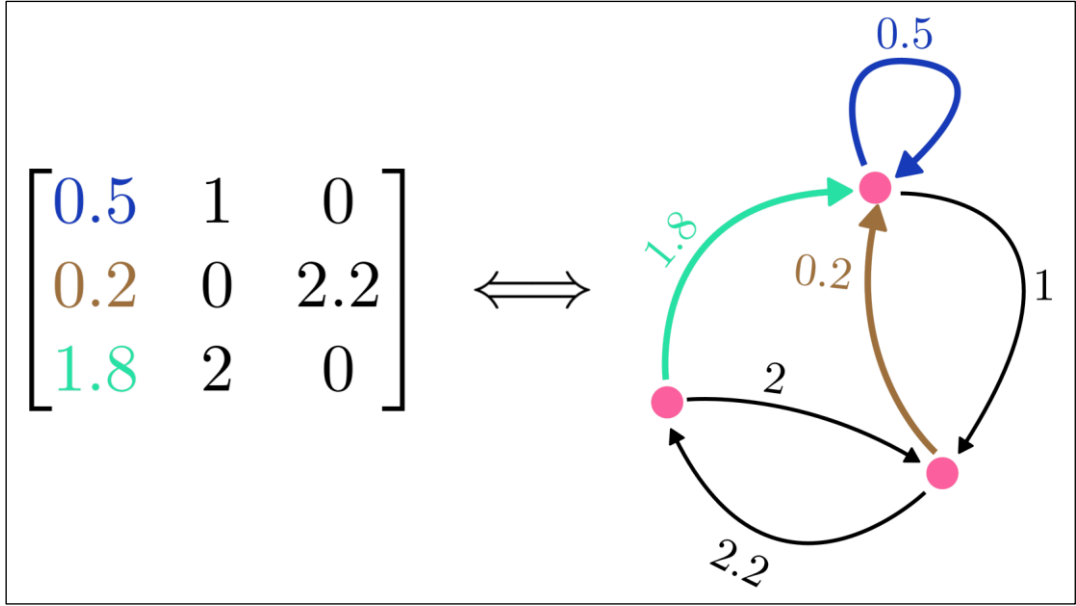
$\sigma(1) = 2, \quad \sigma(2) = 1, \quad \sigma(3) = 4, \quad \sigma(4) = 3, \quad \sigma(5) = 5$

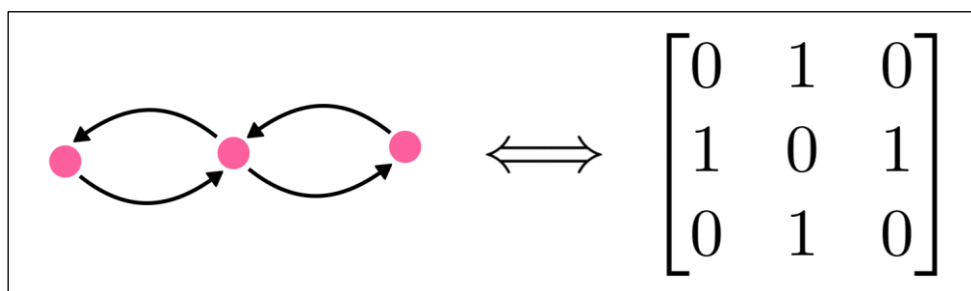
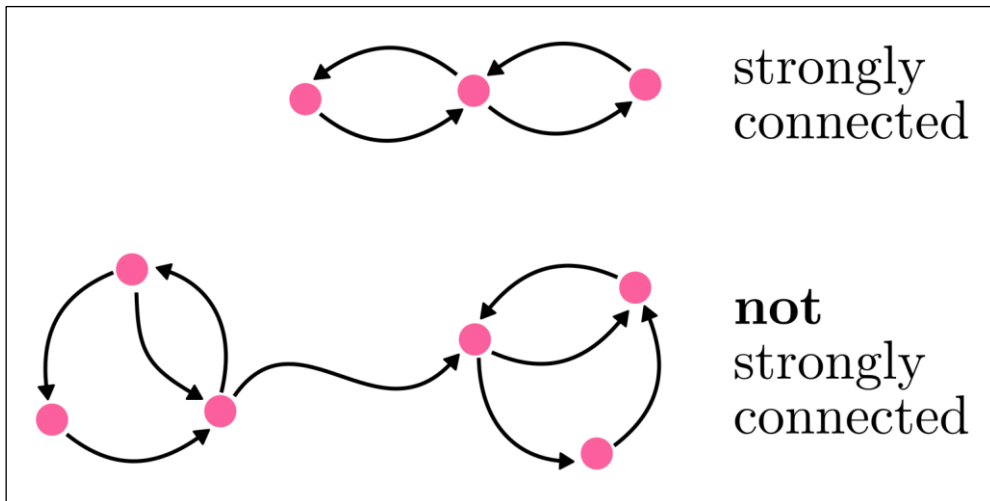
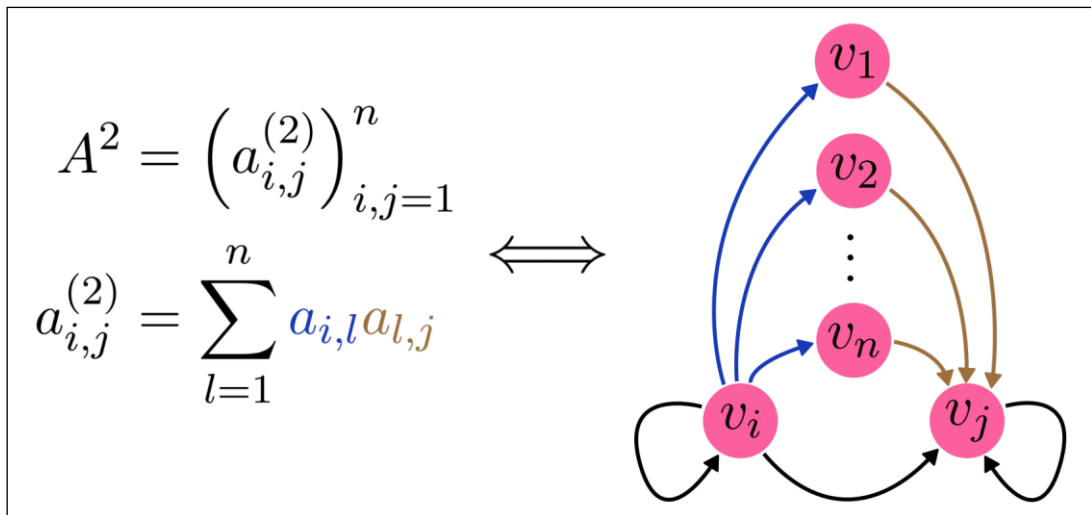
Chapter 6: Eigenvalues and Eigenvectors



Chapter 8: Matrices and Graphs

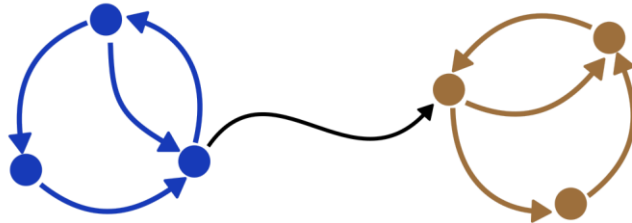




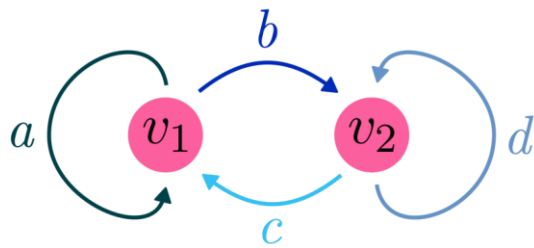
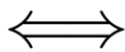


1st strongly
connected
component

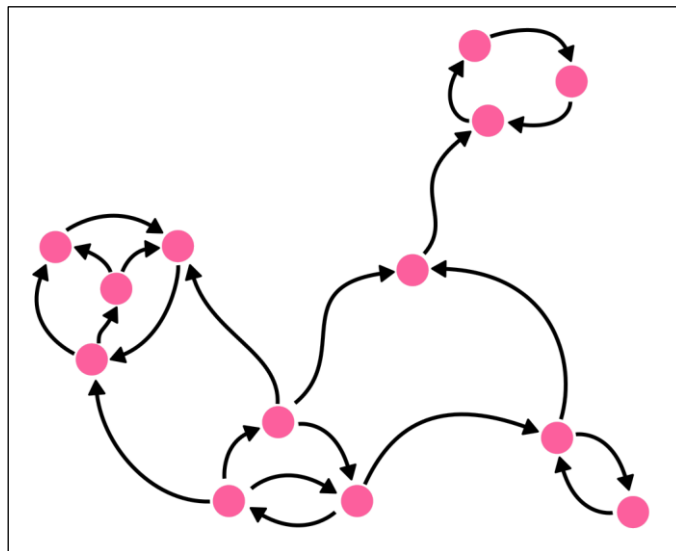
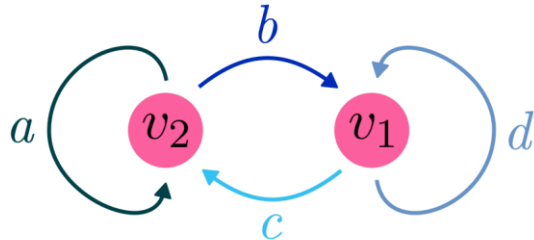
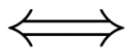
2nd strongly
connected
component

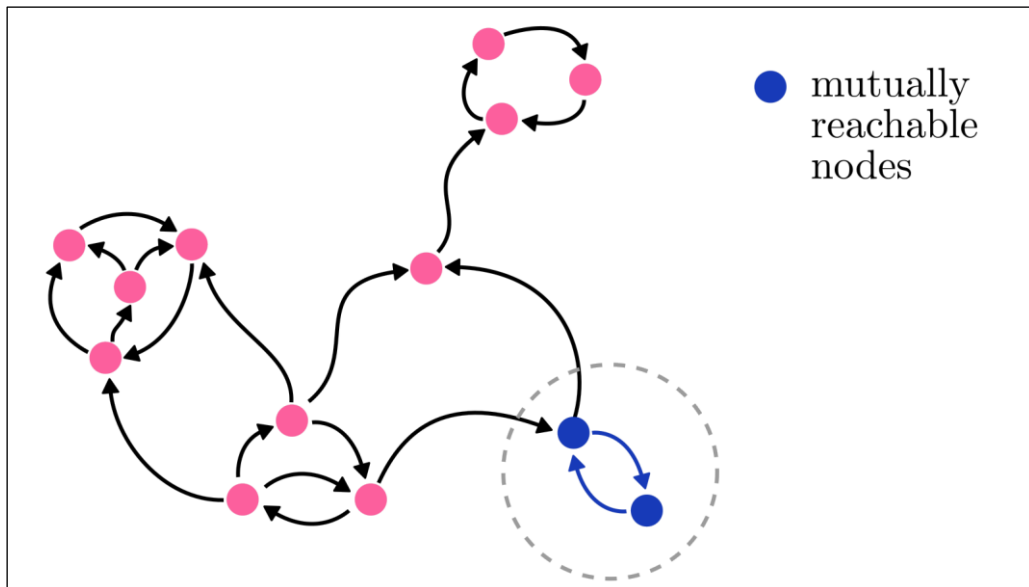
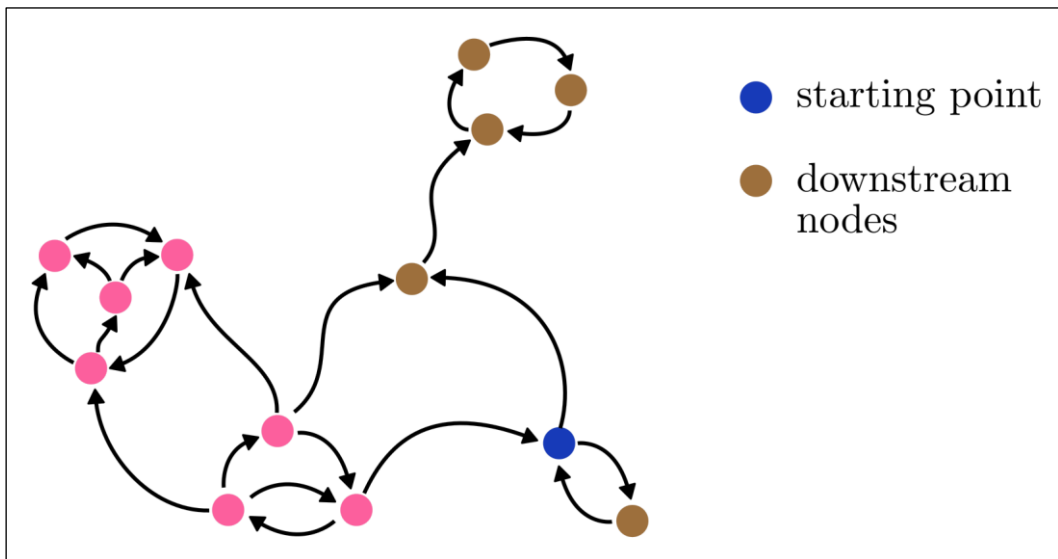


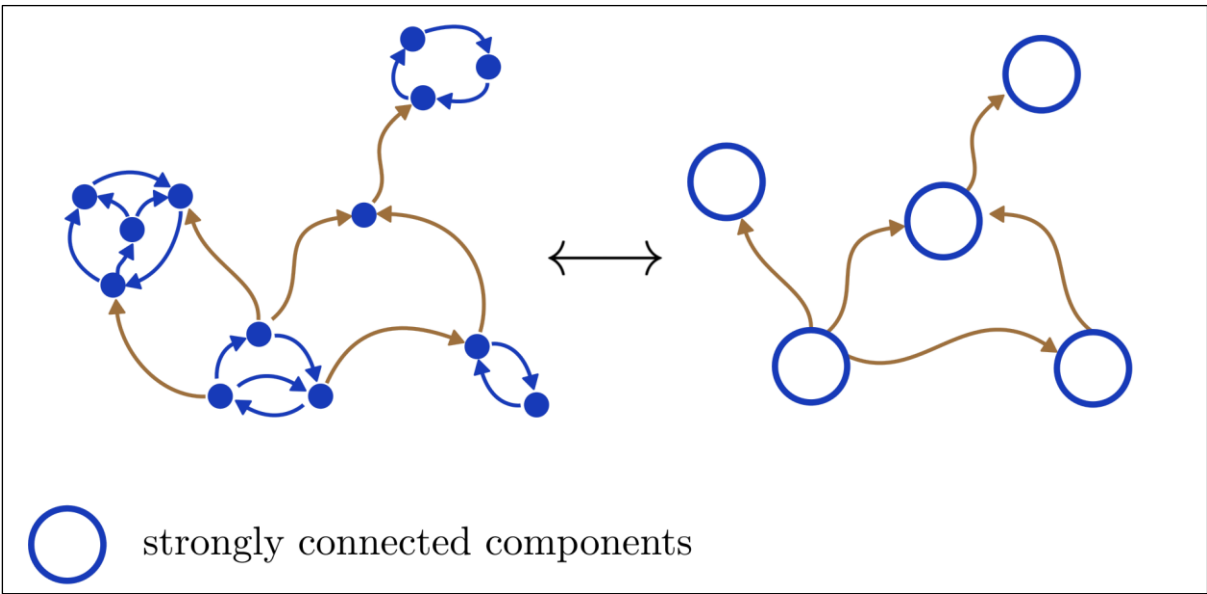
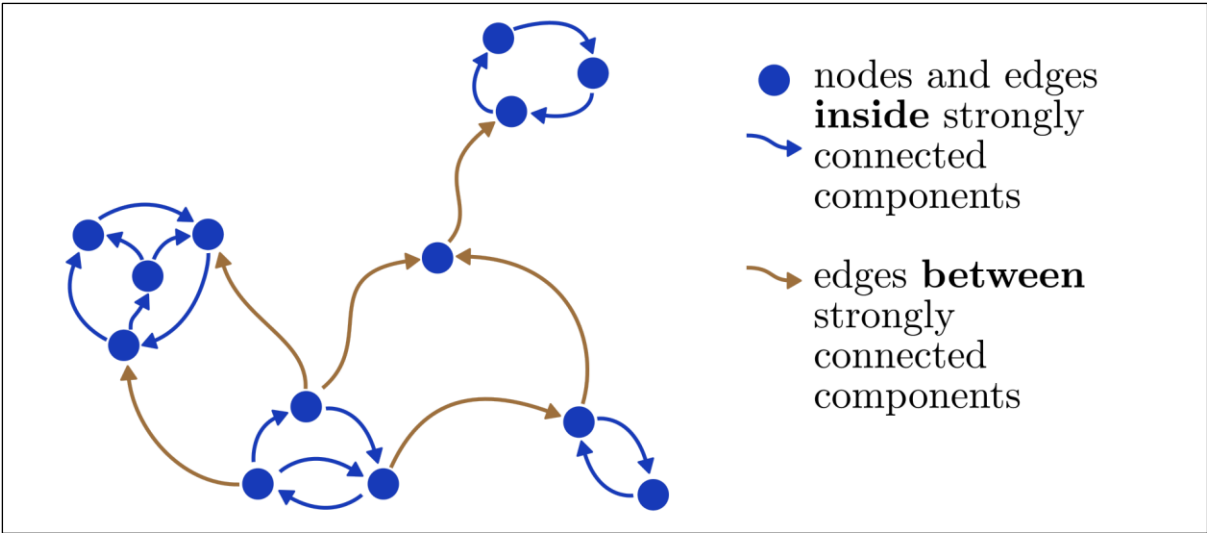
$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

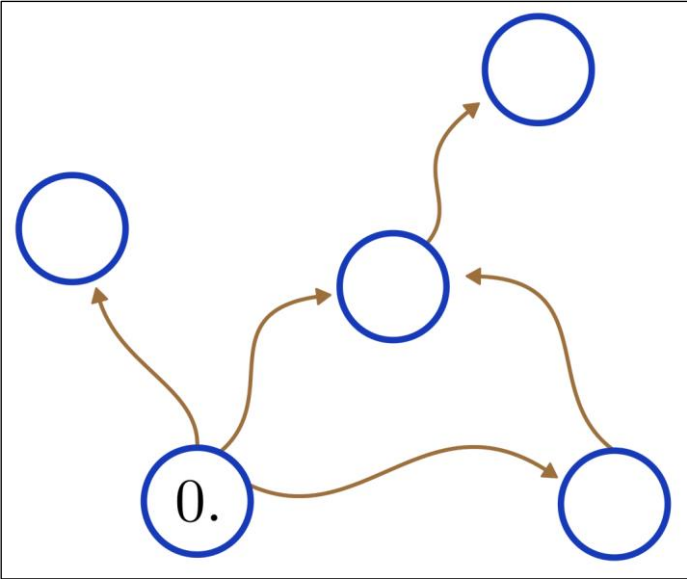


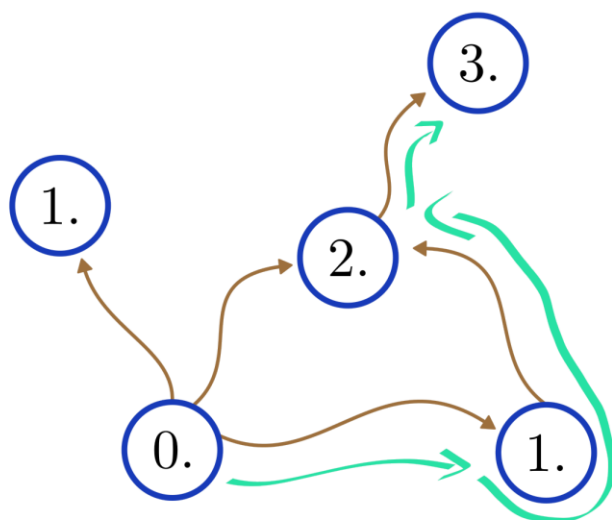
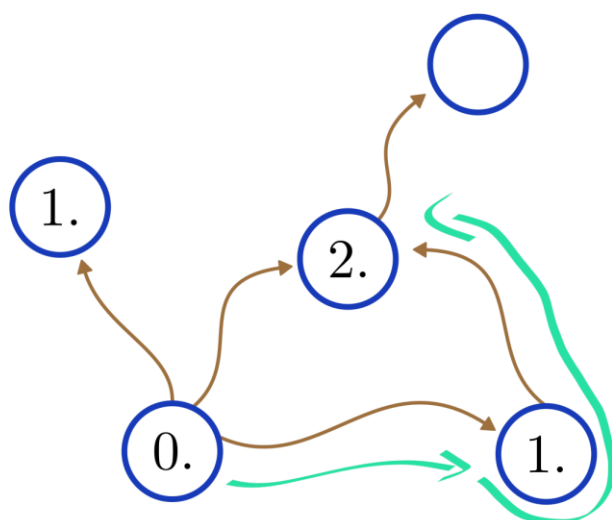
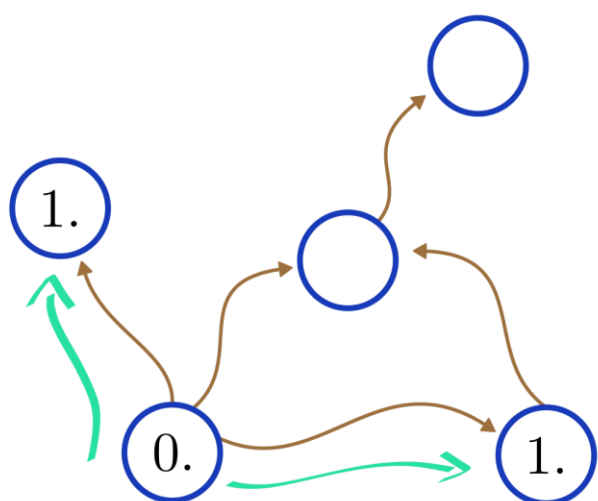
$$\begin{bmatrix} d & c \\ b & a \end{bmatrix}$$

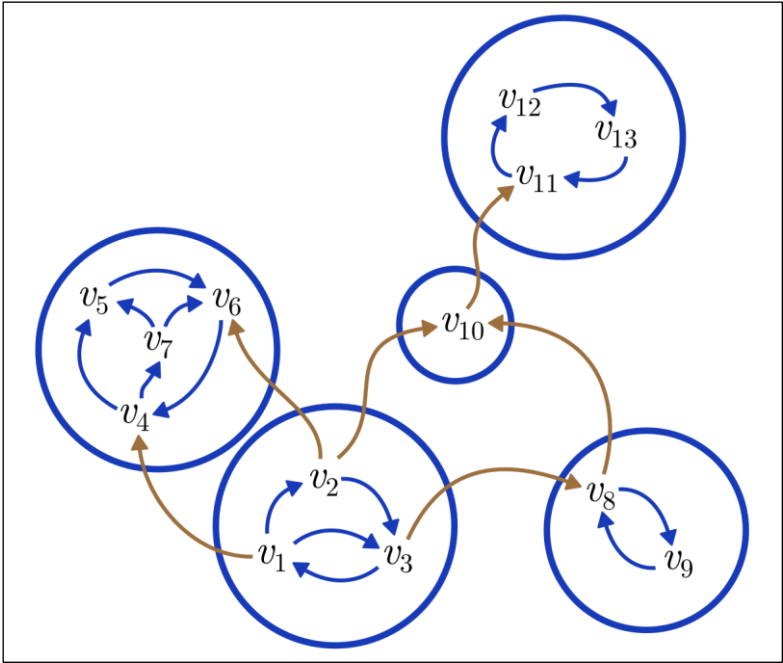
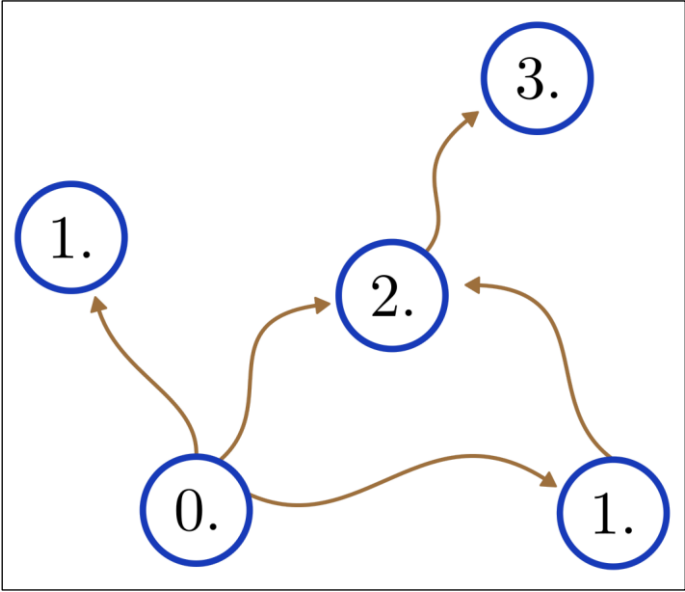




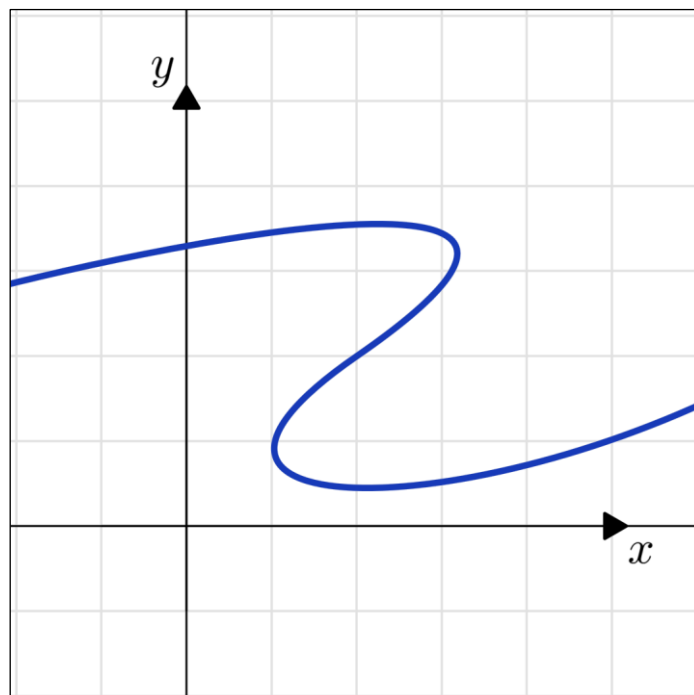
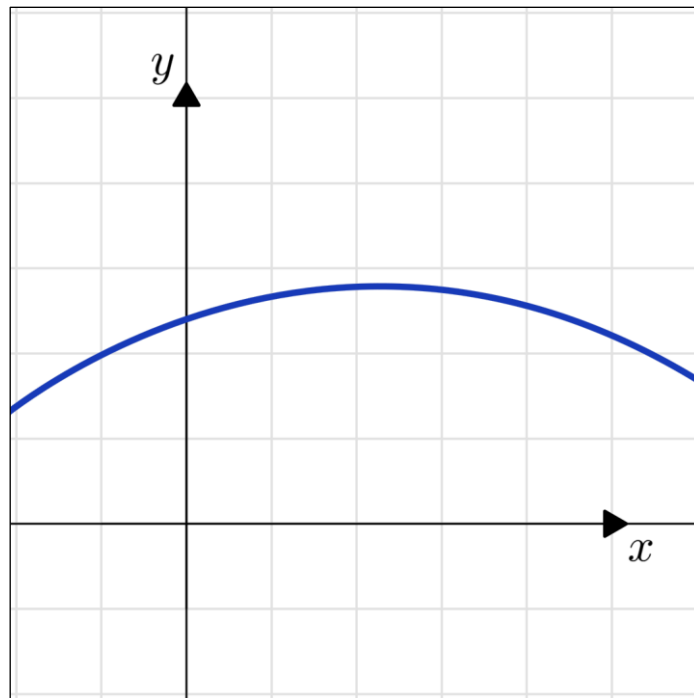


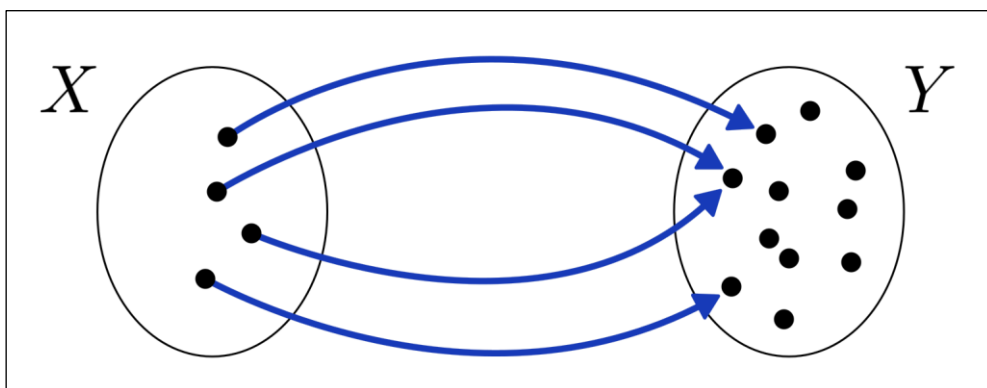
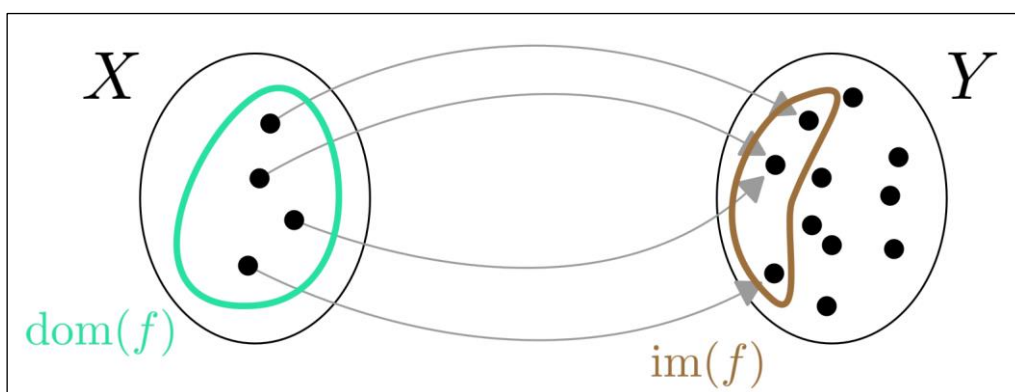
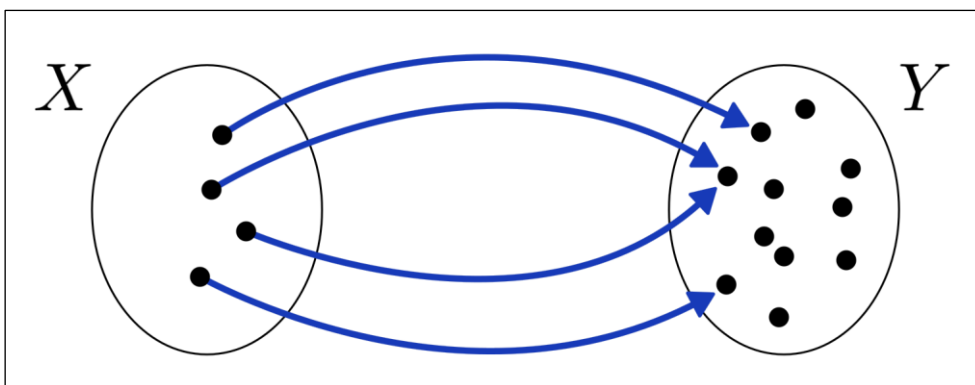




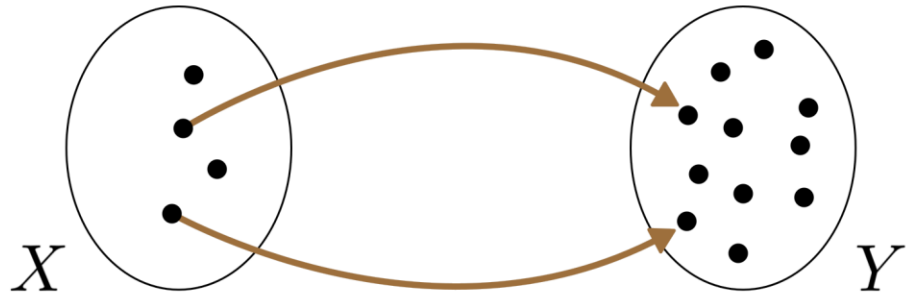


Chapter 9: Functions

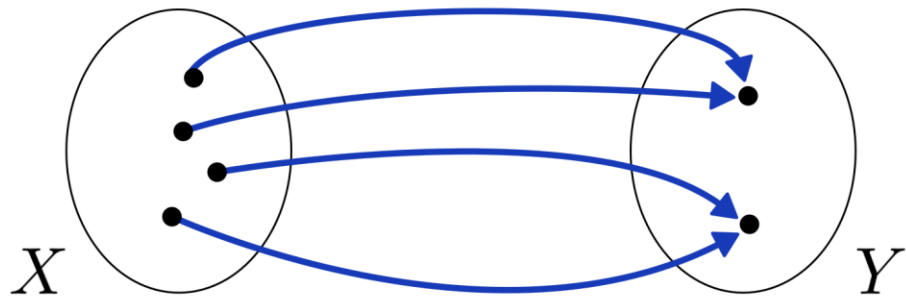




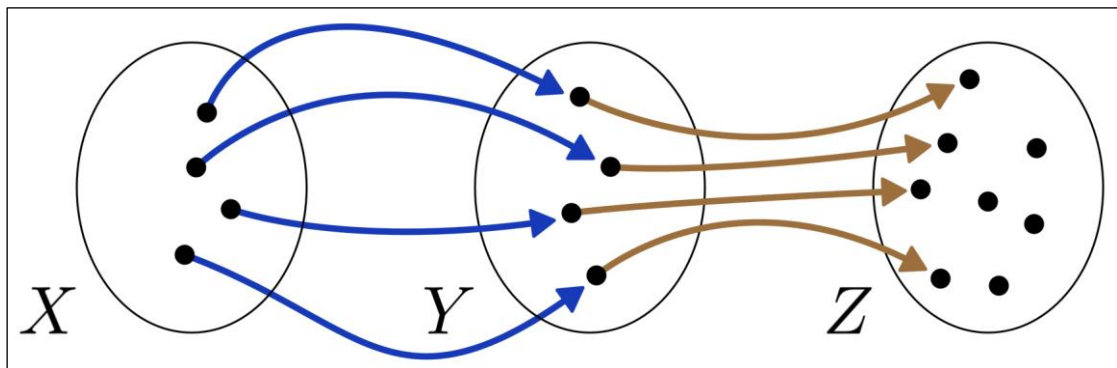
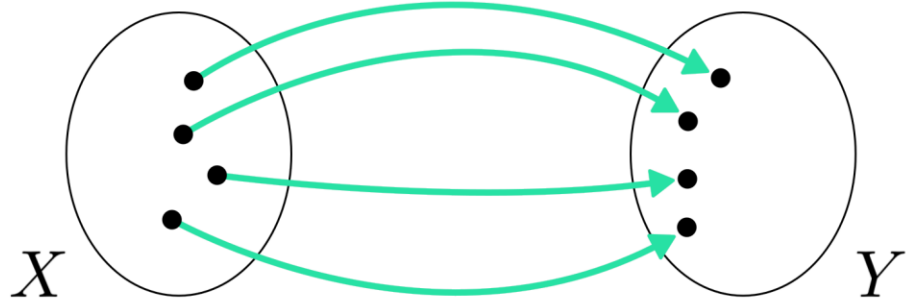
injective

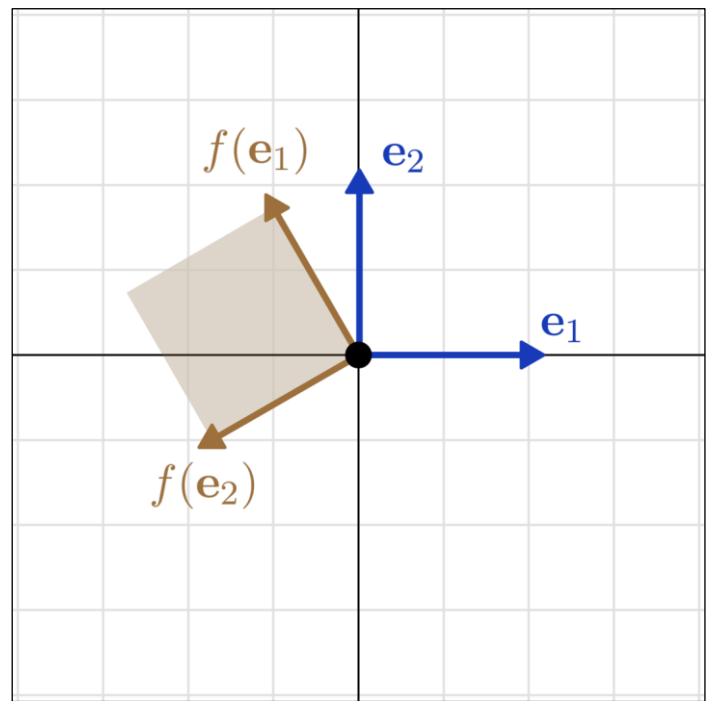
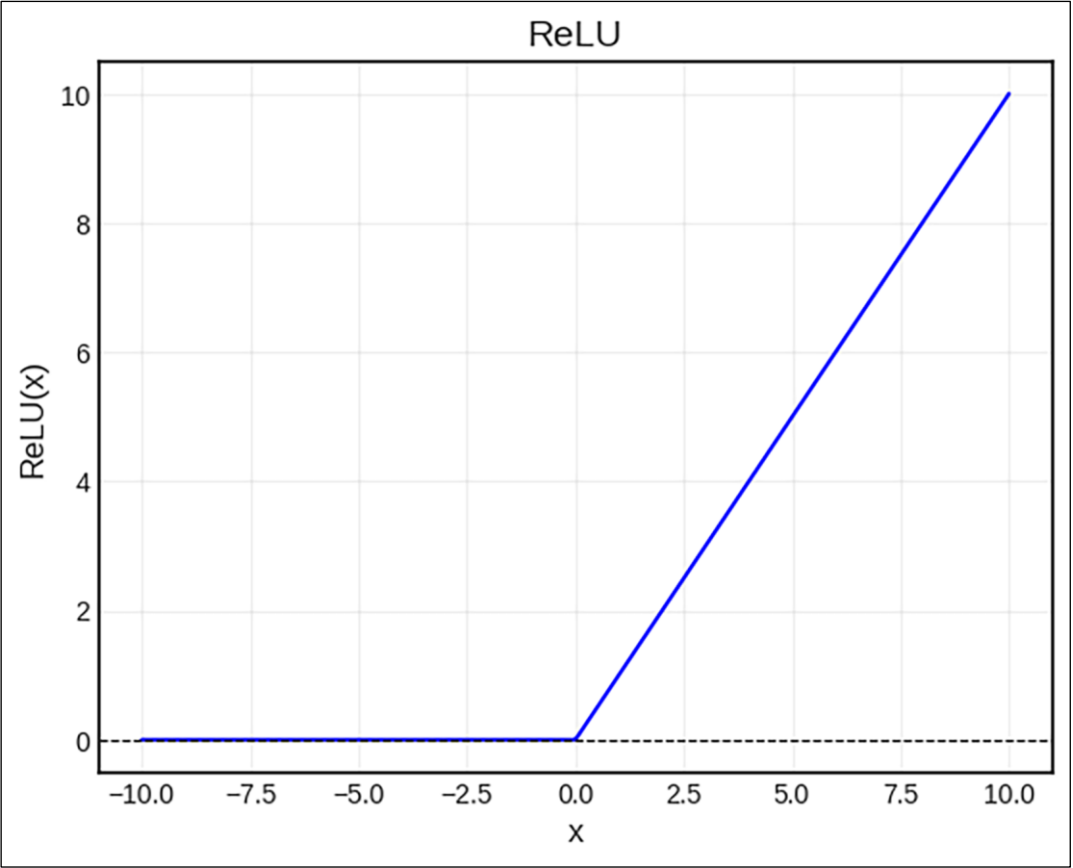


surjective



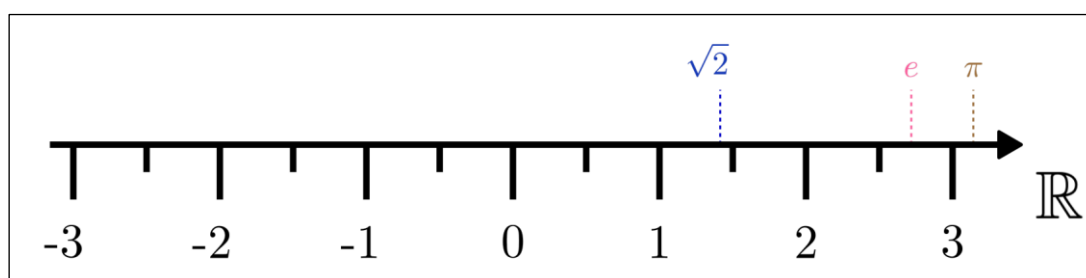
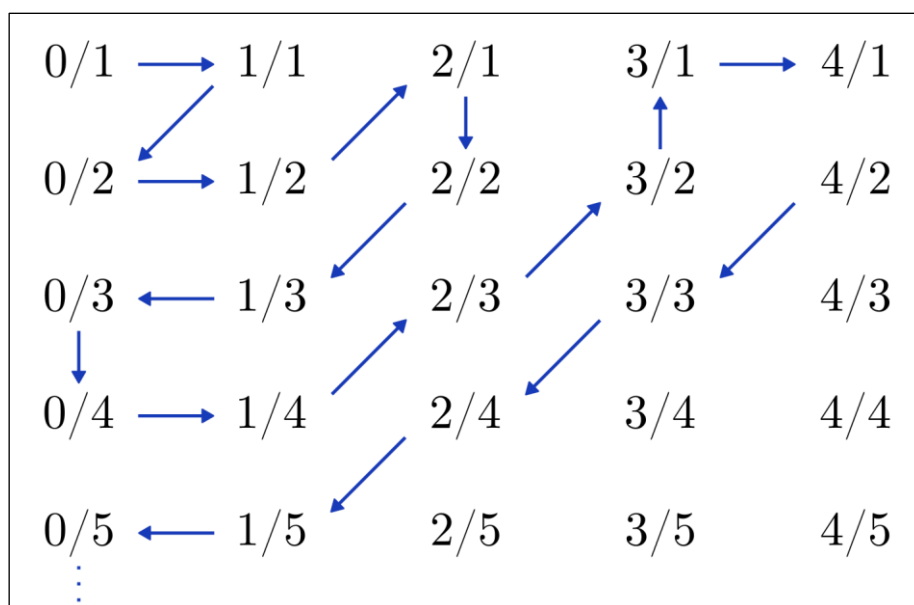
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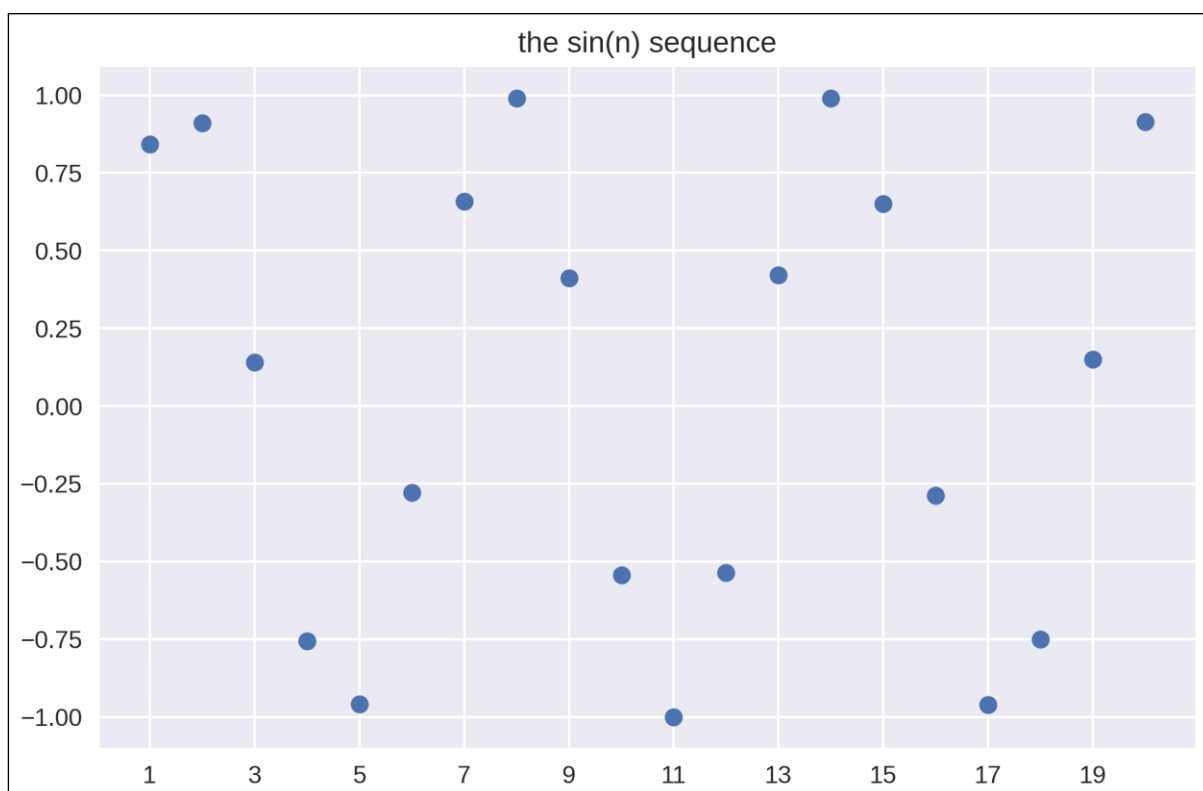
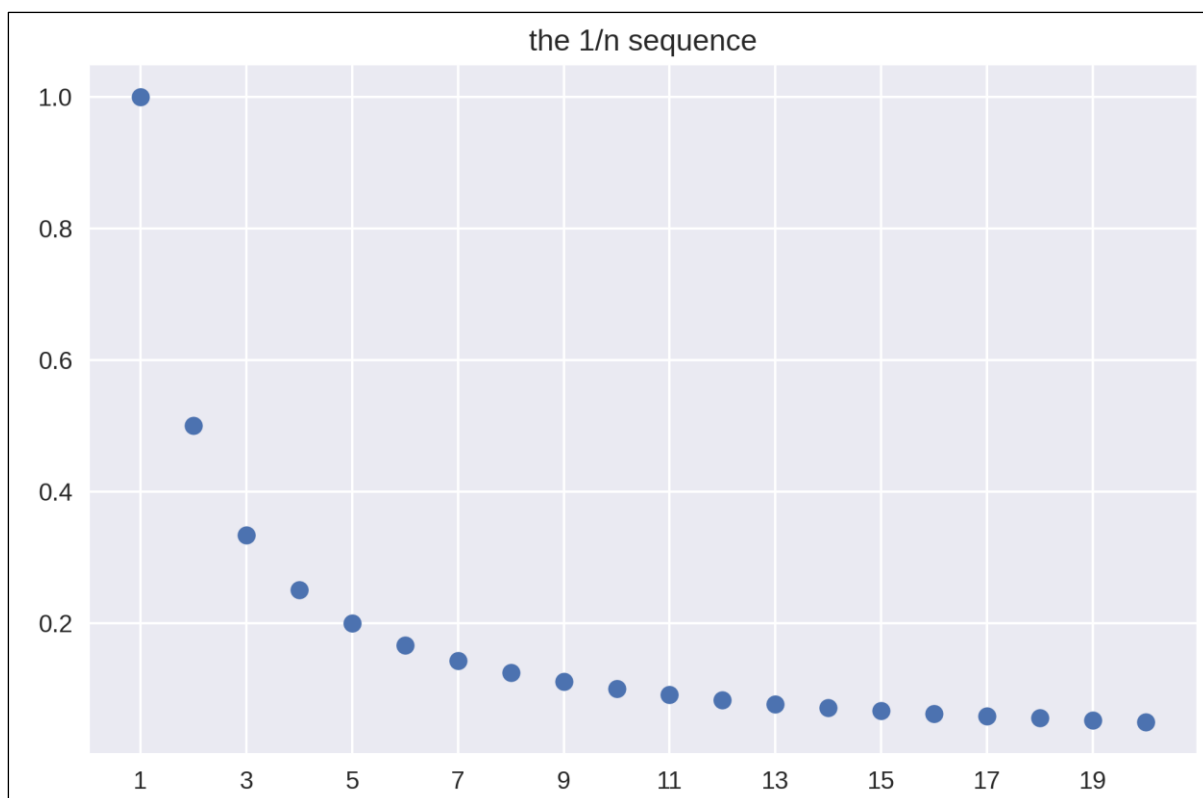


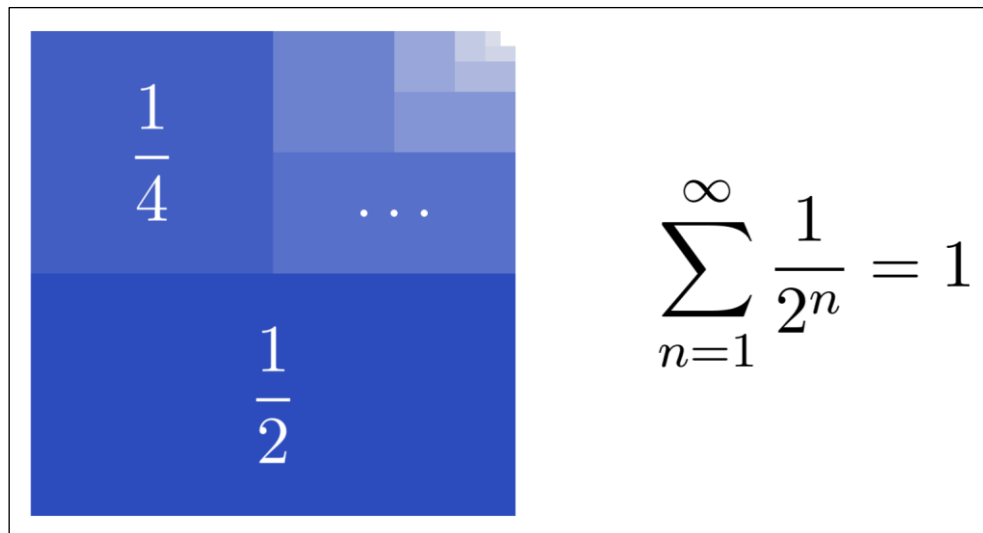
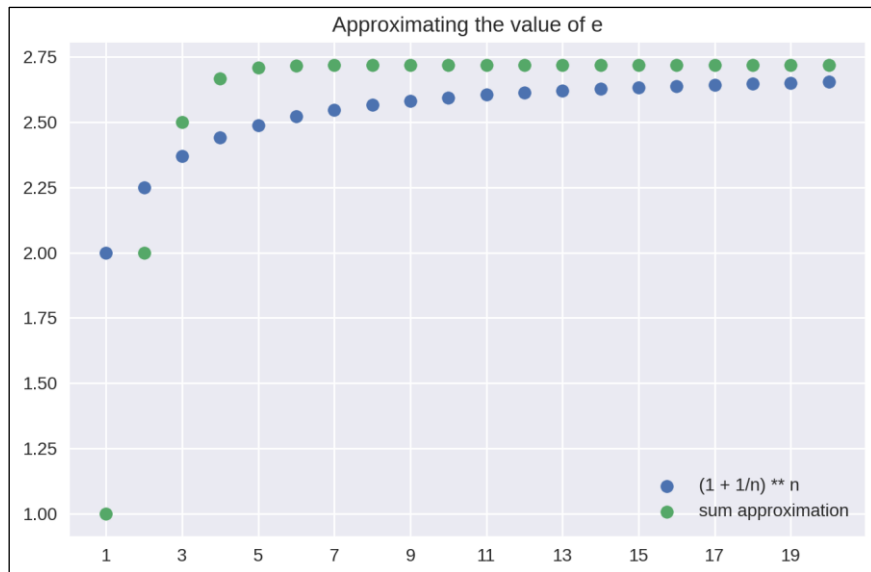


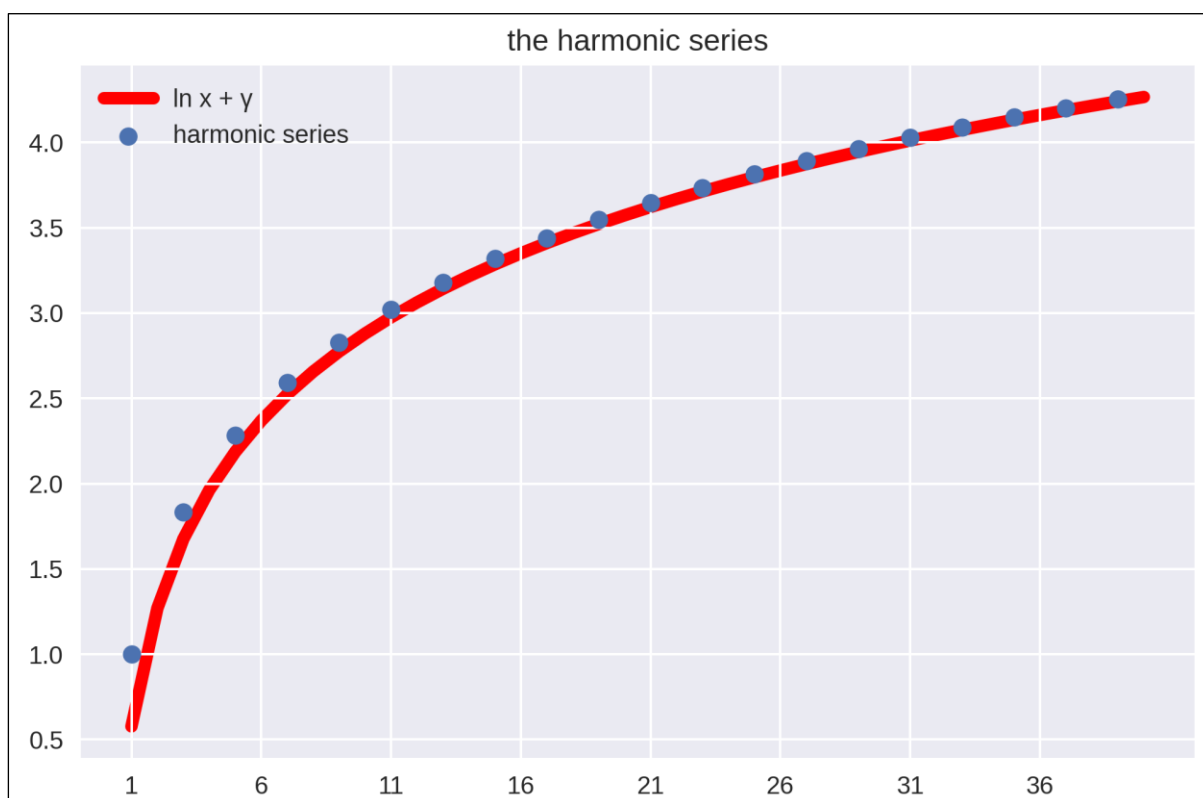
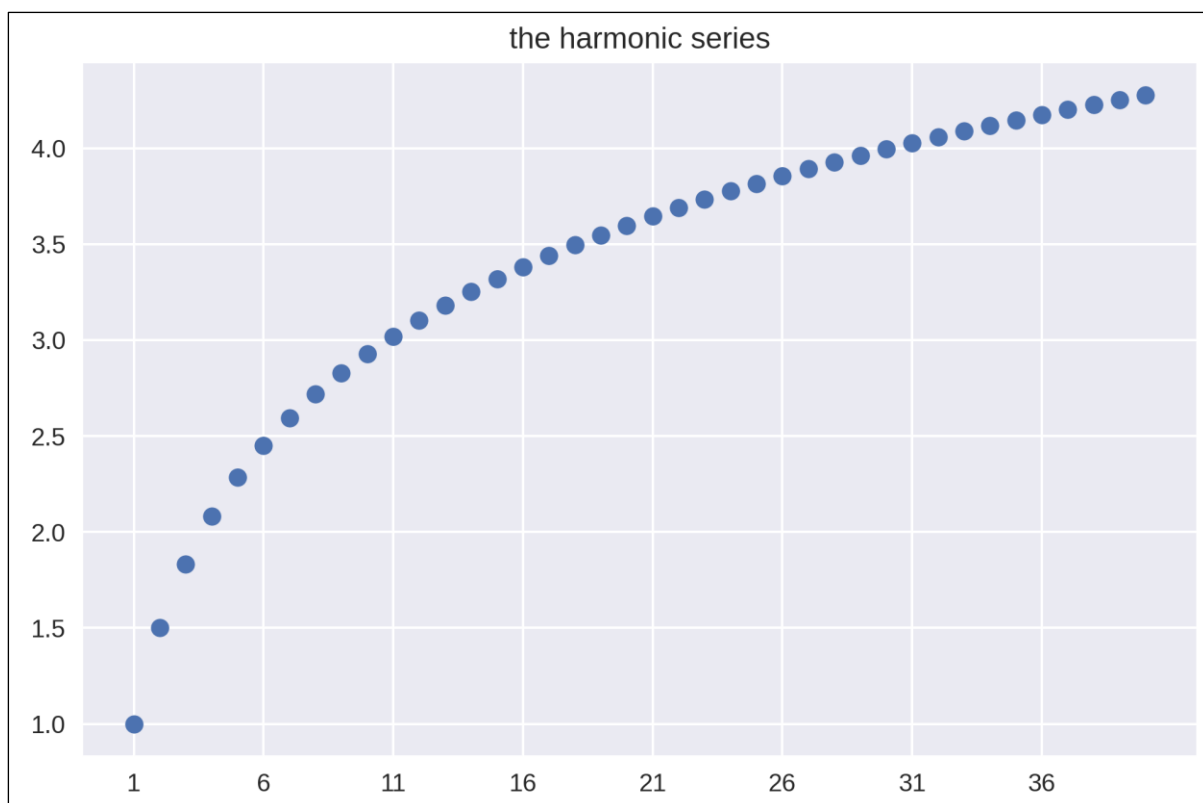


Chapter 10: Numbers, Sequences, and Series









$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \frac{1}{7} - \frac{1}{8} + \frac{1}{9} - \dots$$

$$1 - \frac{1}{2} - \frac{1}{4} + \frac{1}{3} - \frac{1}{6} - \frac{1}{8} + \frac{1}{5} - \frac{1}{10} - \frac{1}{12} + \dots$$

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \frac{1}{7} - \frac{1}{8} + \frac{1}{9} - \dots$$

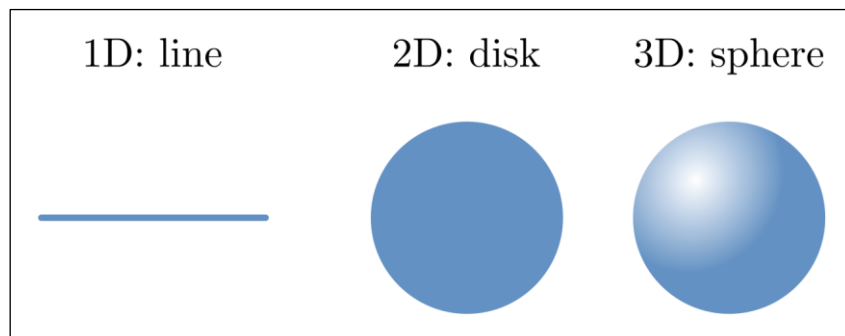
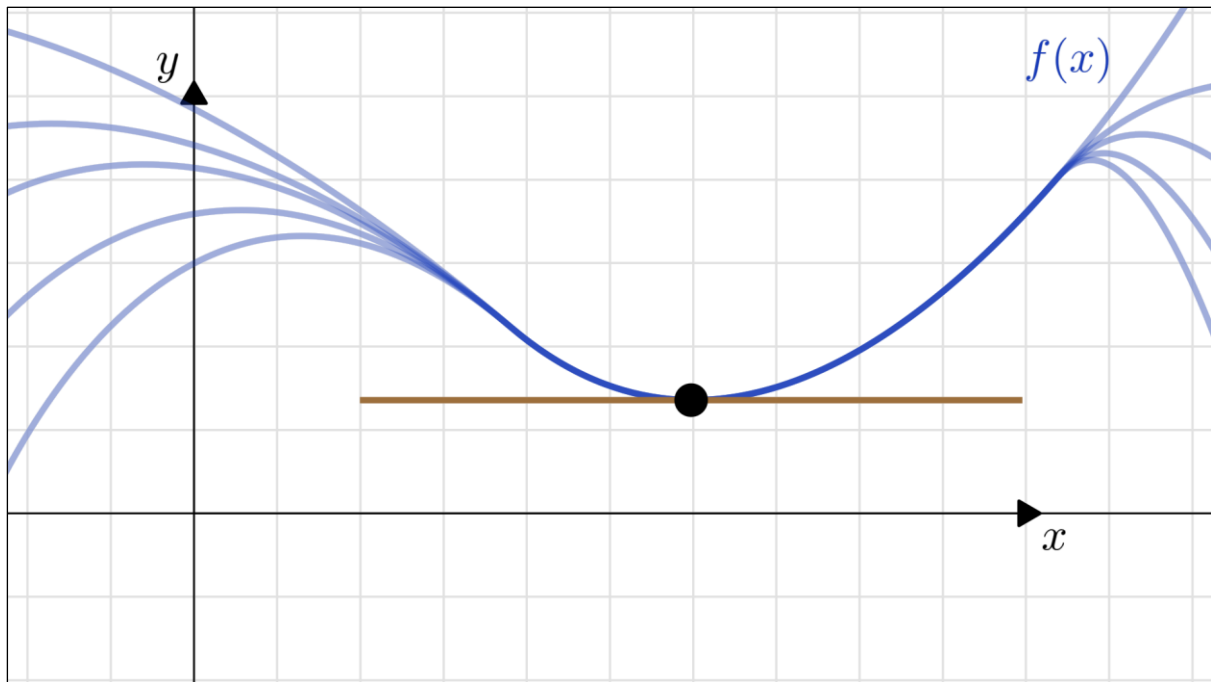
$$\underbrace{1 - \frac{1}{2} - \frac{1}{4}}_{=\frac{1}{2}} + \underbrace{\frac{1}{3} - \frac{1}{6} - \frac{1}{8}}_{=\frac{1}{6}} + \underbrace{\frac{1}{5} - \frac{1}{10} - \frac{1}{12}}_{=\frac{1}{10}} + \dots$$

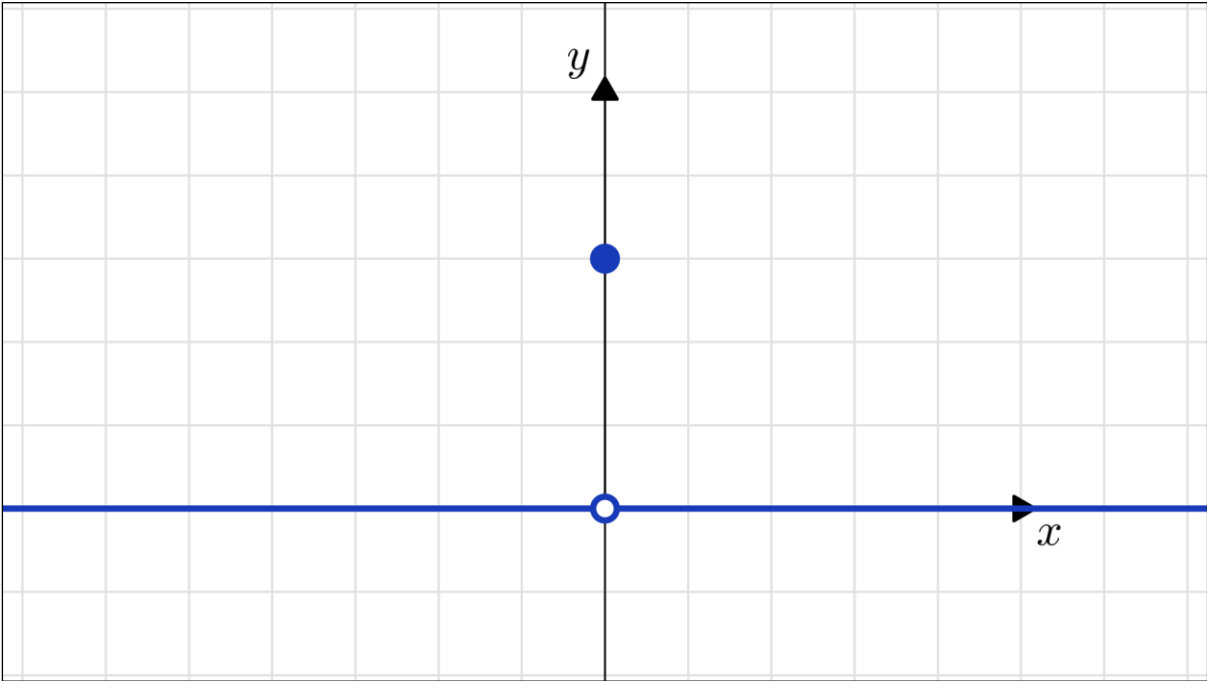
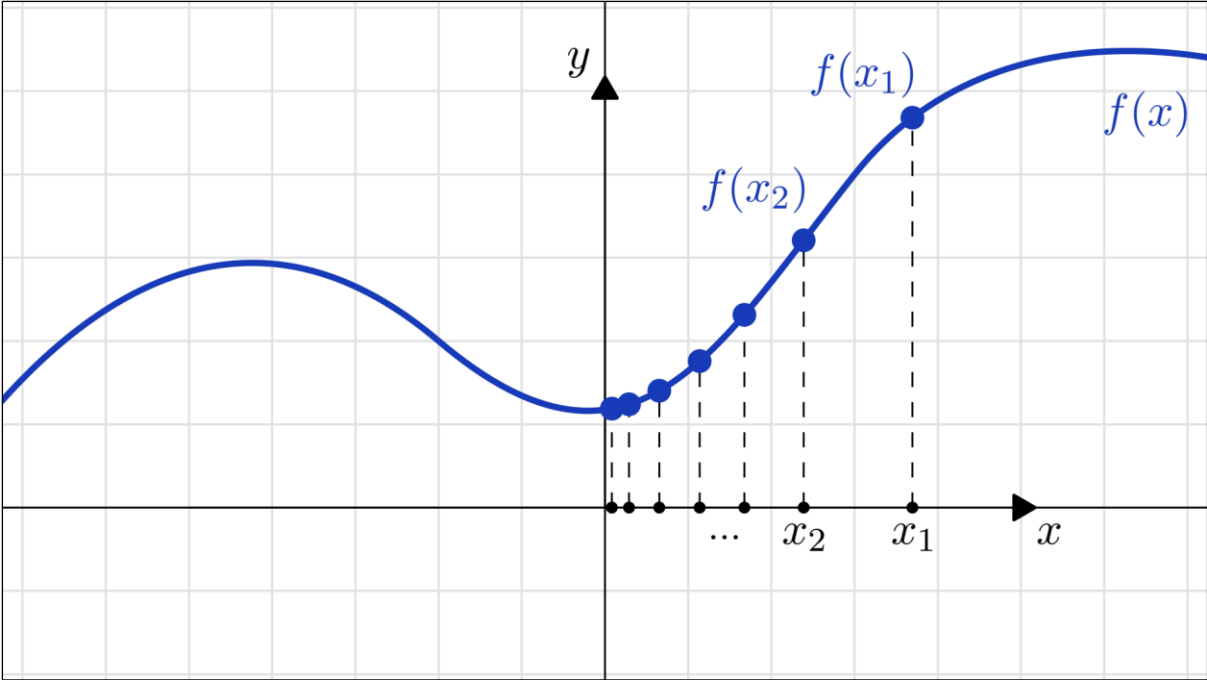
$$= \frac{1}{2} - \frac{1}{4} + \frac{1}{6} - \frac{1}{8} + \frac{1}{10} - \frac{1}{12} + \dots$$

$$= \frac{1}{2} \left(1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \dots \right)$$

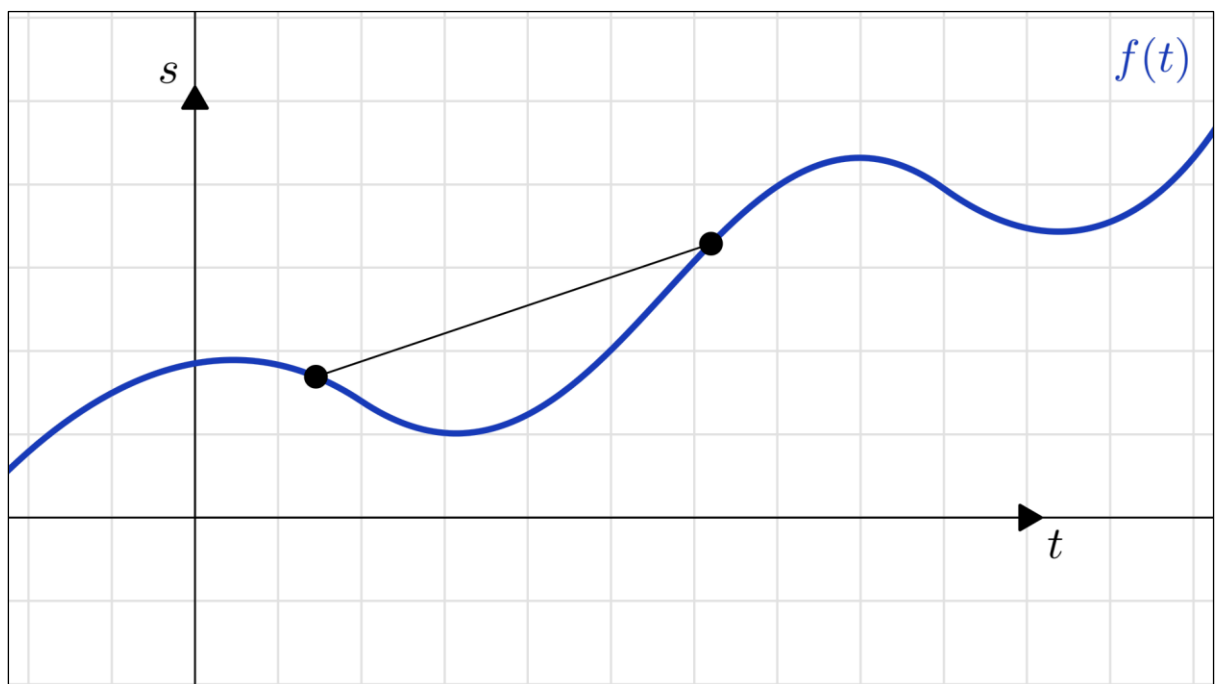
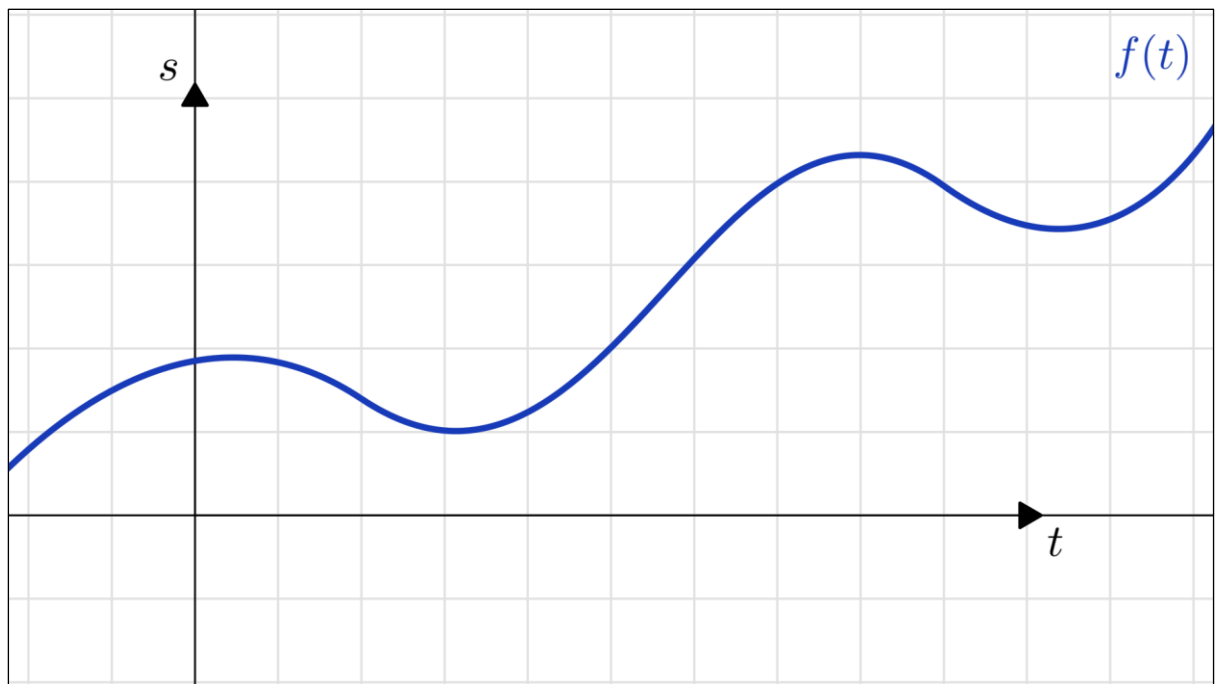
$$= \frac{1}{2} \sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n} = \frac{1}{2} \log 2$$

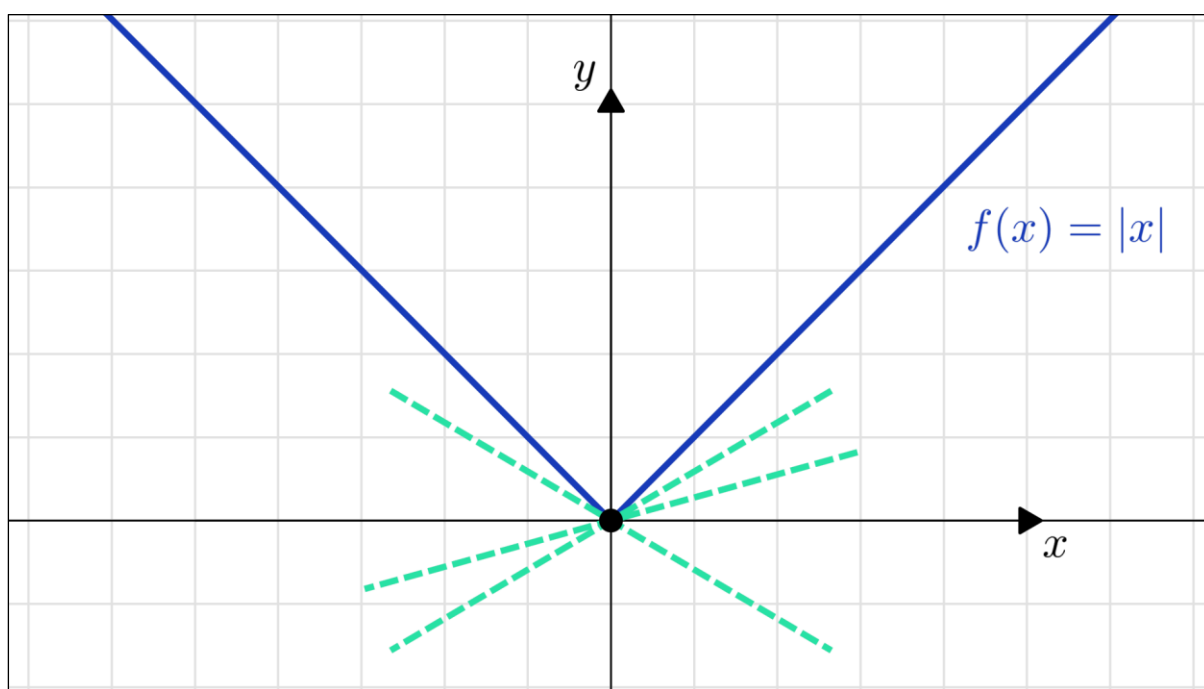
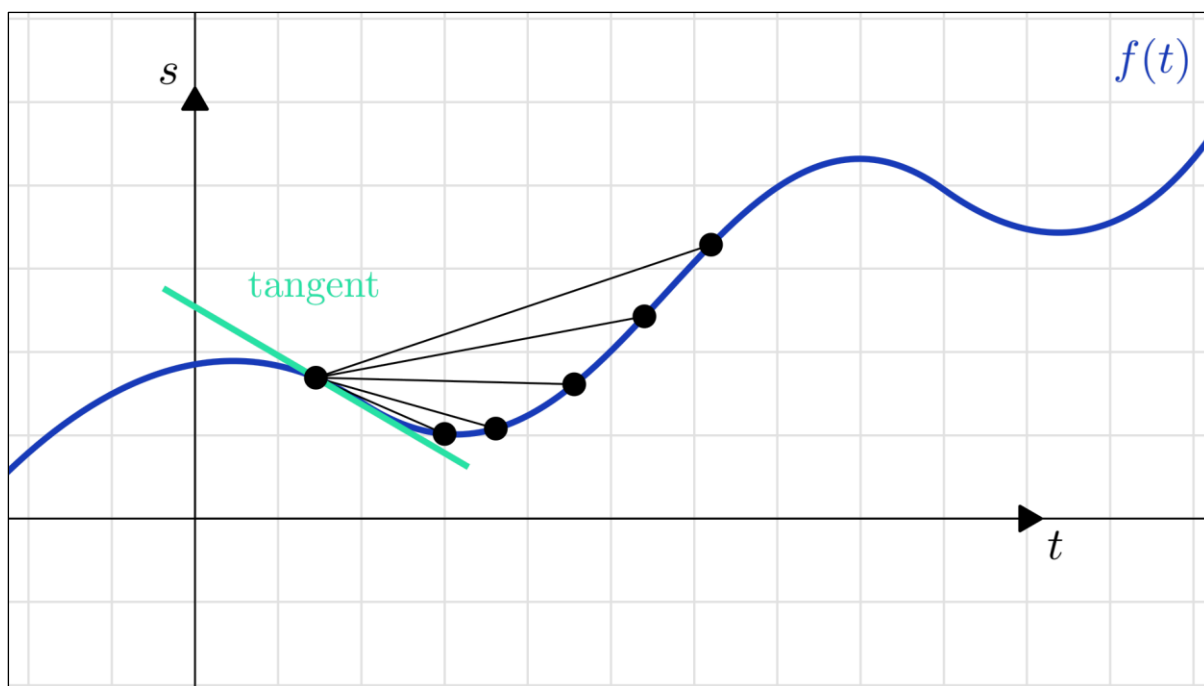
Chapter 11: Topology, Limits, and Continuity

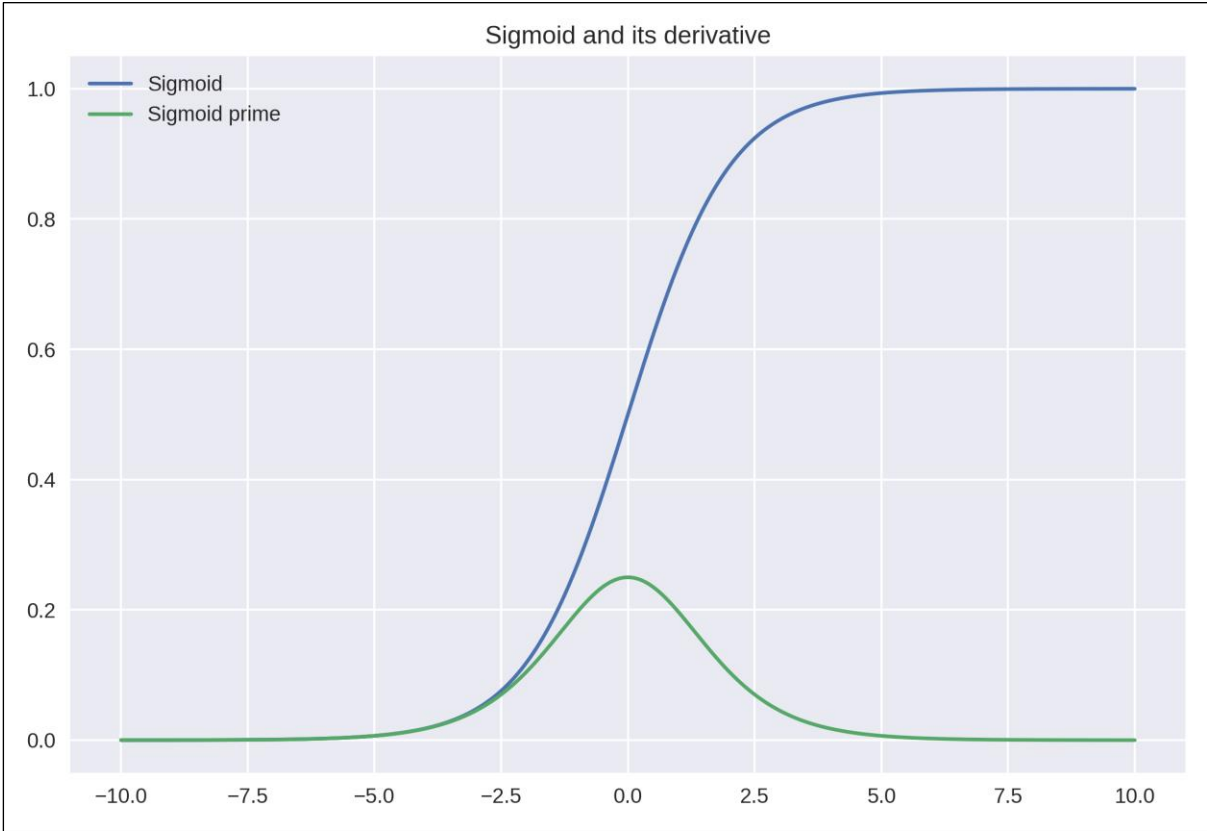
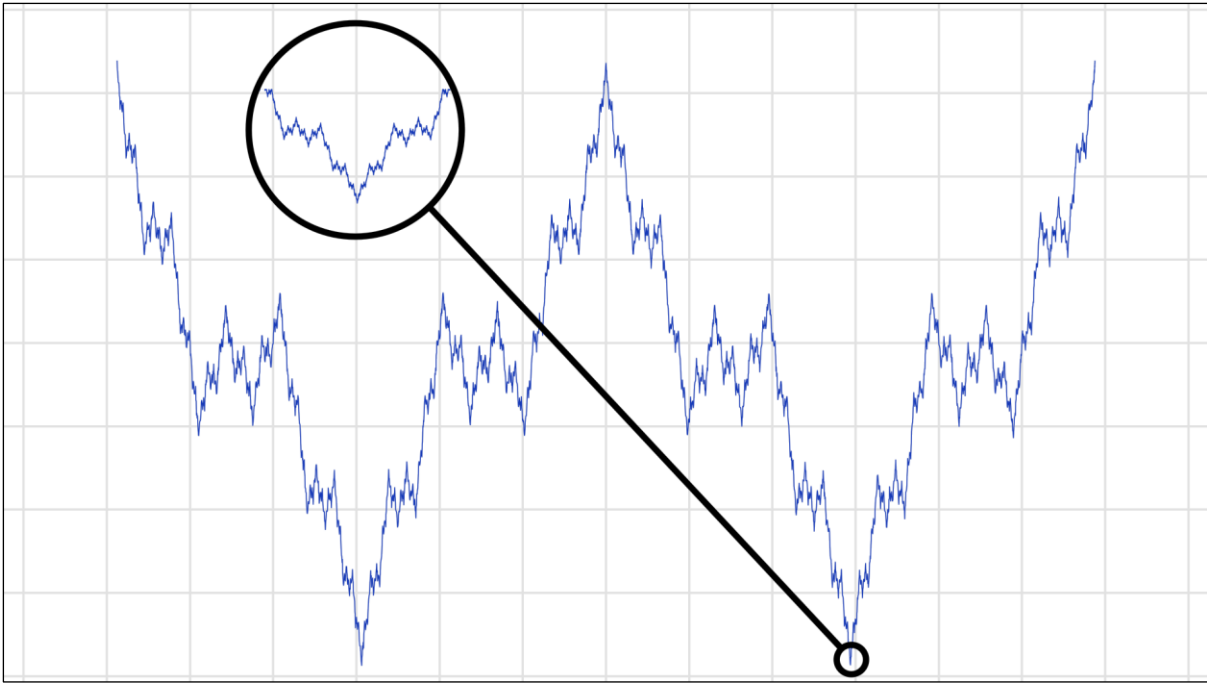


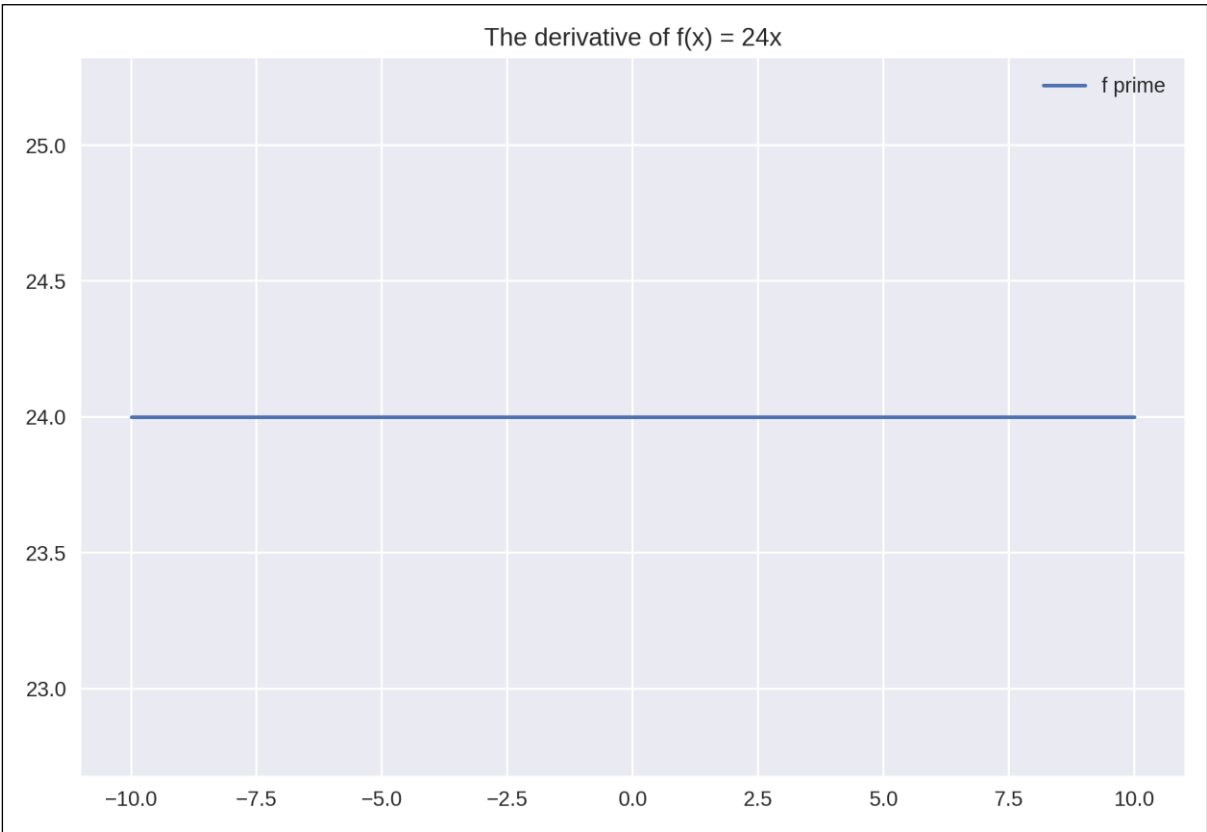
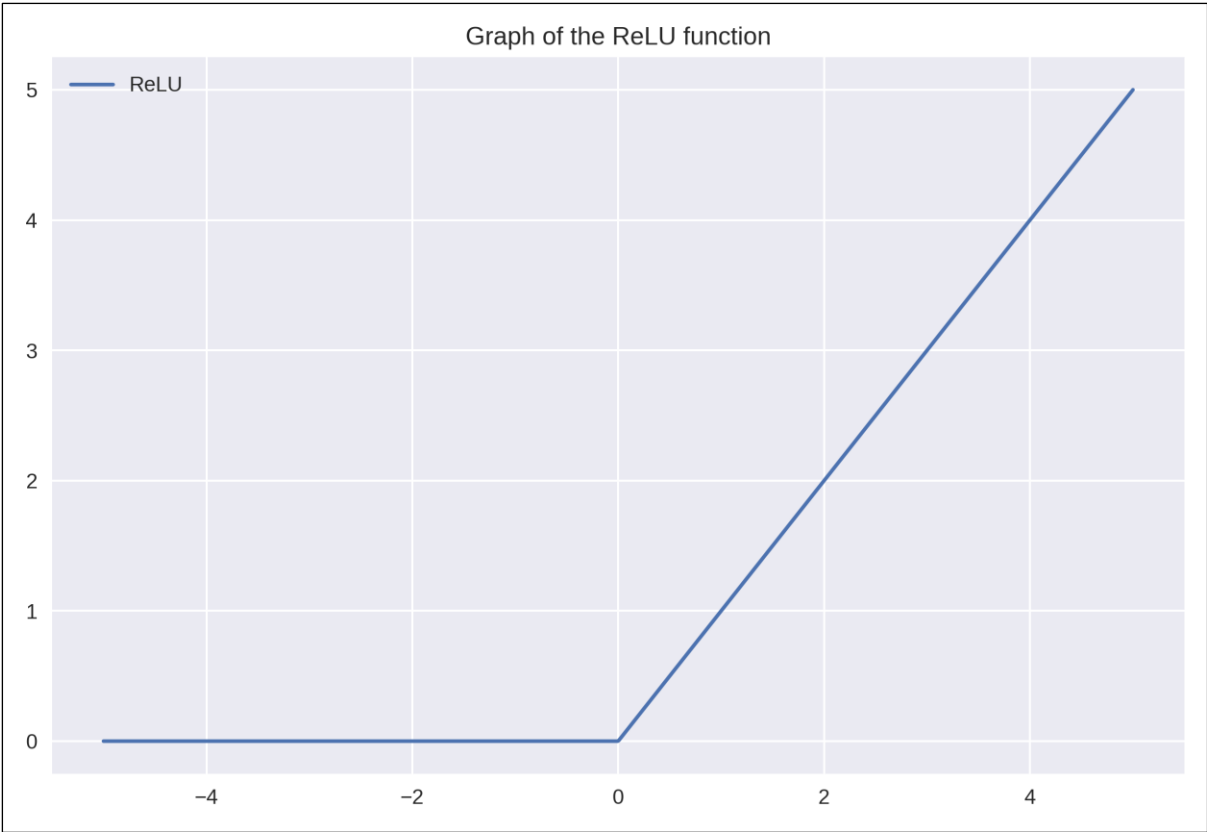


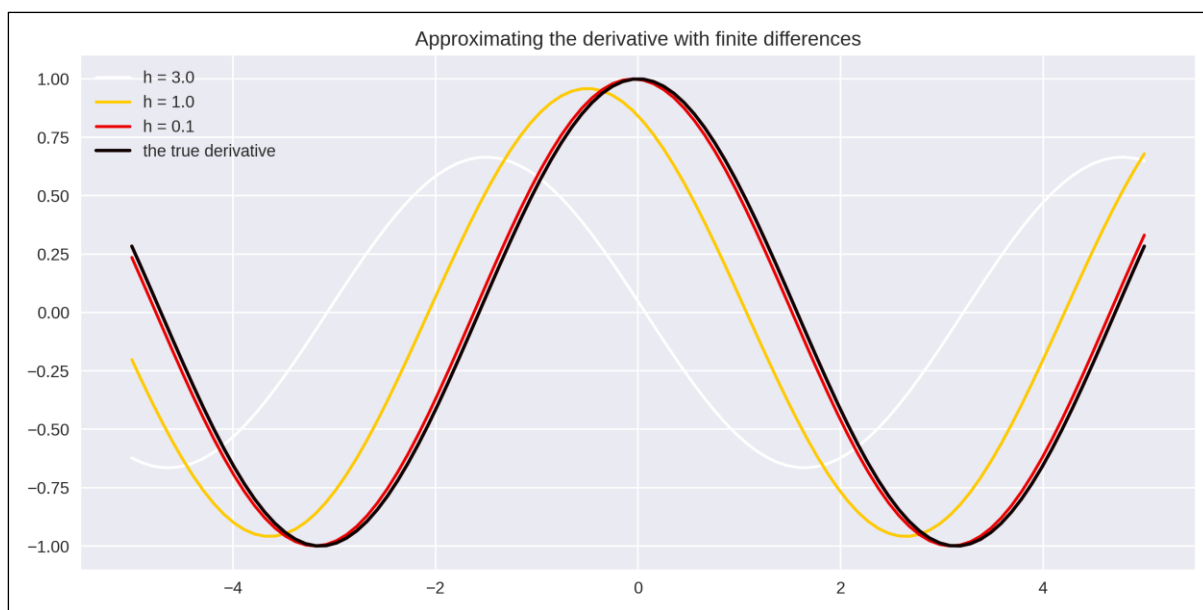
Chapter 12: Differentiation



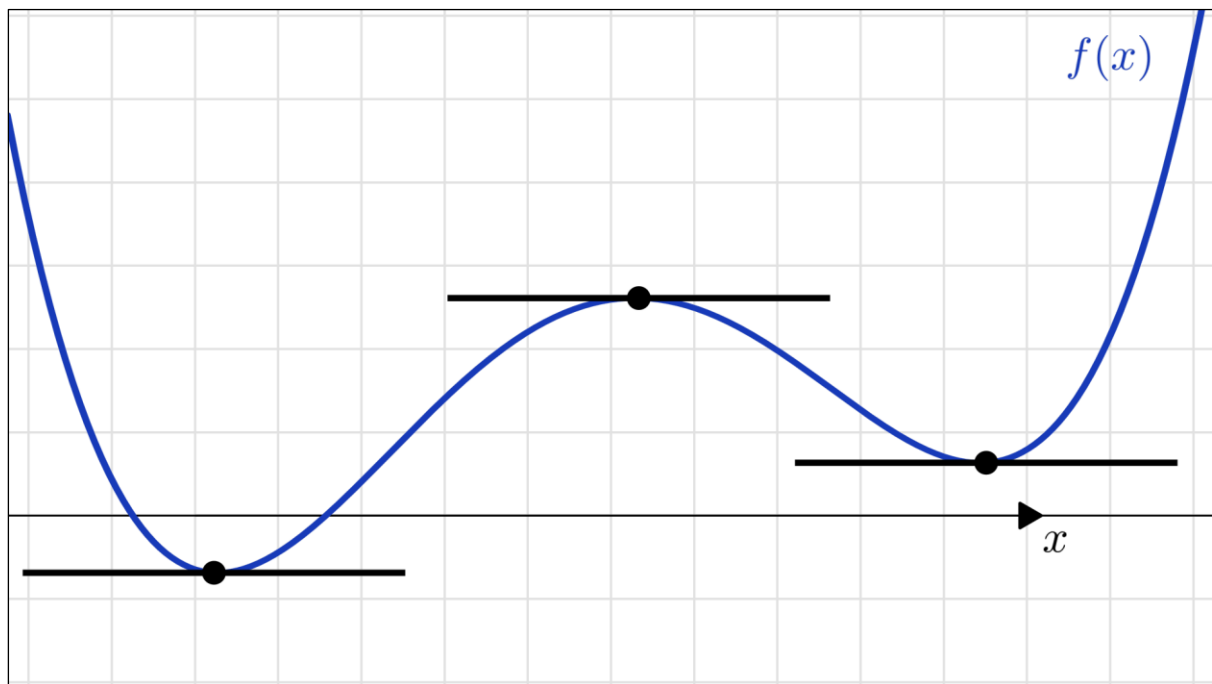
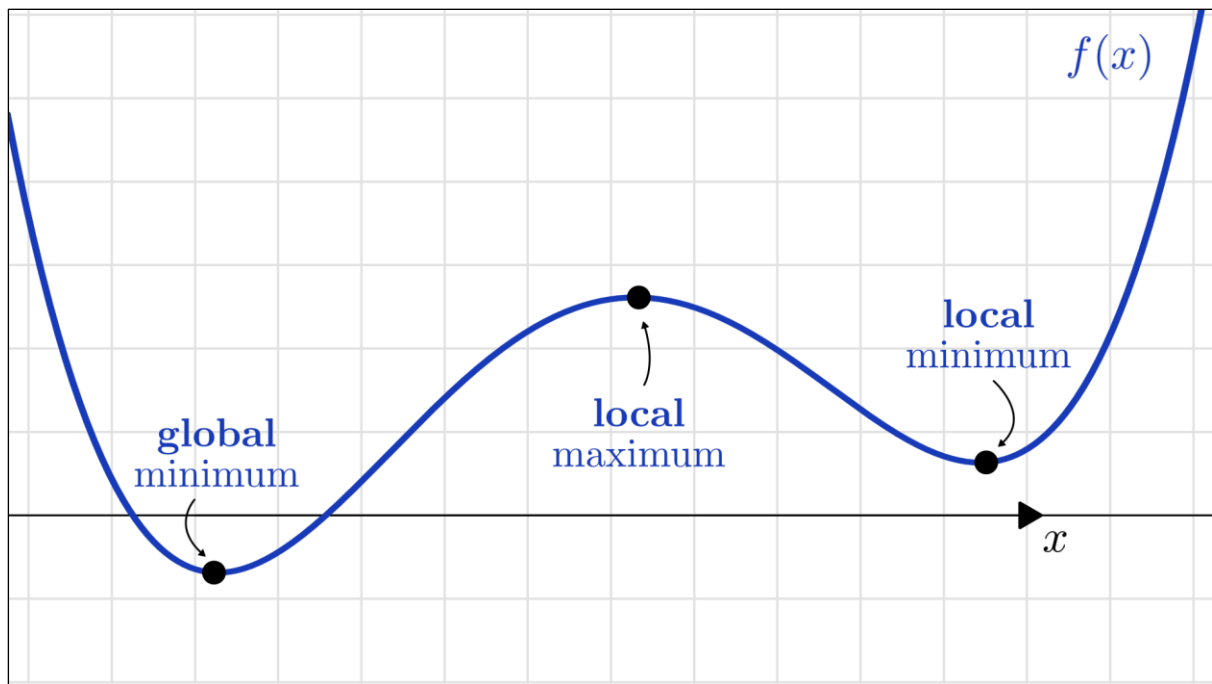


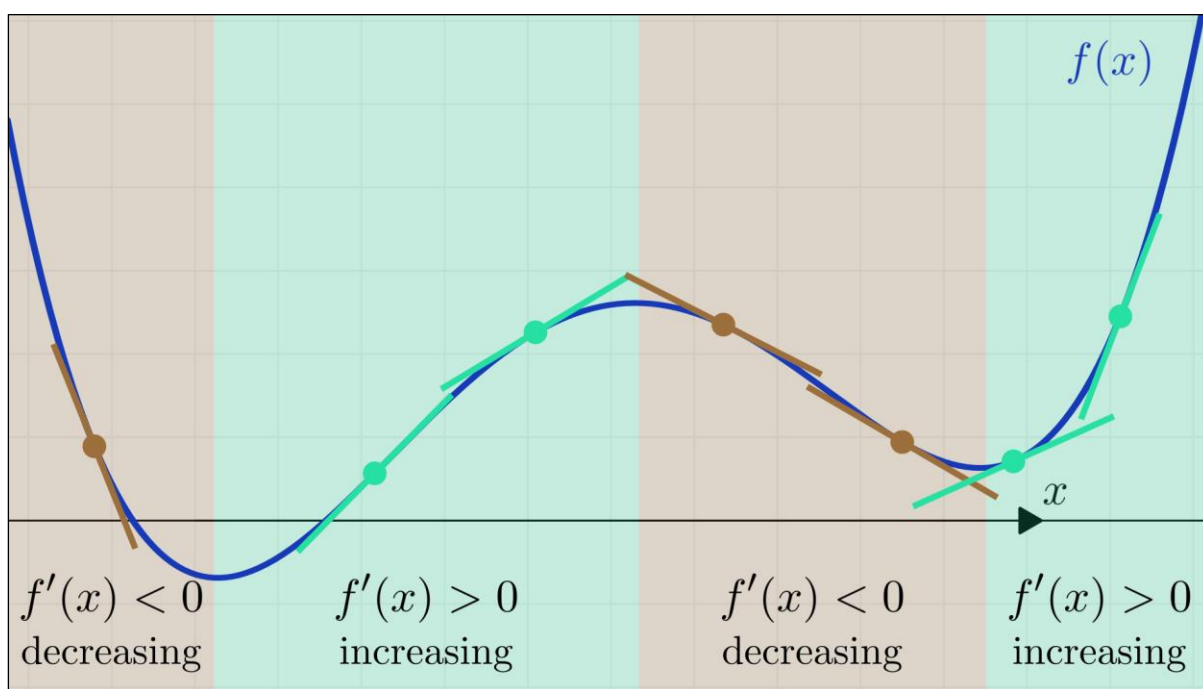
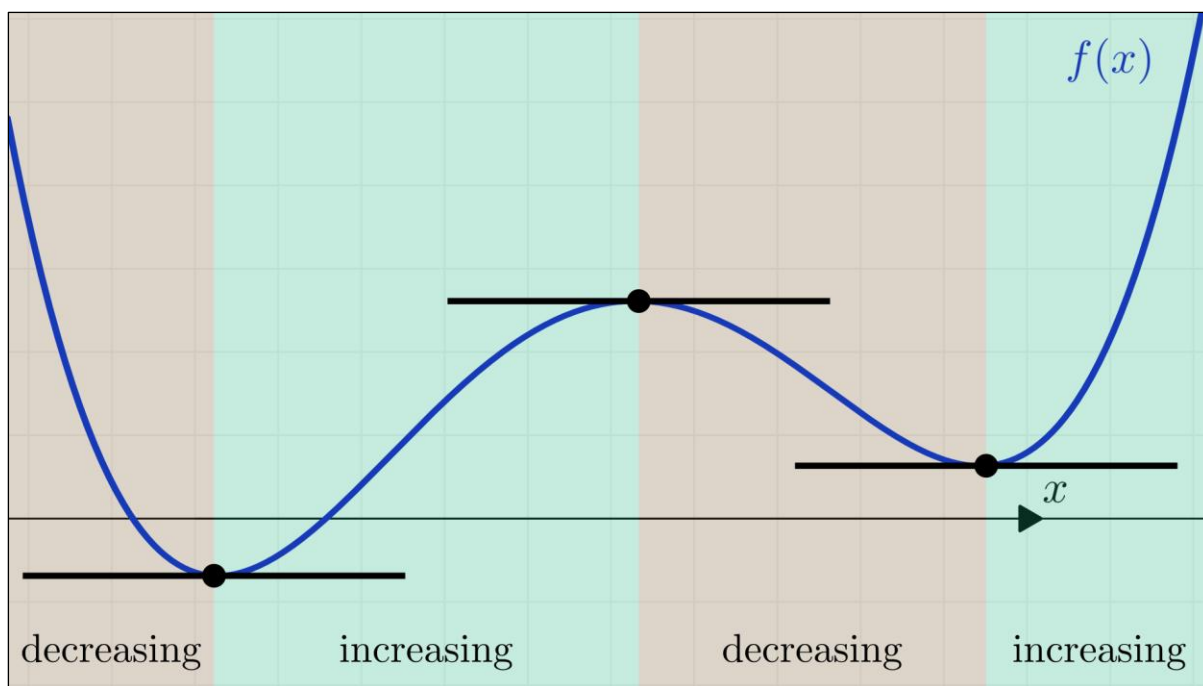


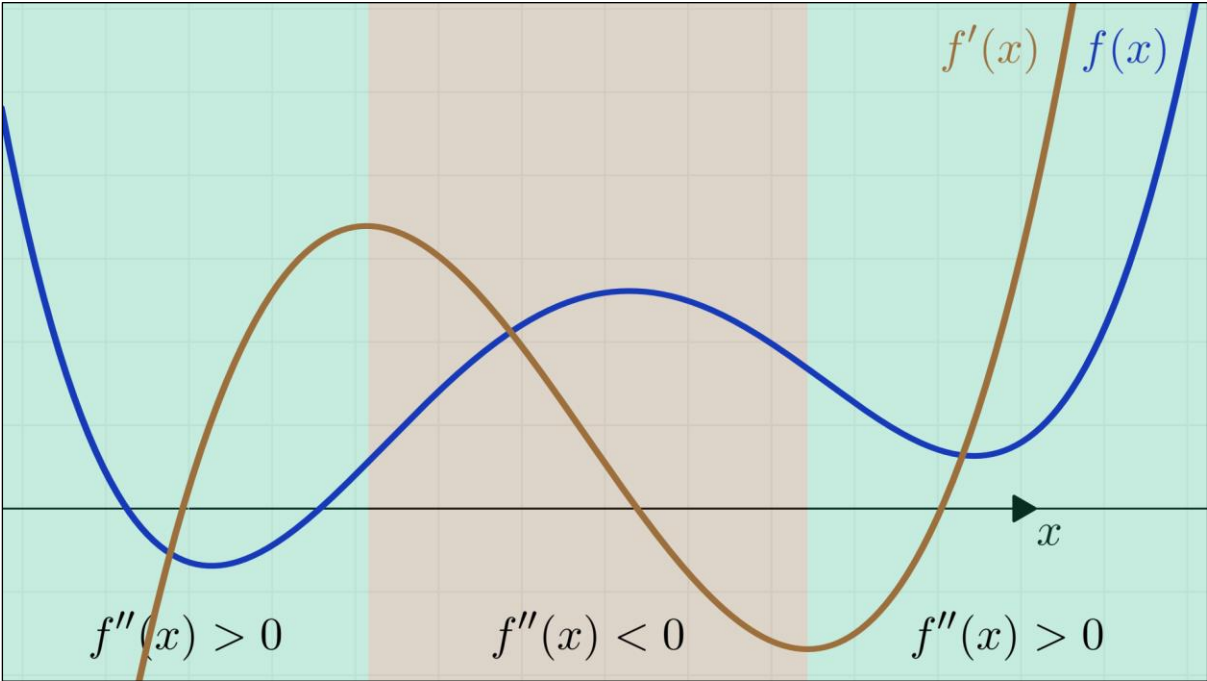
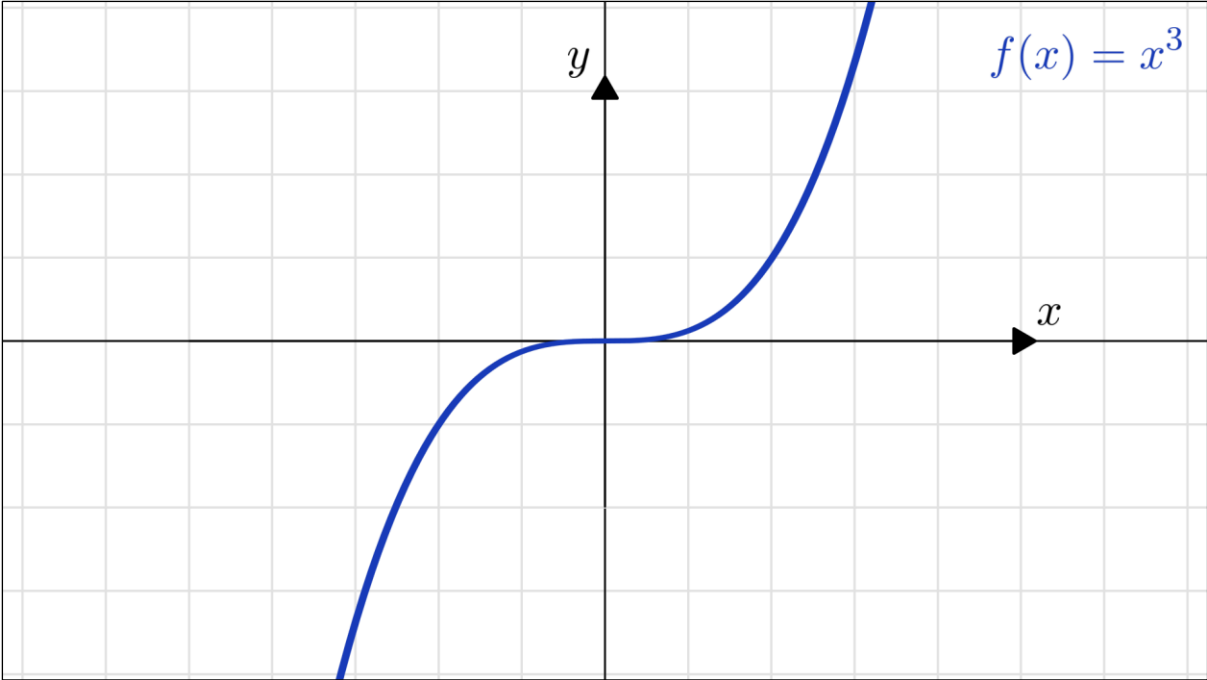


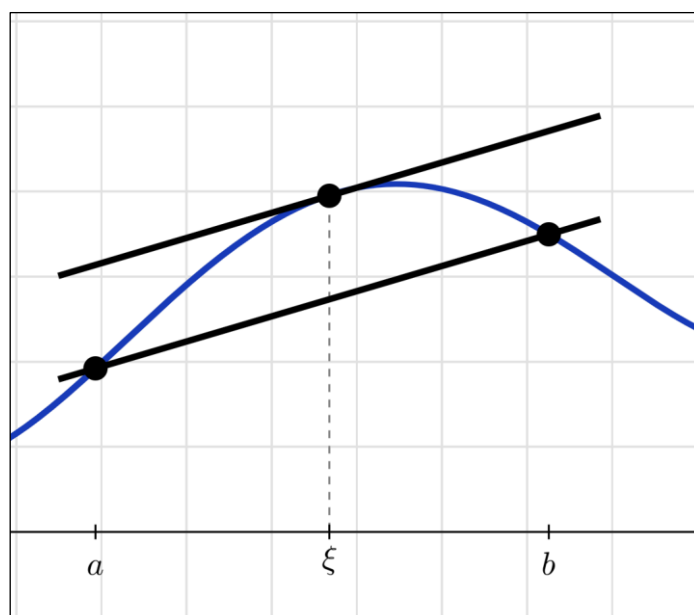
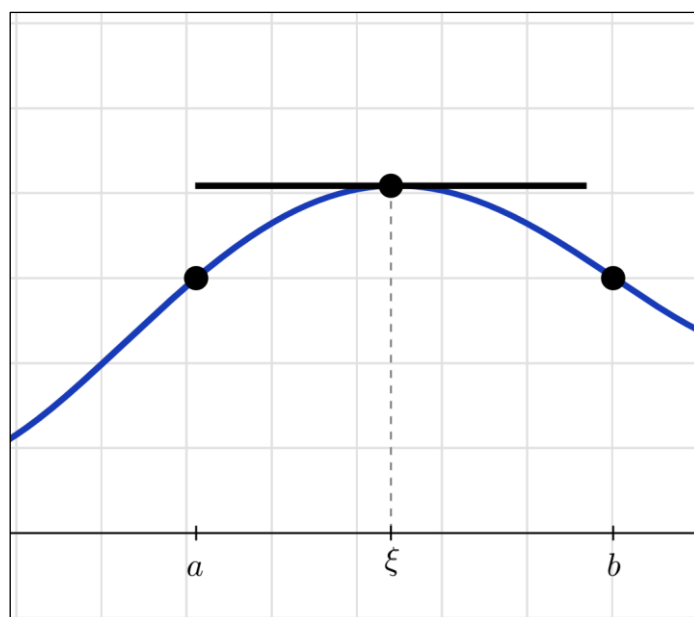


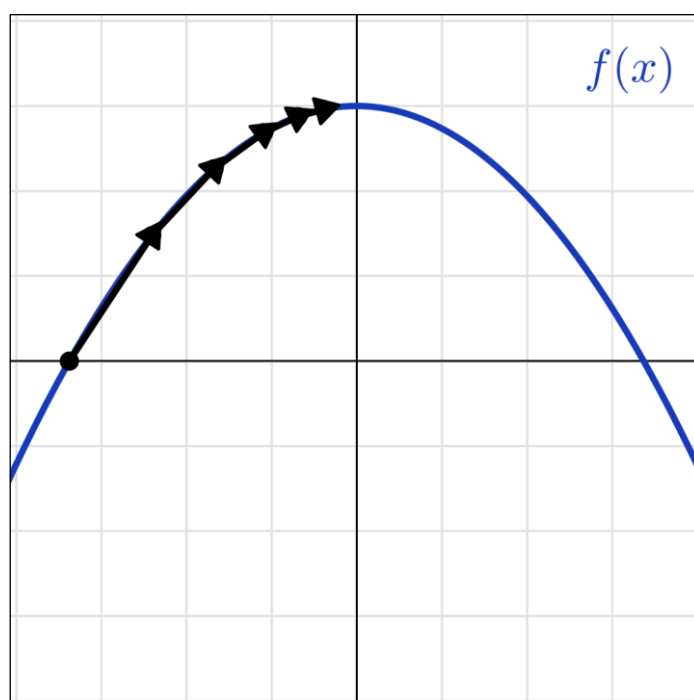
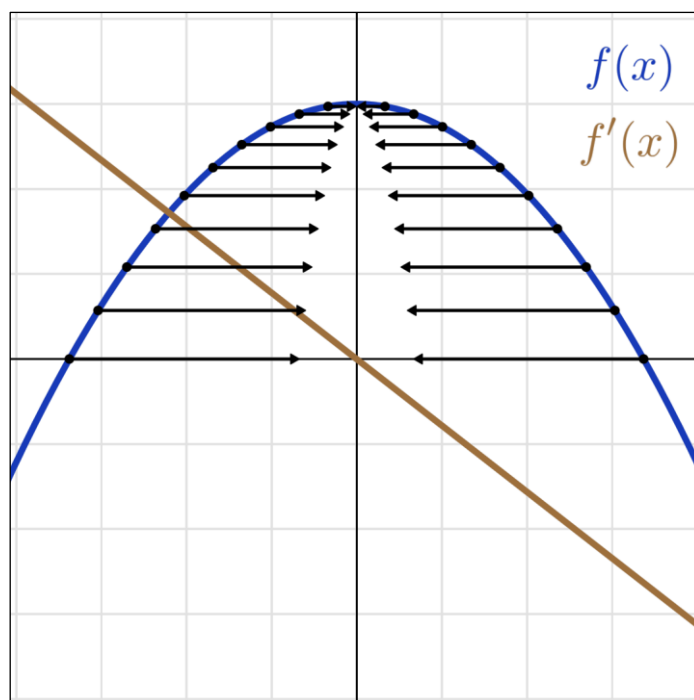
Chapter 13: Optimization

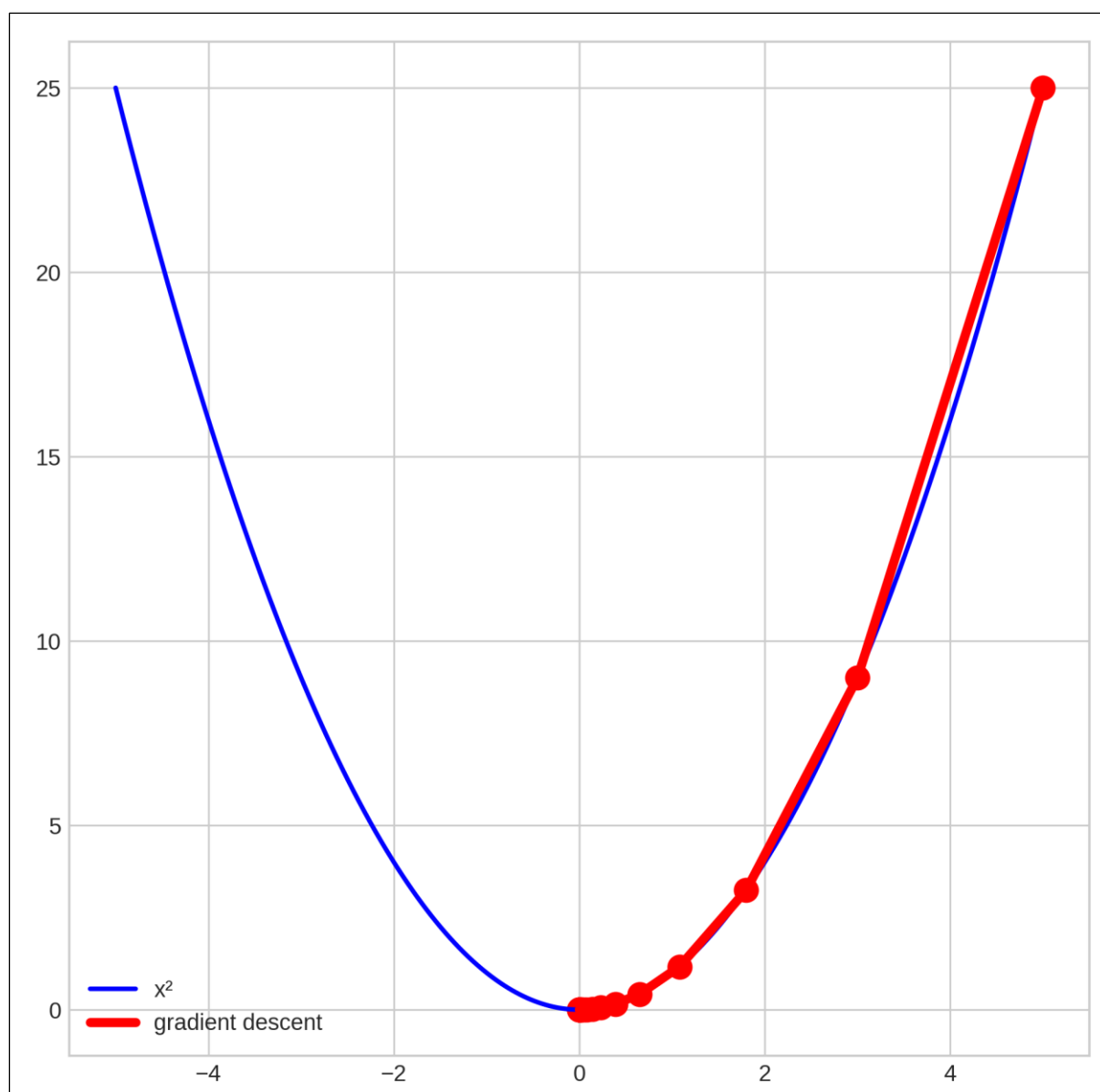


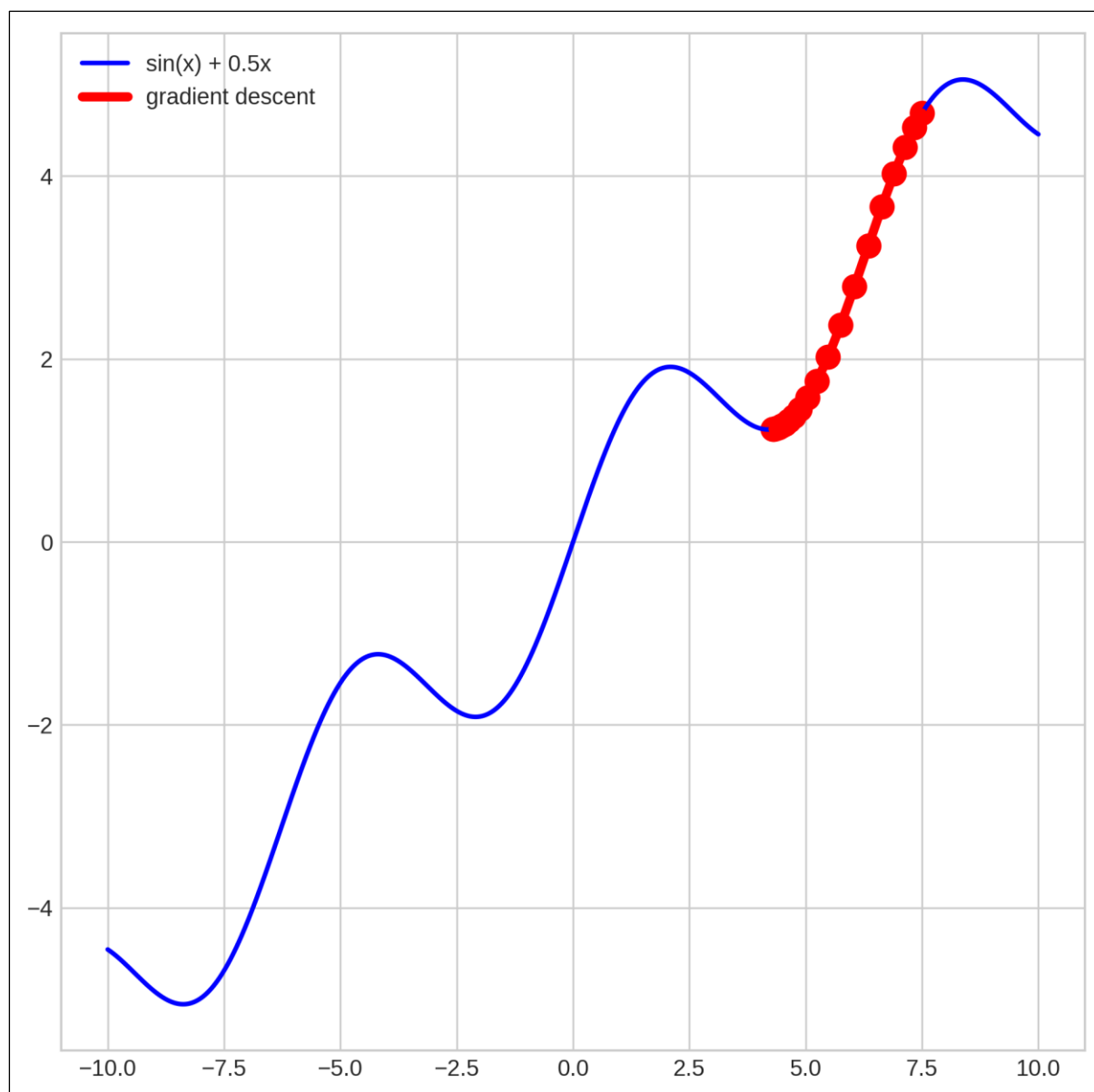


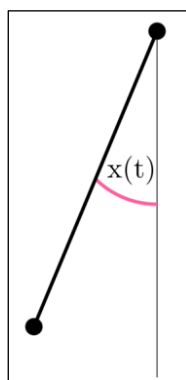
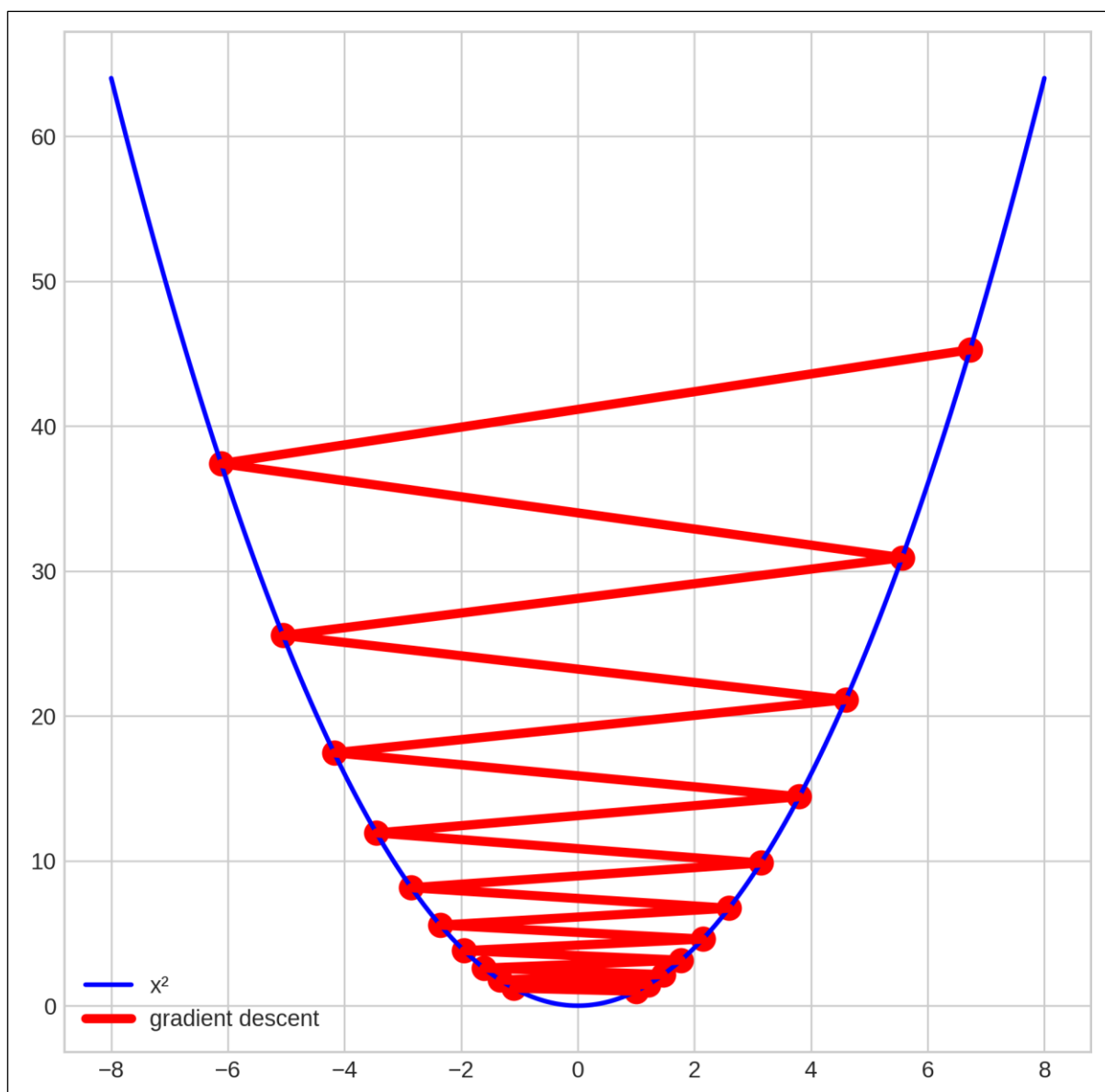


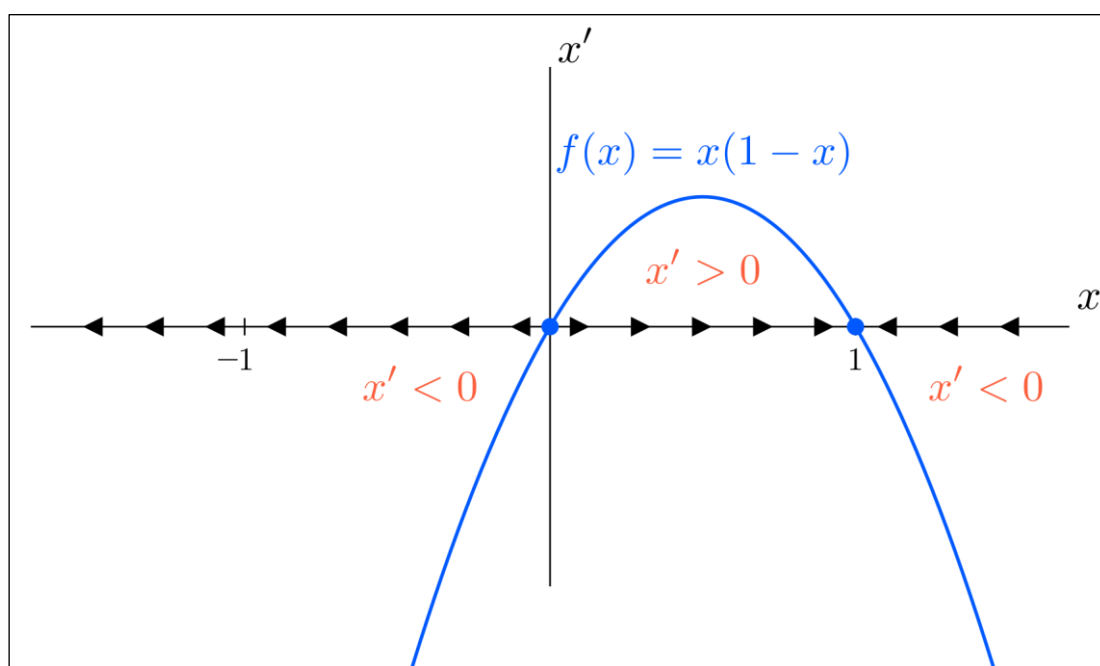
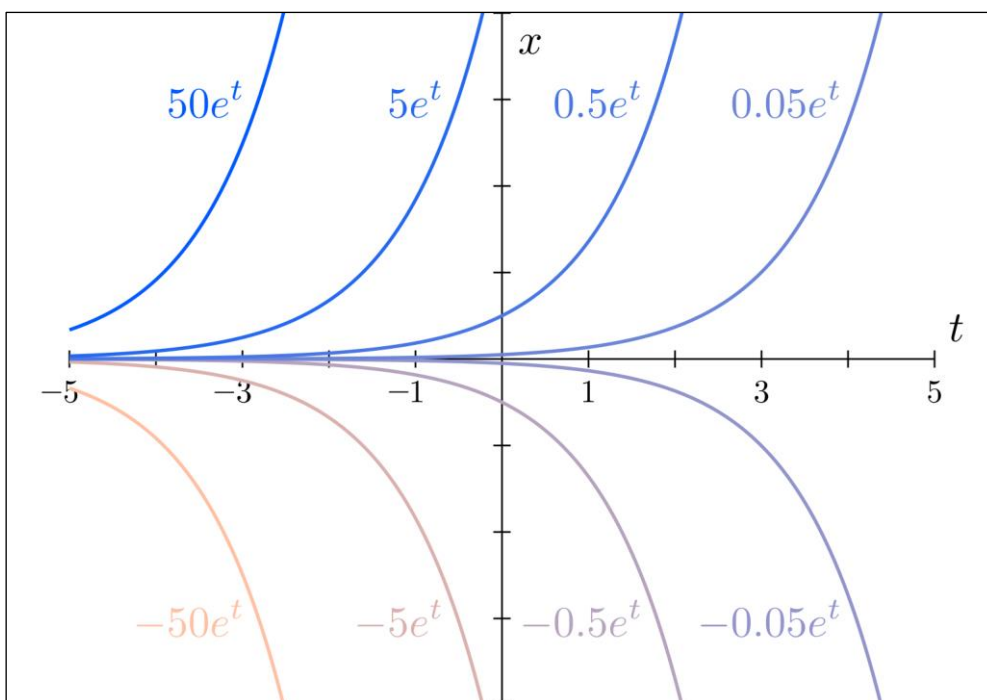


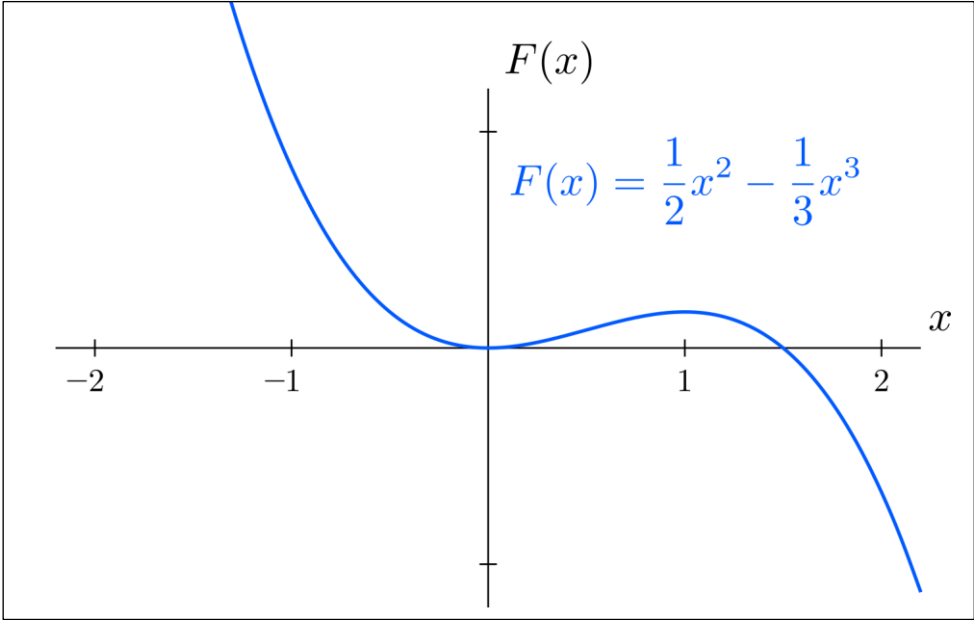
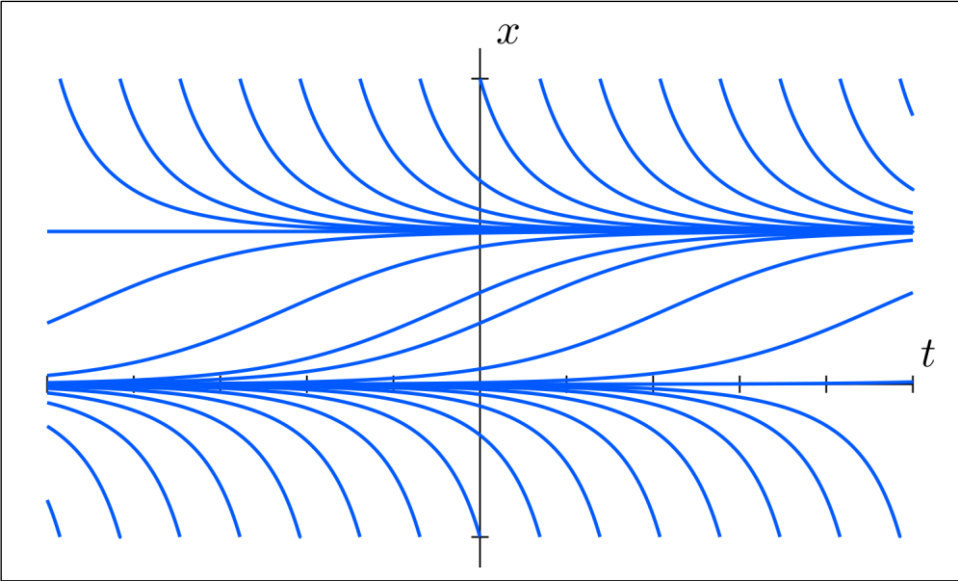


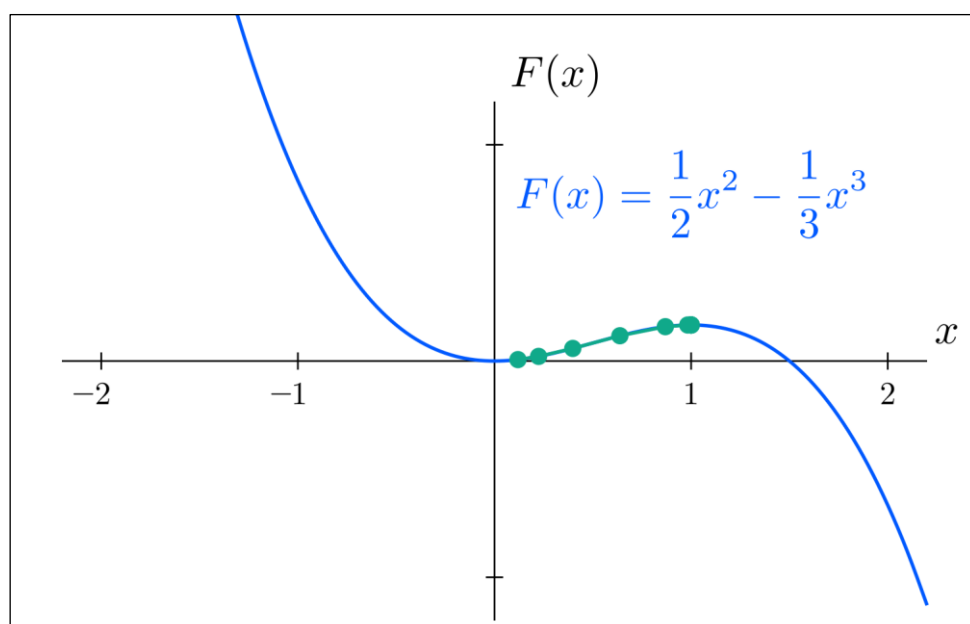
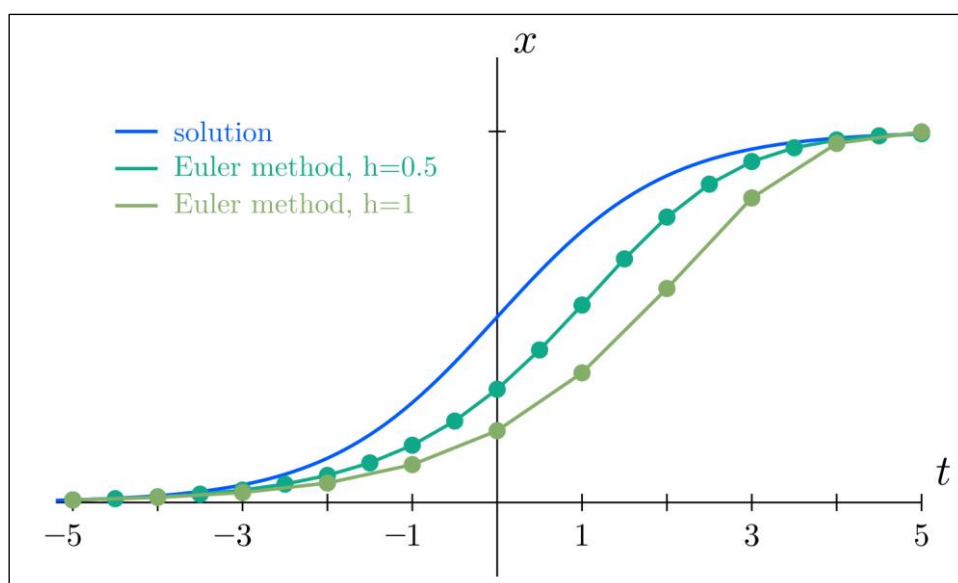


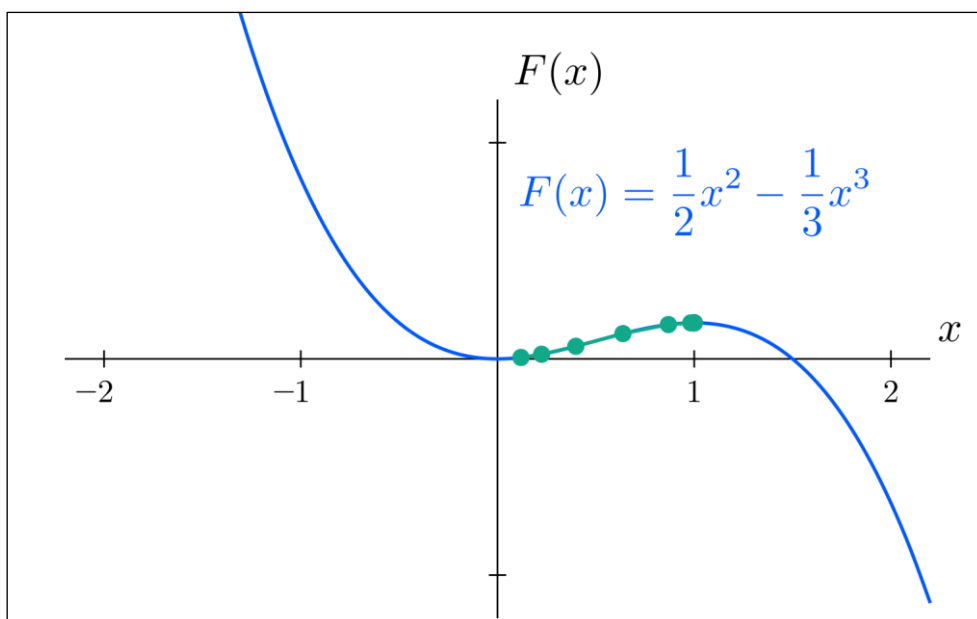




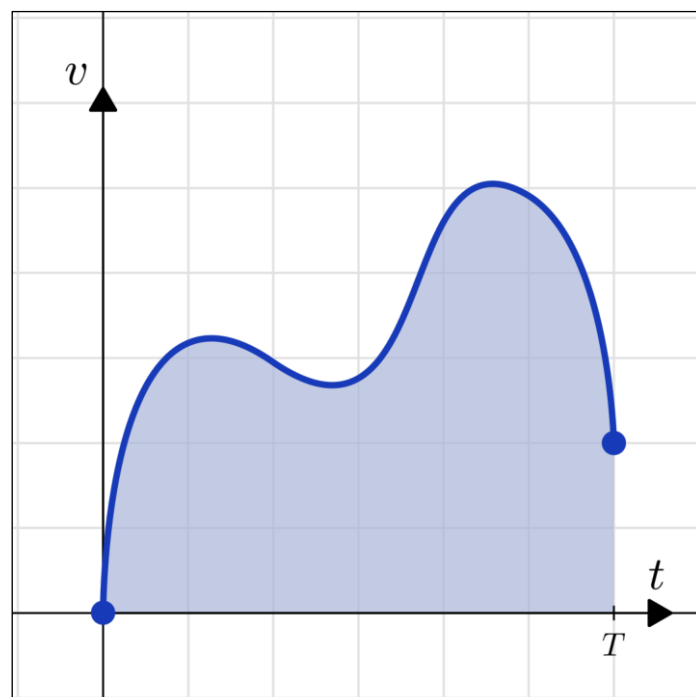
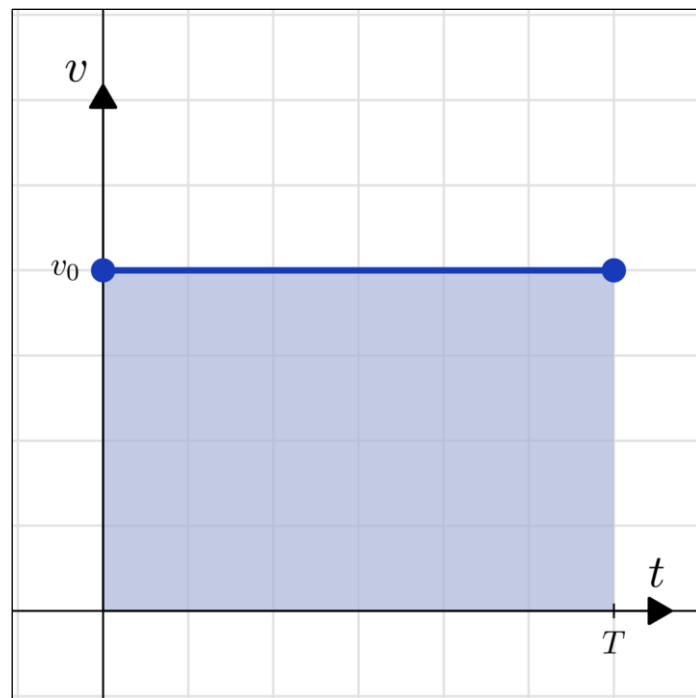


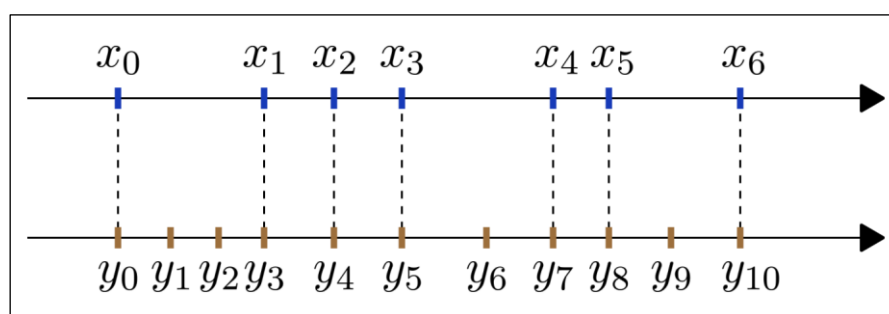
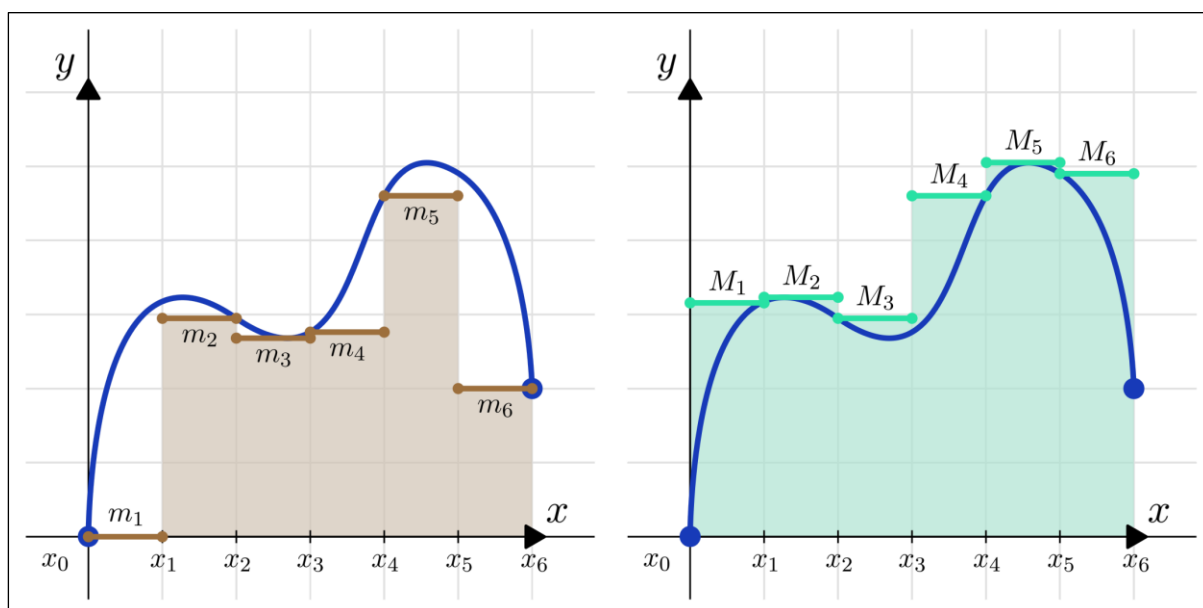
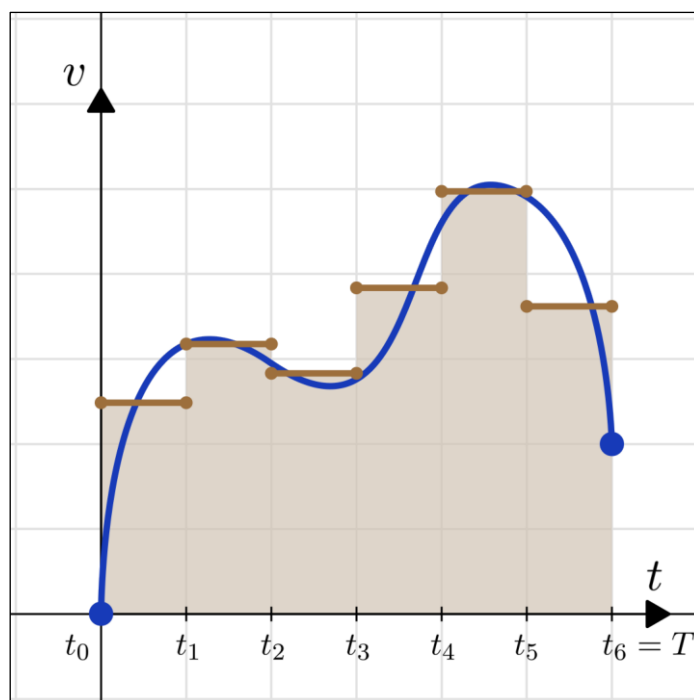


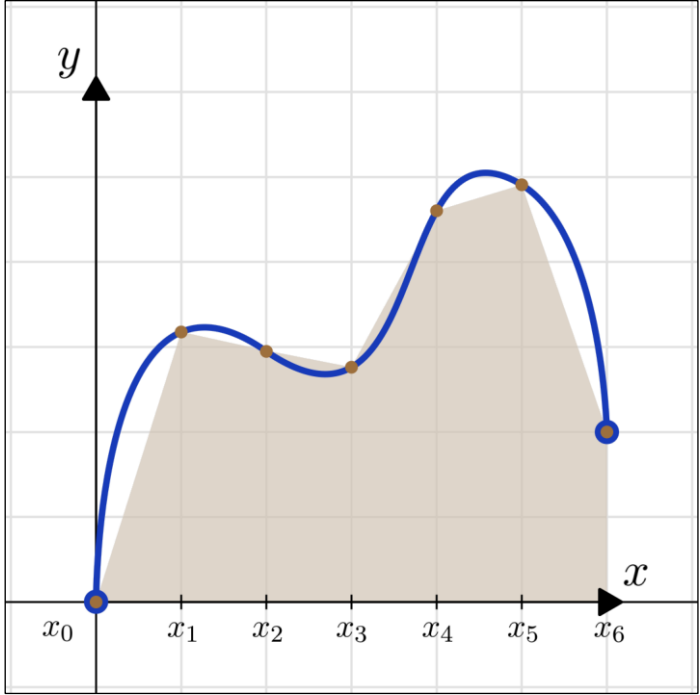
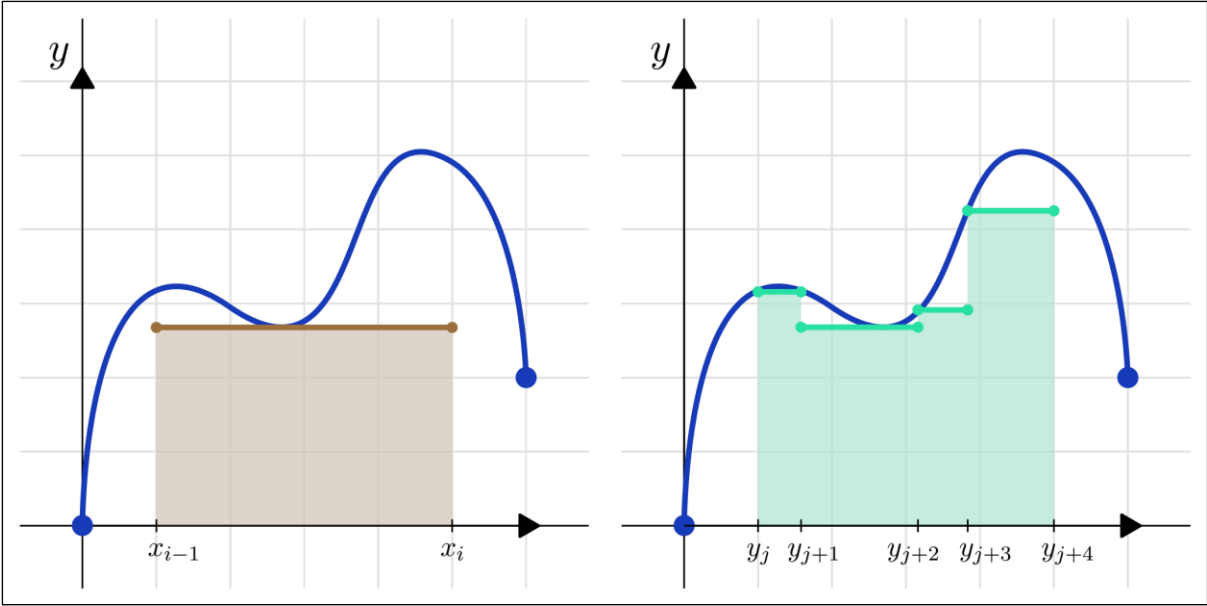


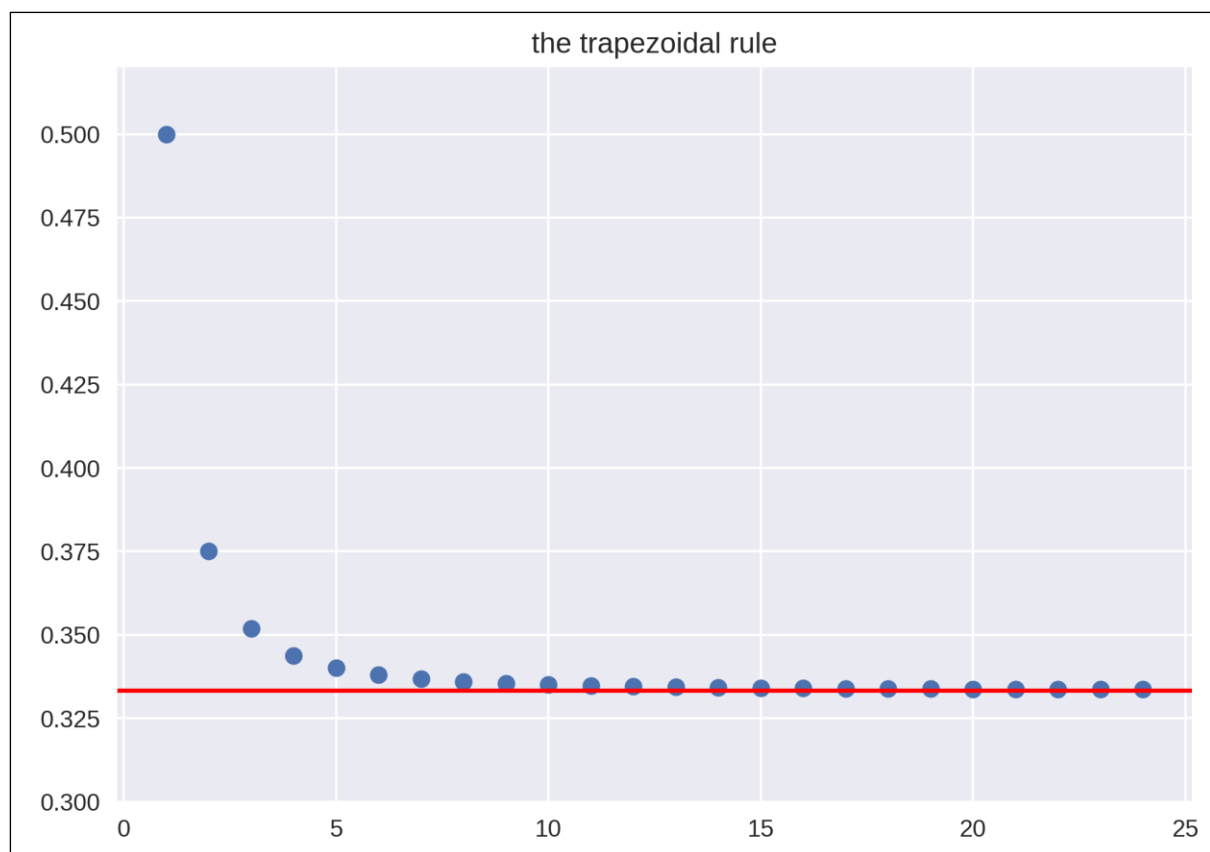


Chapter 14: Integration

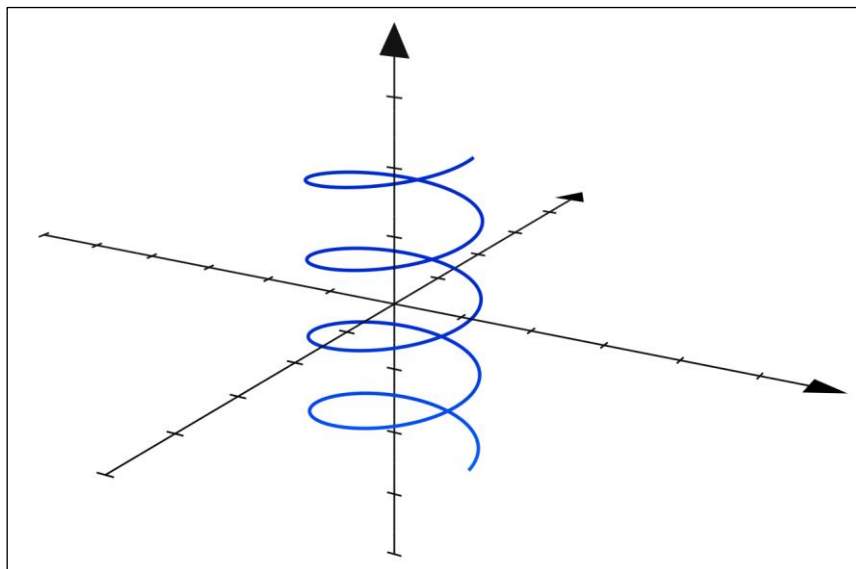
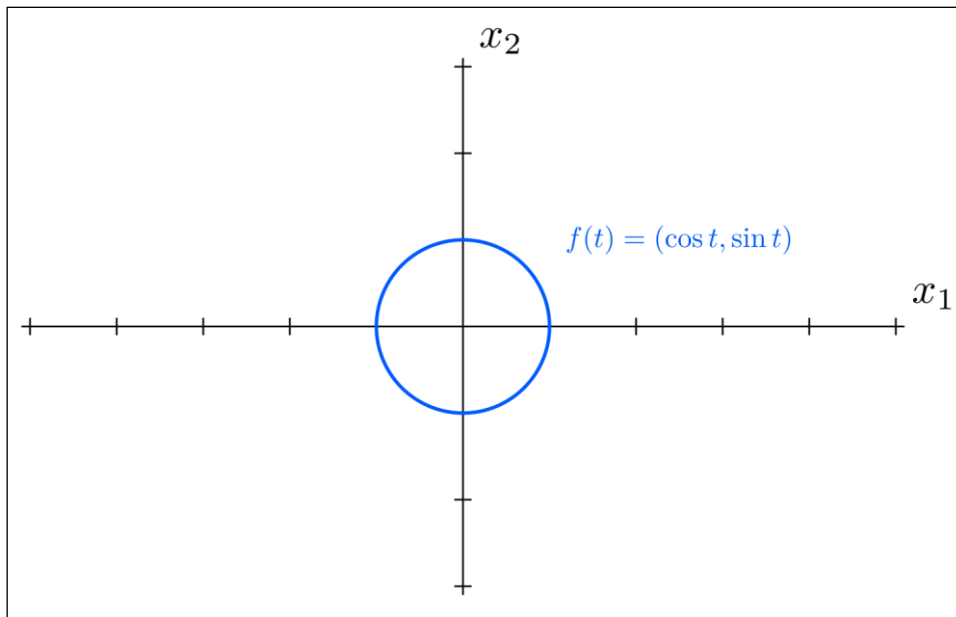


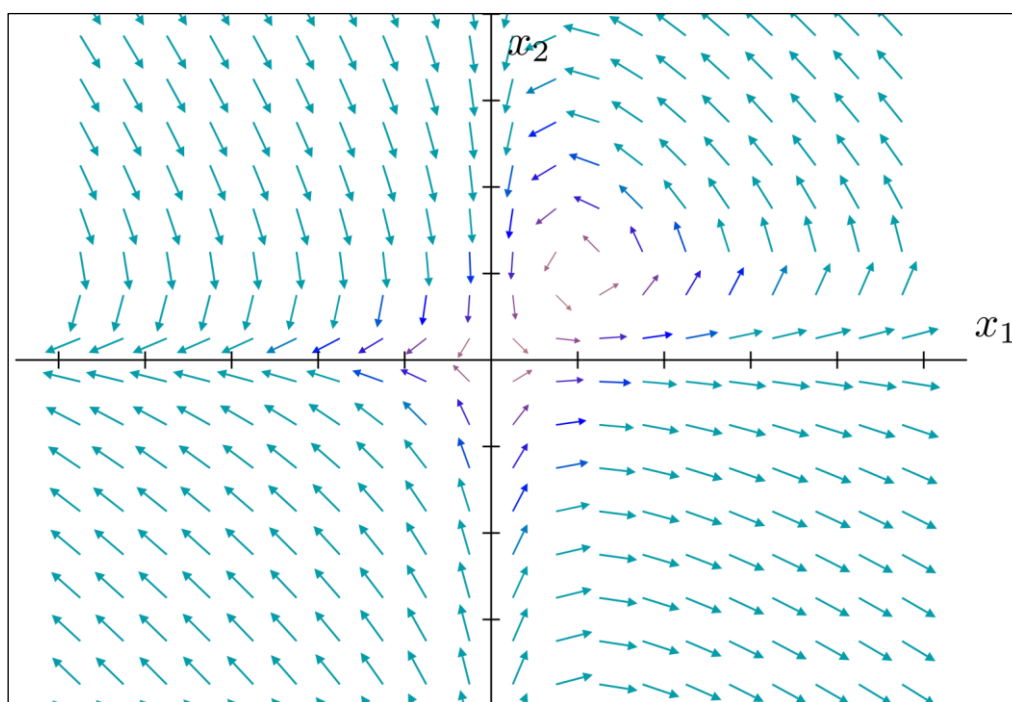
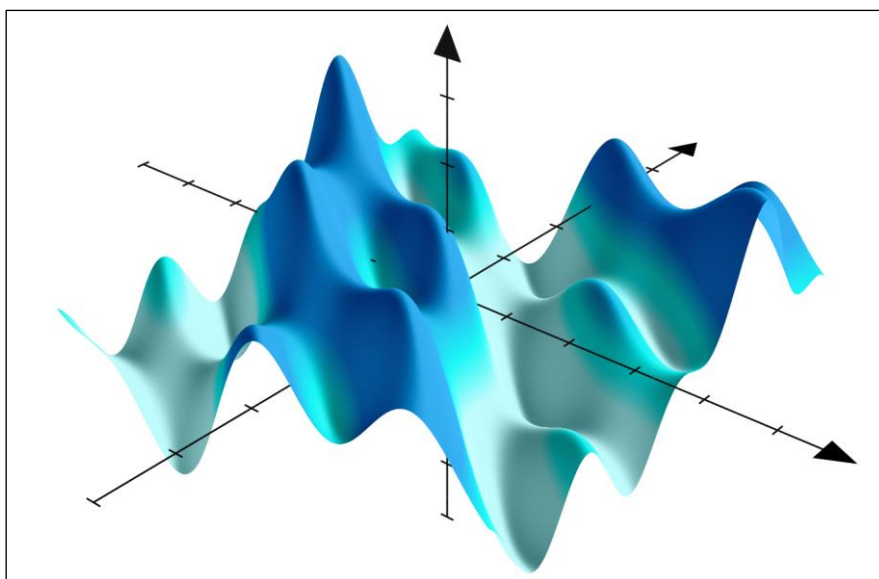


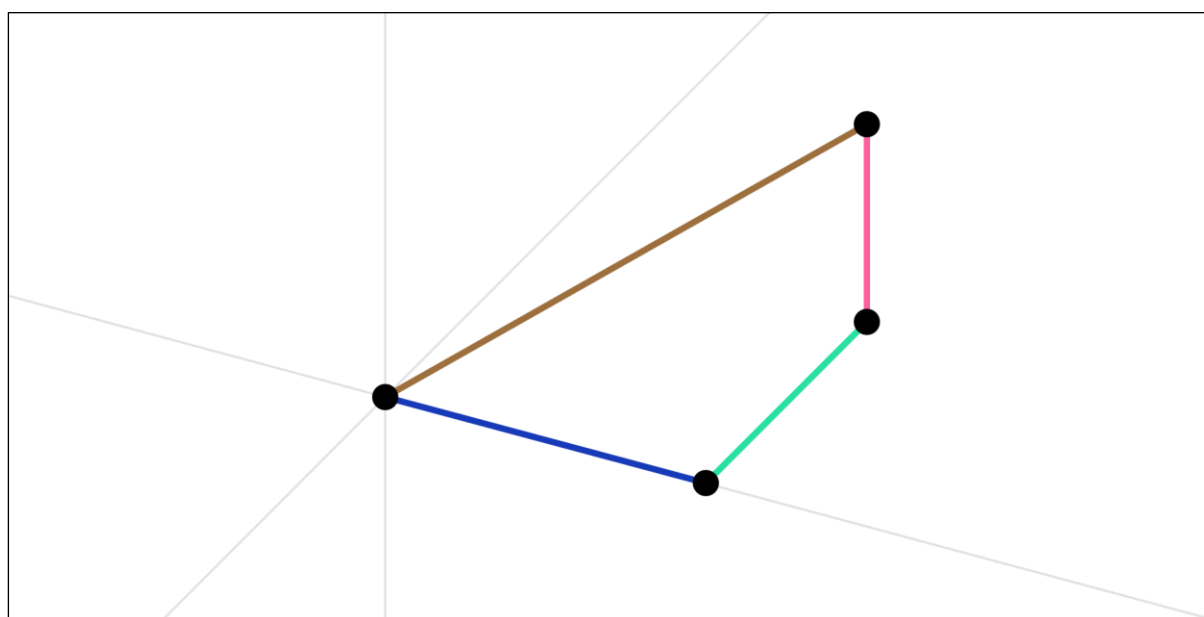
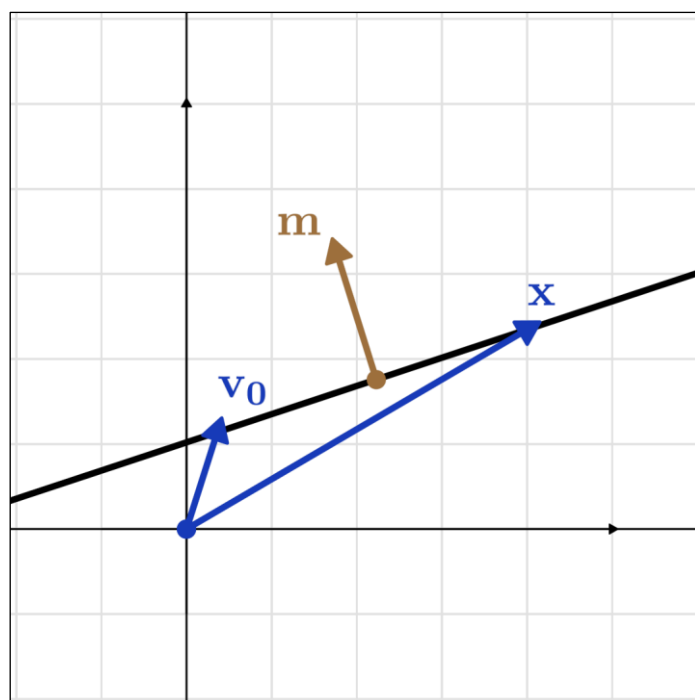




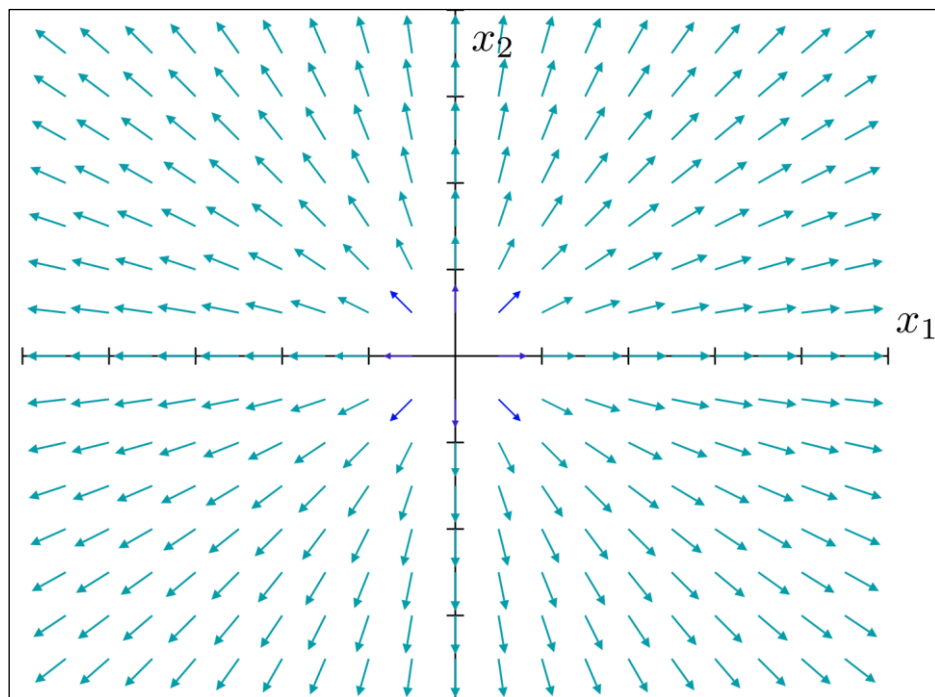
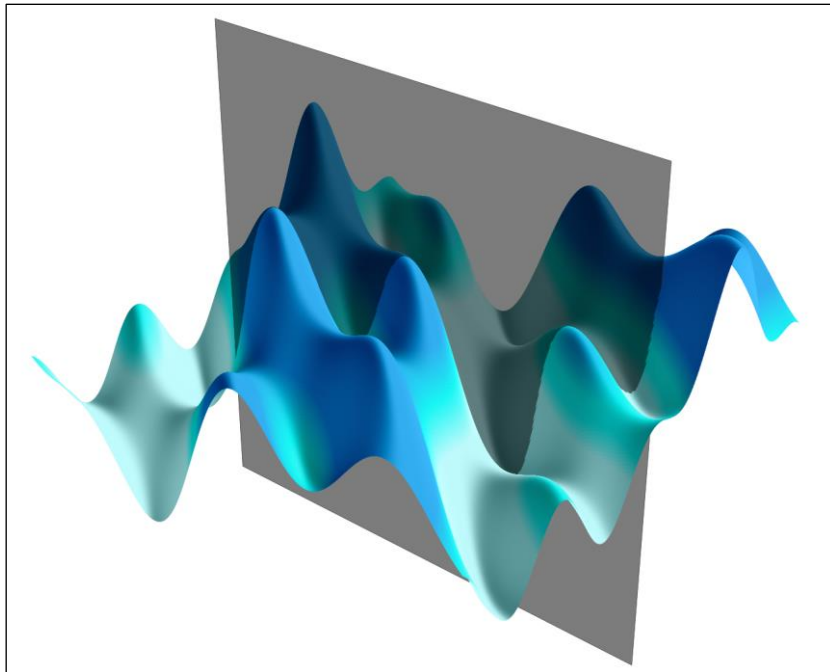
Chapter 15: Multivariable Functions

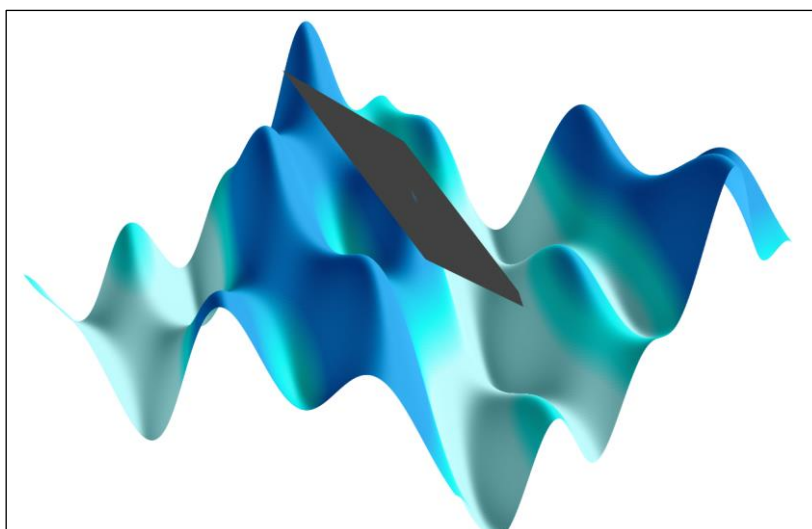




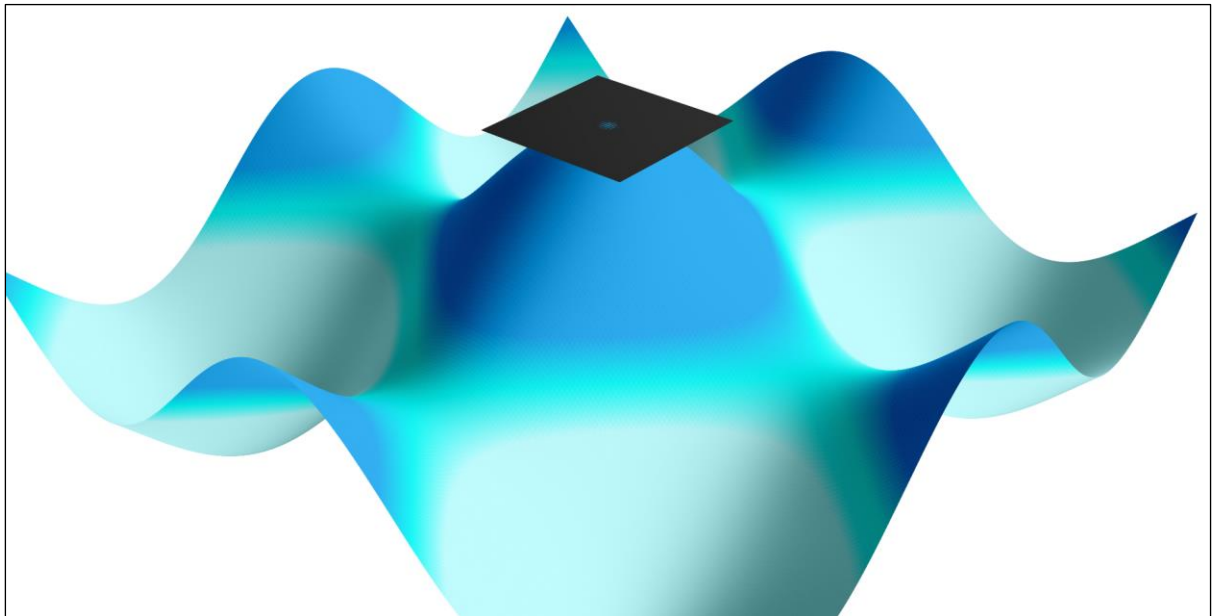
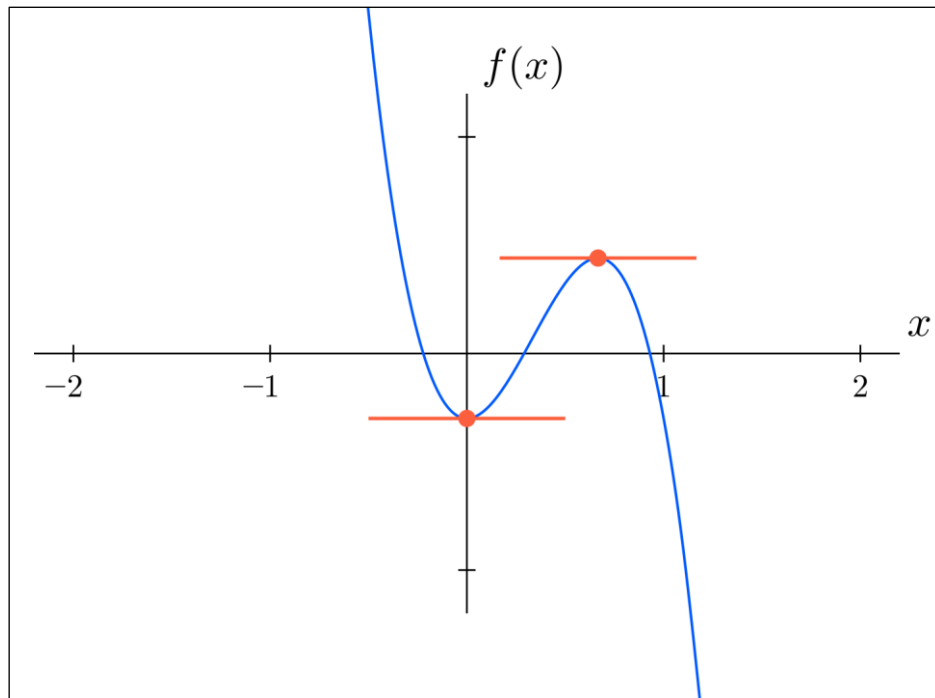


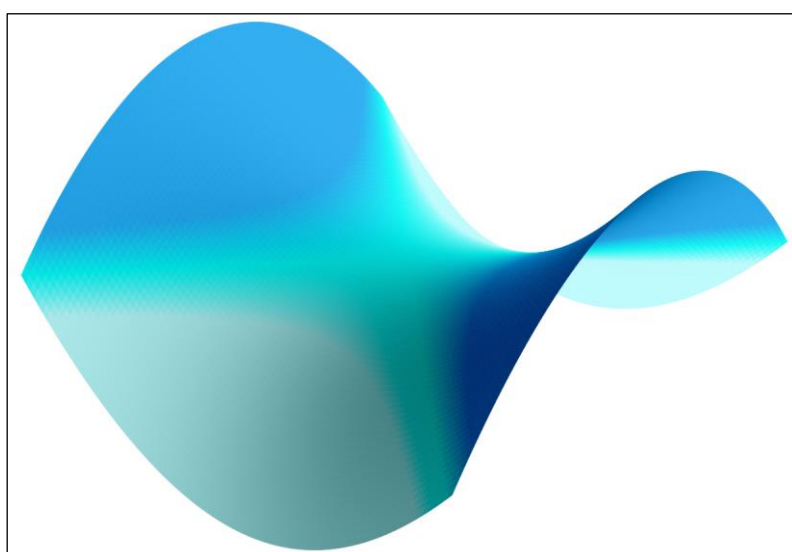
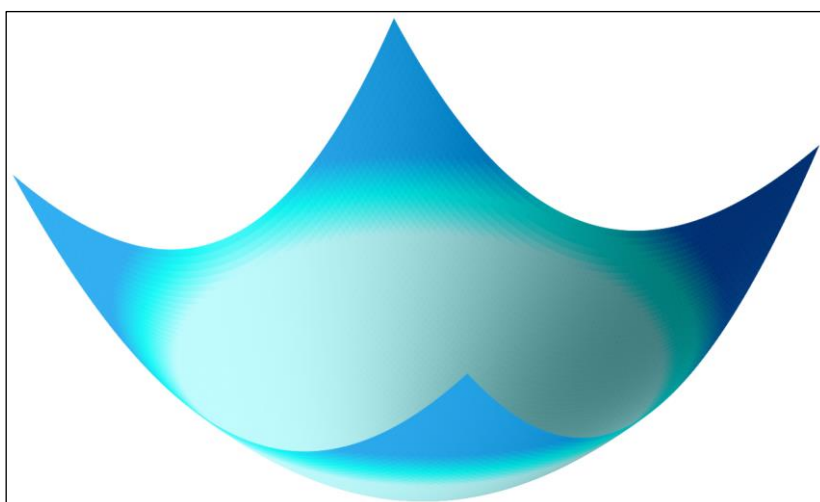
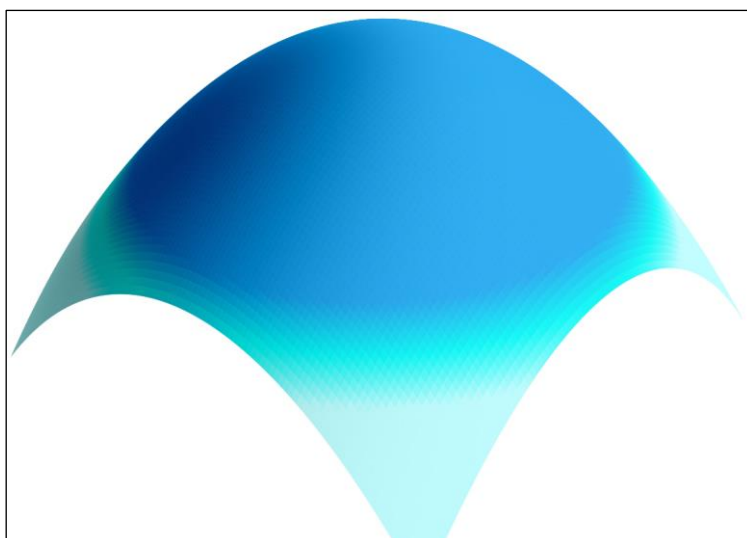
Chapter 16: Derivatives and Gradients



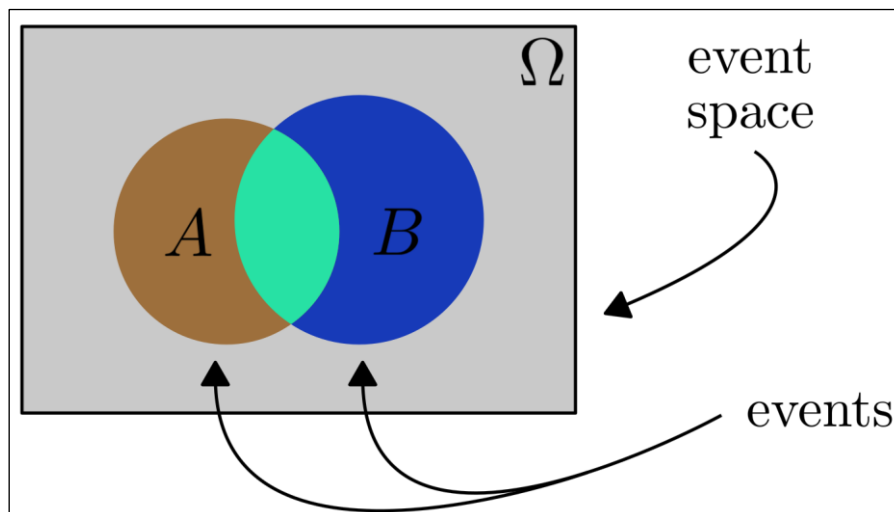
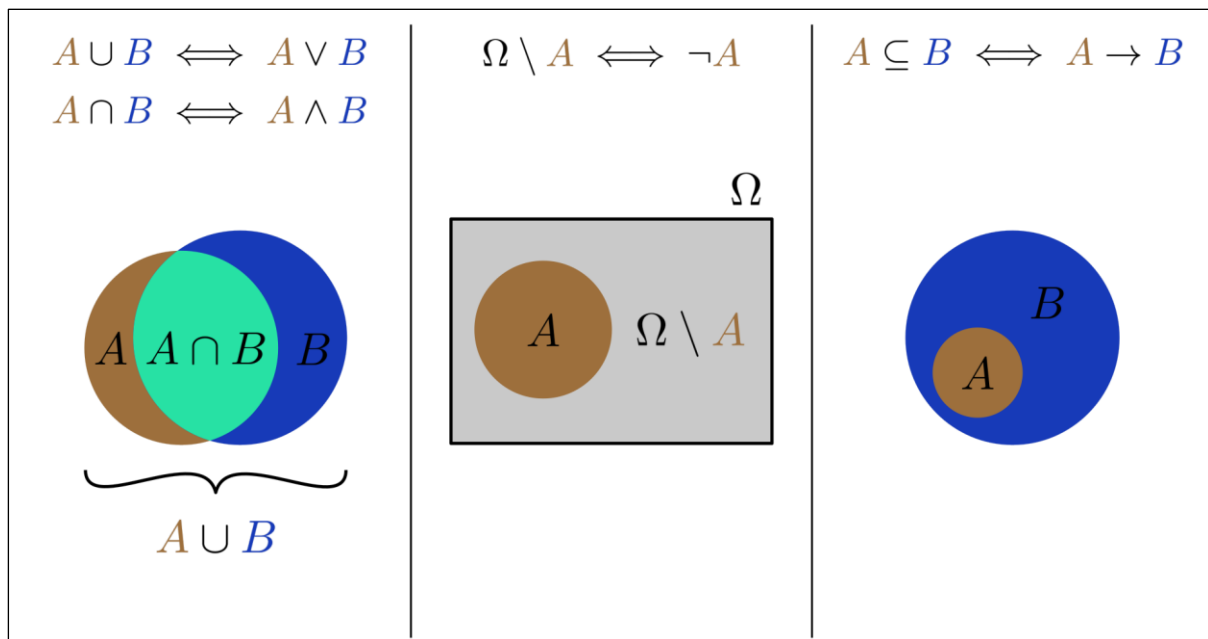


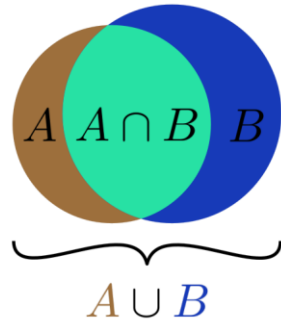
Chapter 17: Optimization in Multiple Variables





Chapter 18: What is Probability?

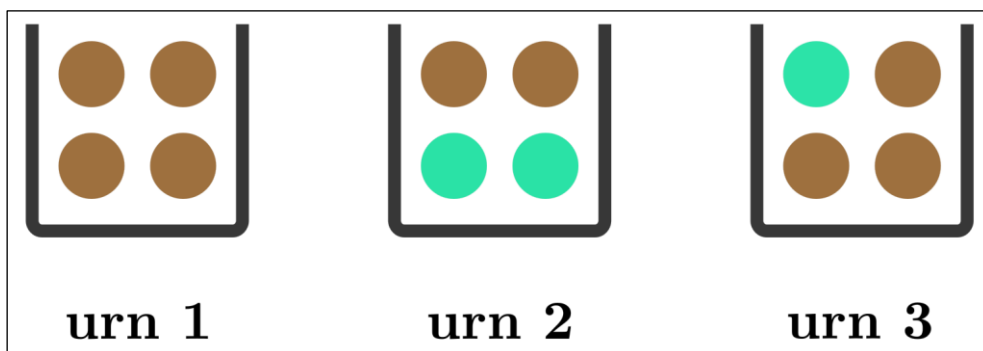
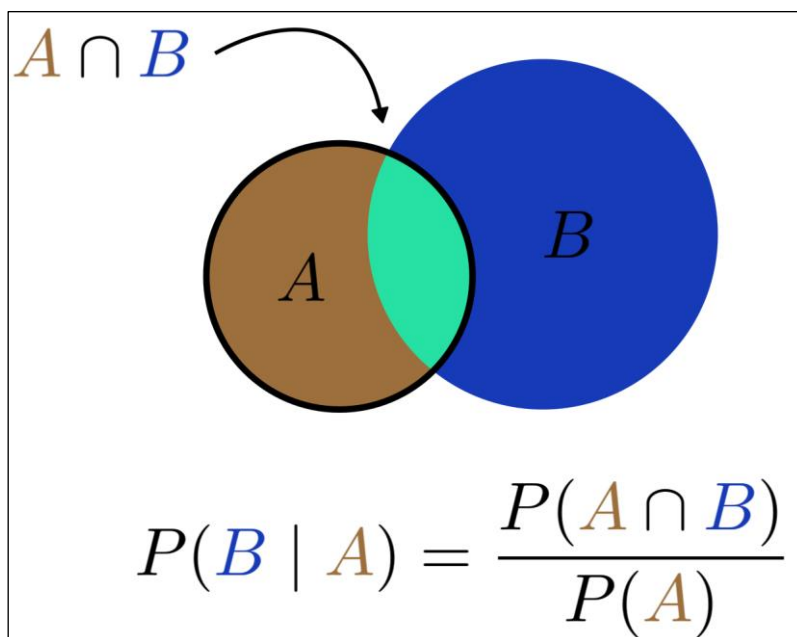
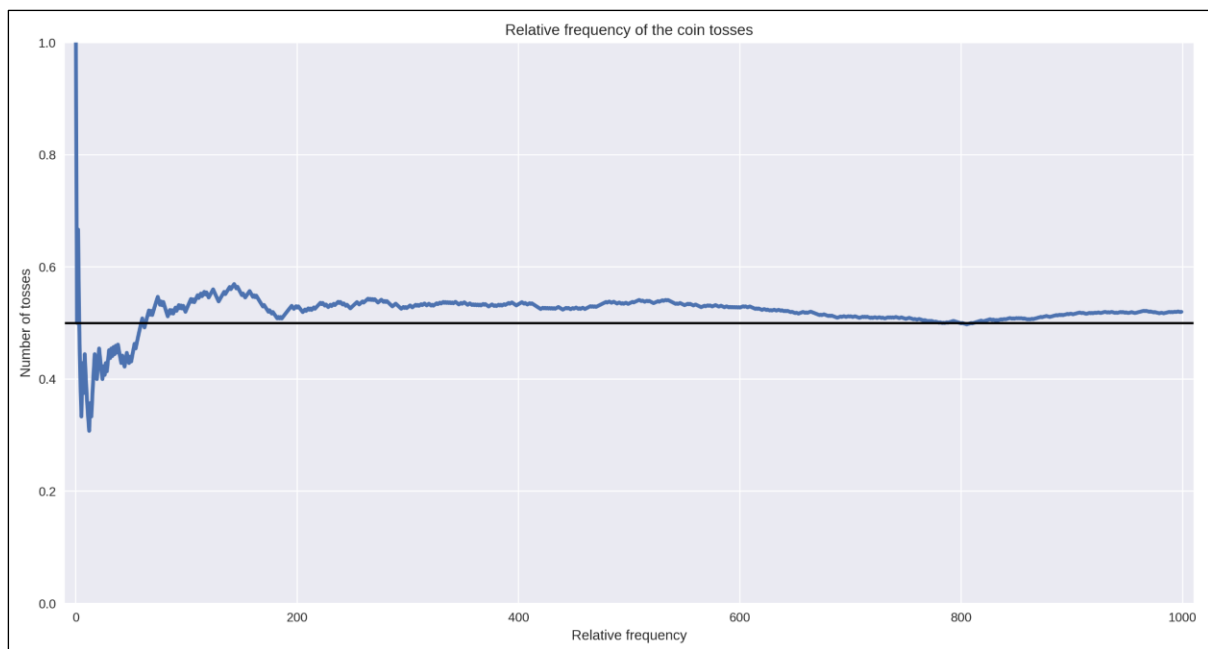




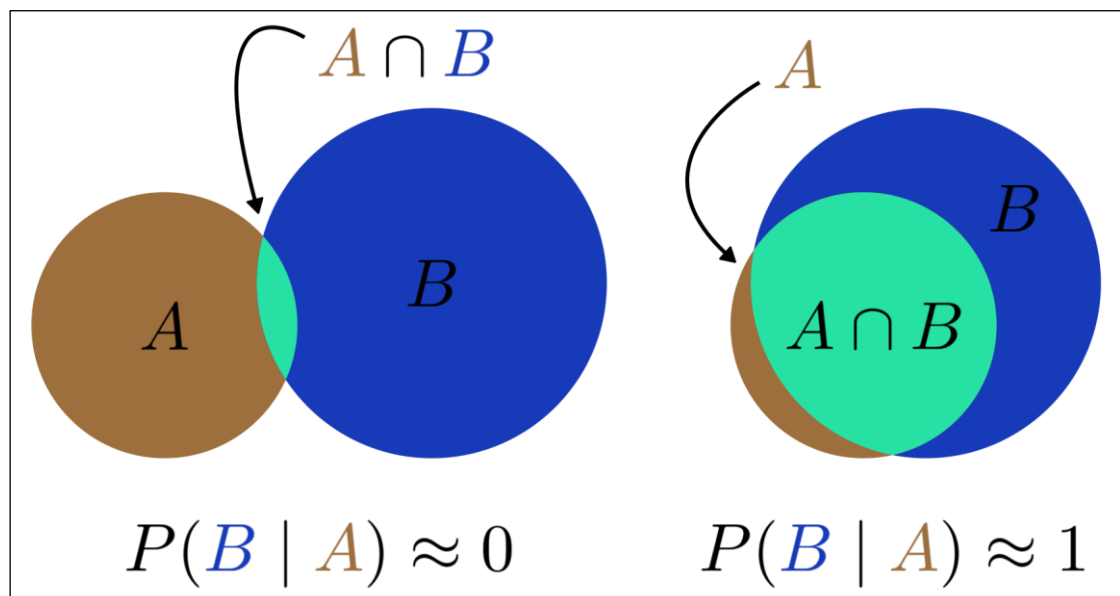
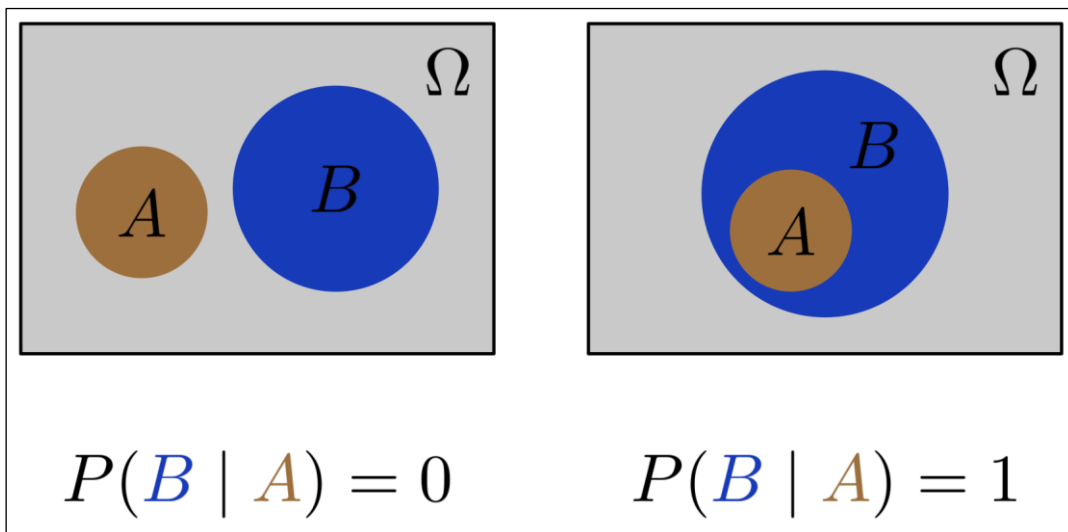
$P(A \cap B)$: probability that A AND B occurs

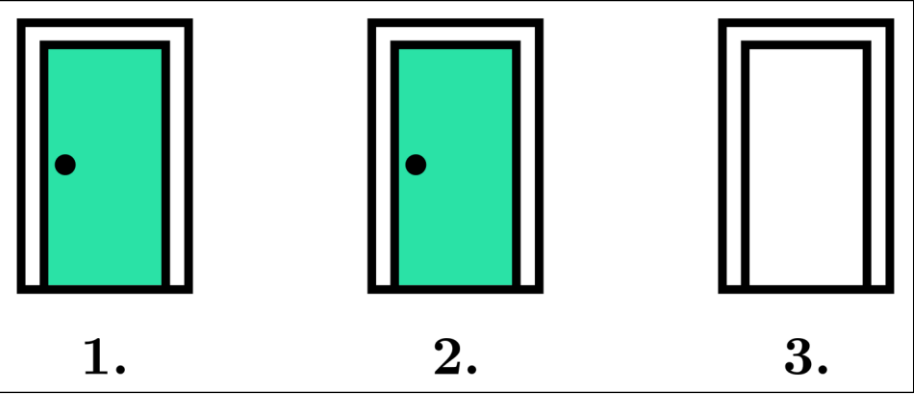
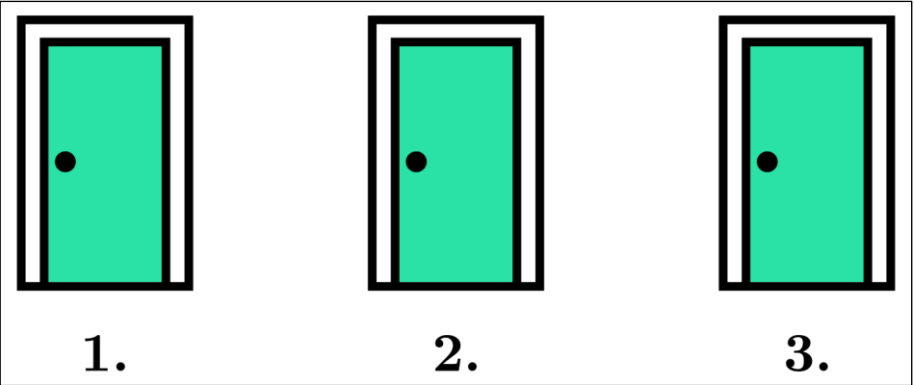
$P(A \cup B)$: probability that A OR B occurs



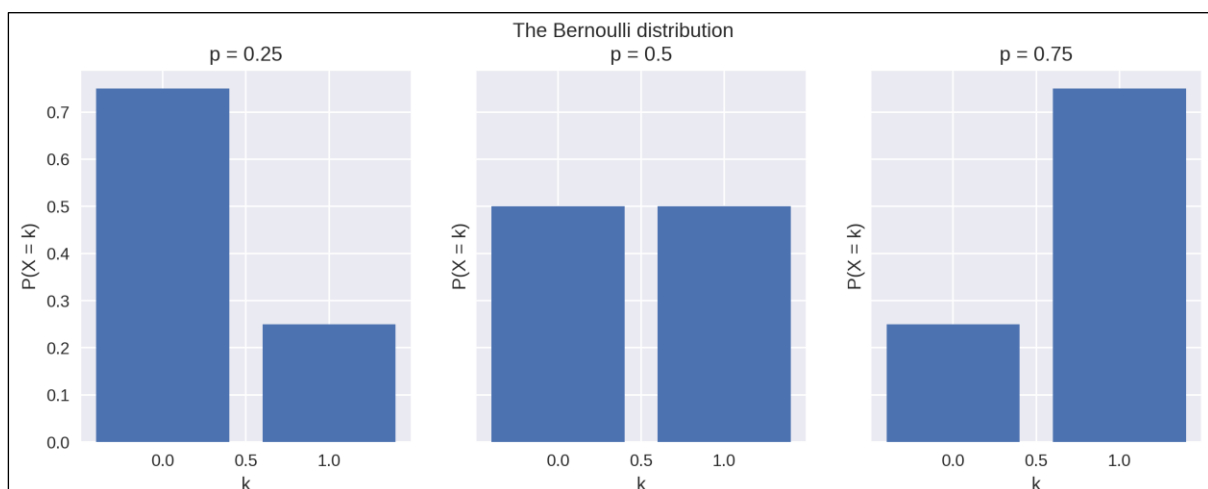
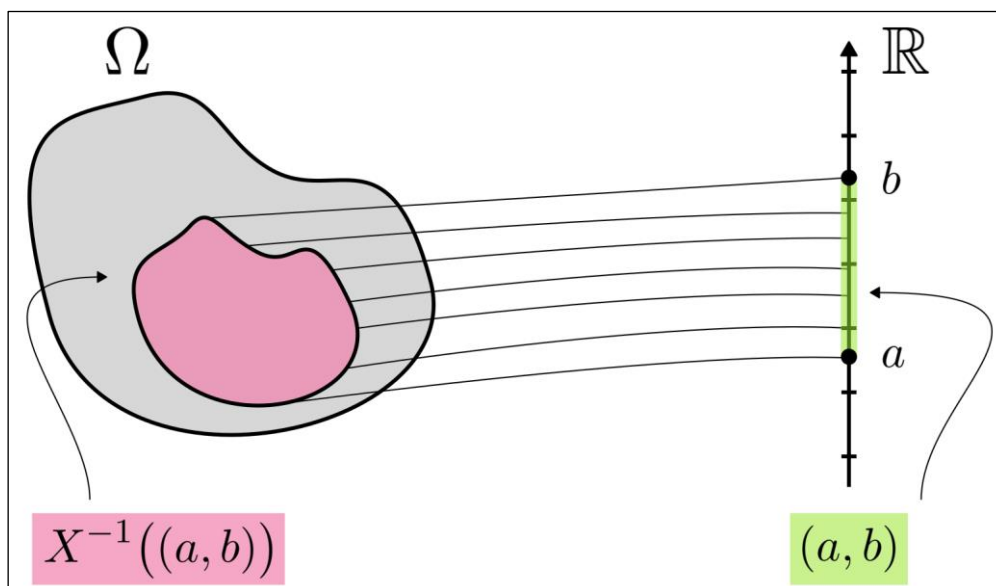
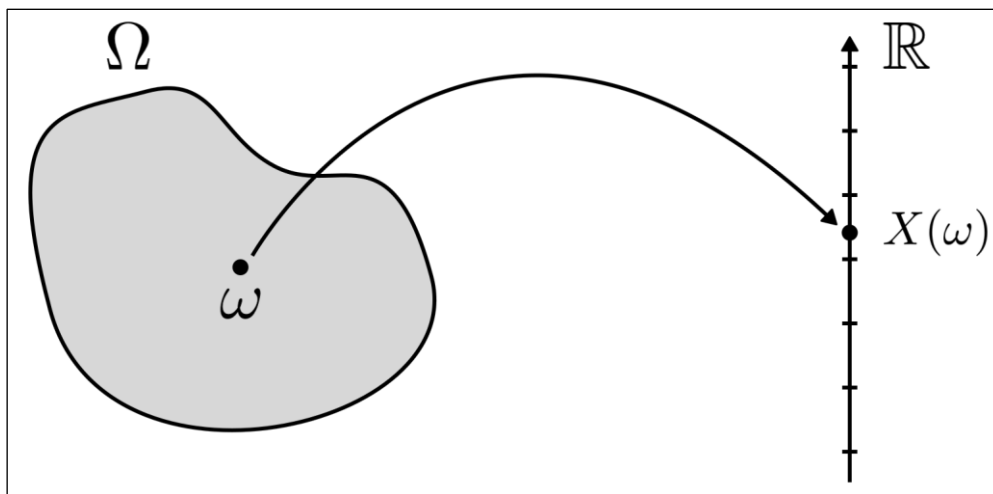


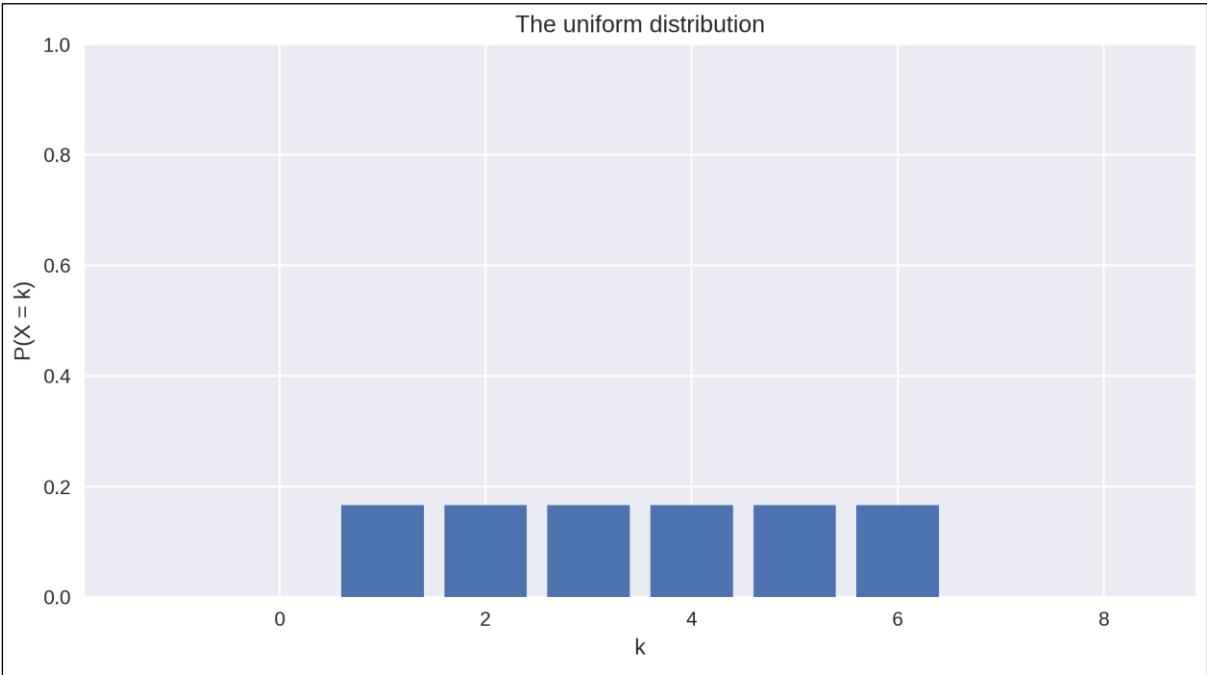
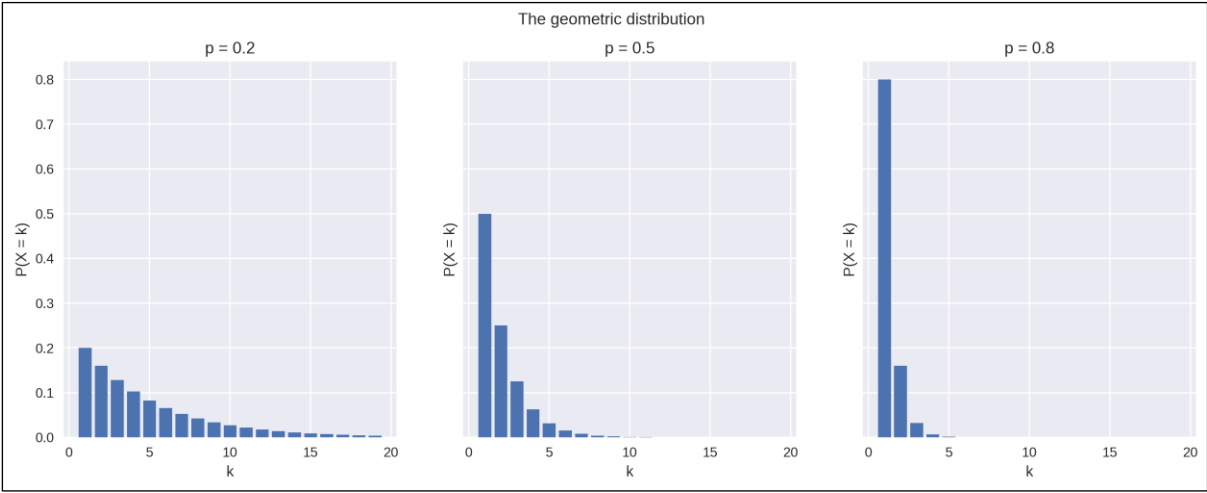
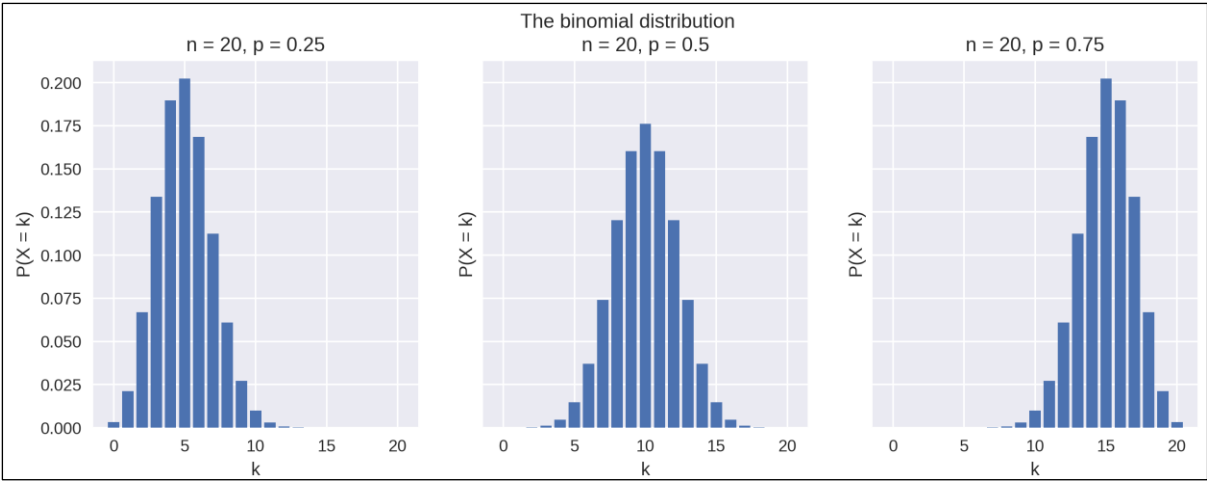
$$\underbrace{P(B | A)}_{\text{posterior}} = \frac{\overbrace{P(A | B)}^{\text{likelihood}} \overbrace{P(B)}^{\text{prior}}}{P(A)}$$

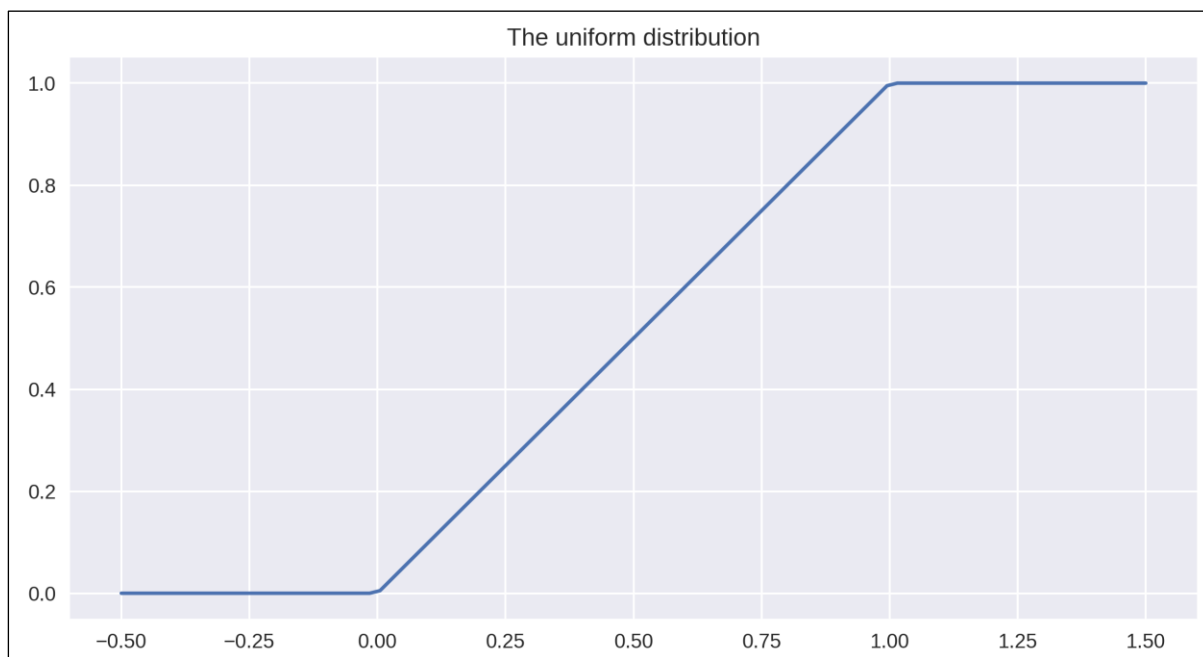
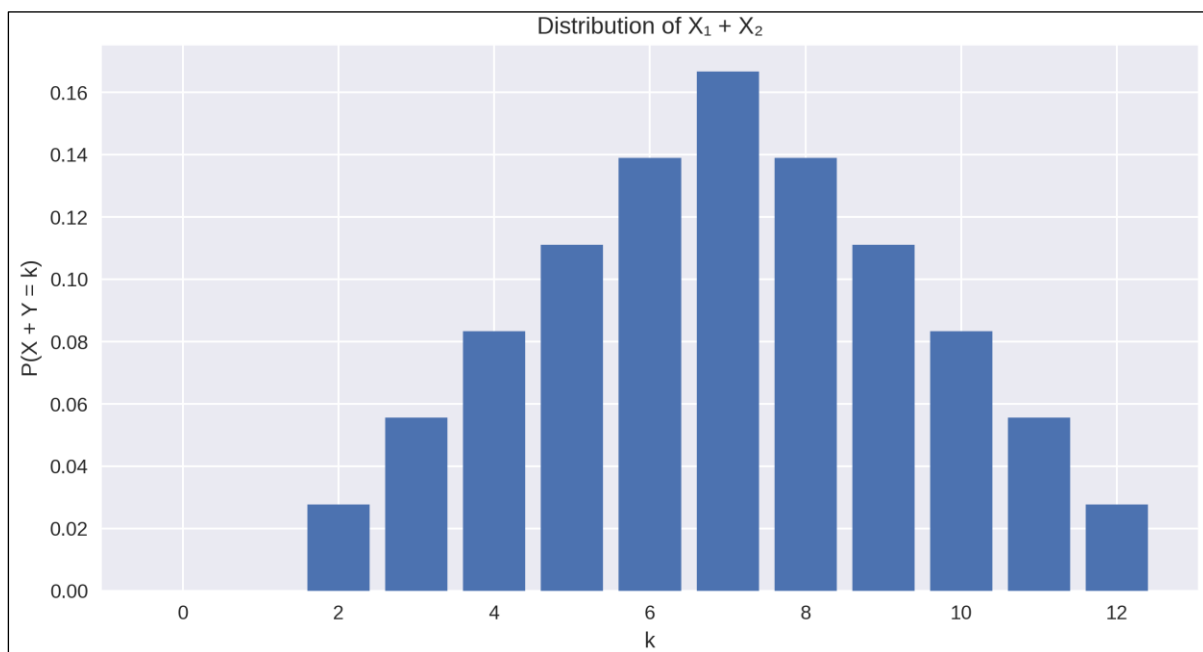


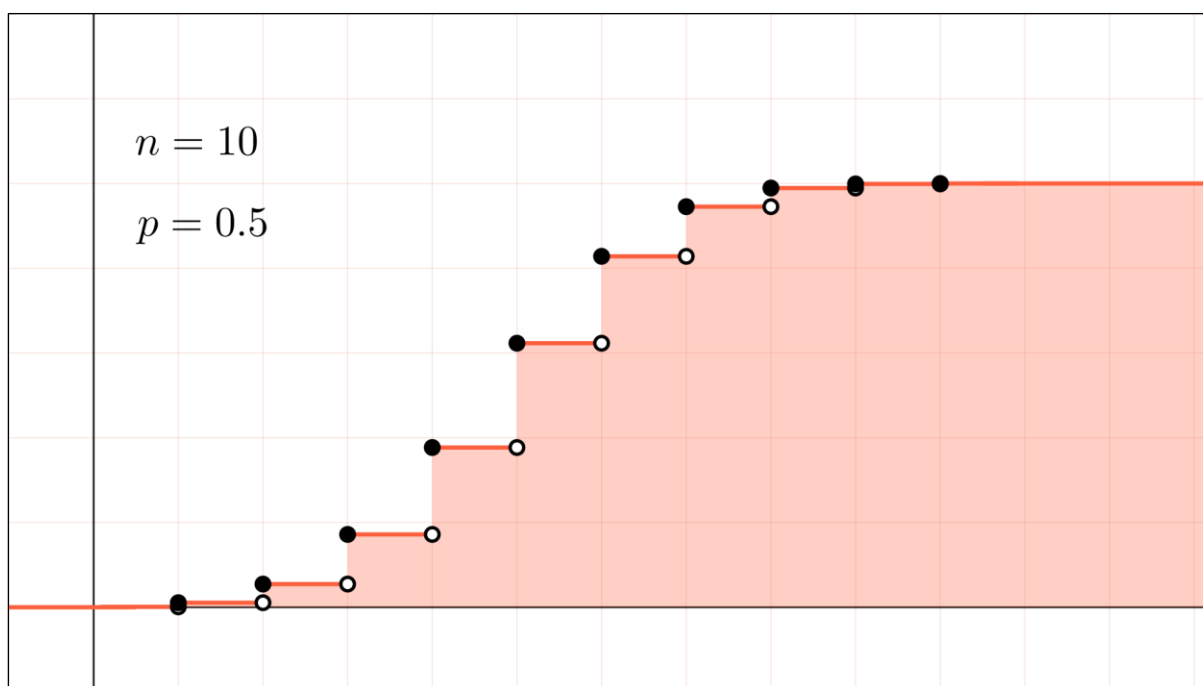
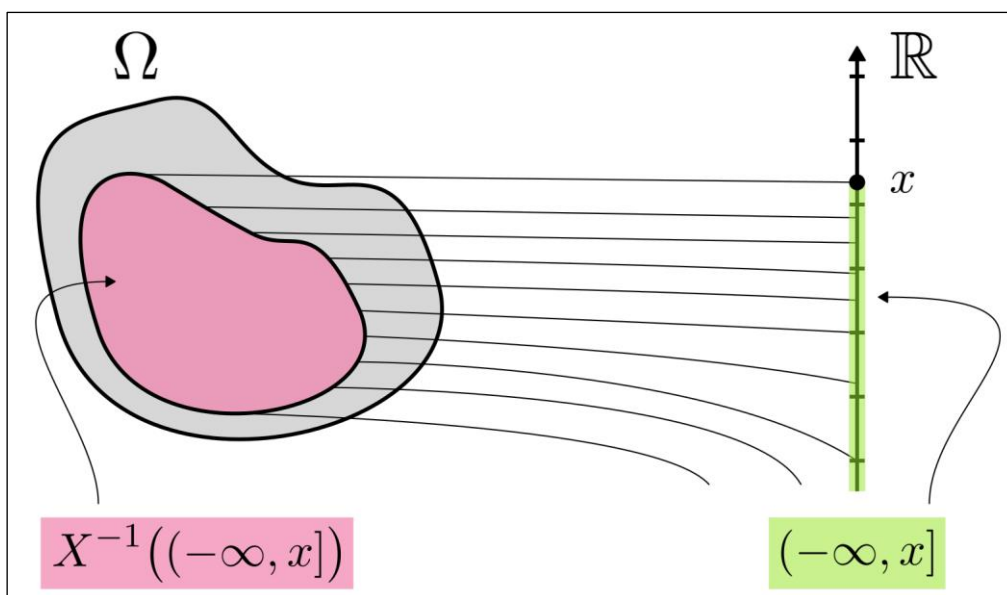


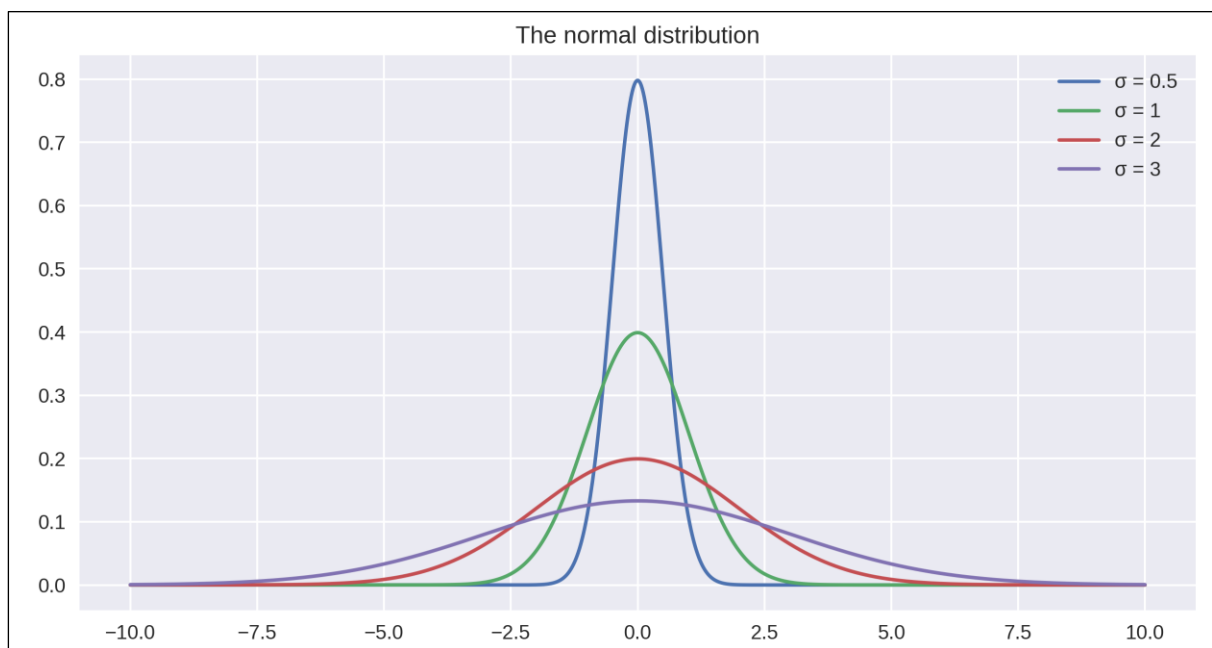
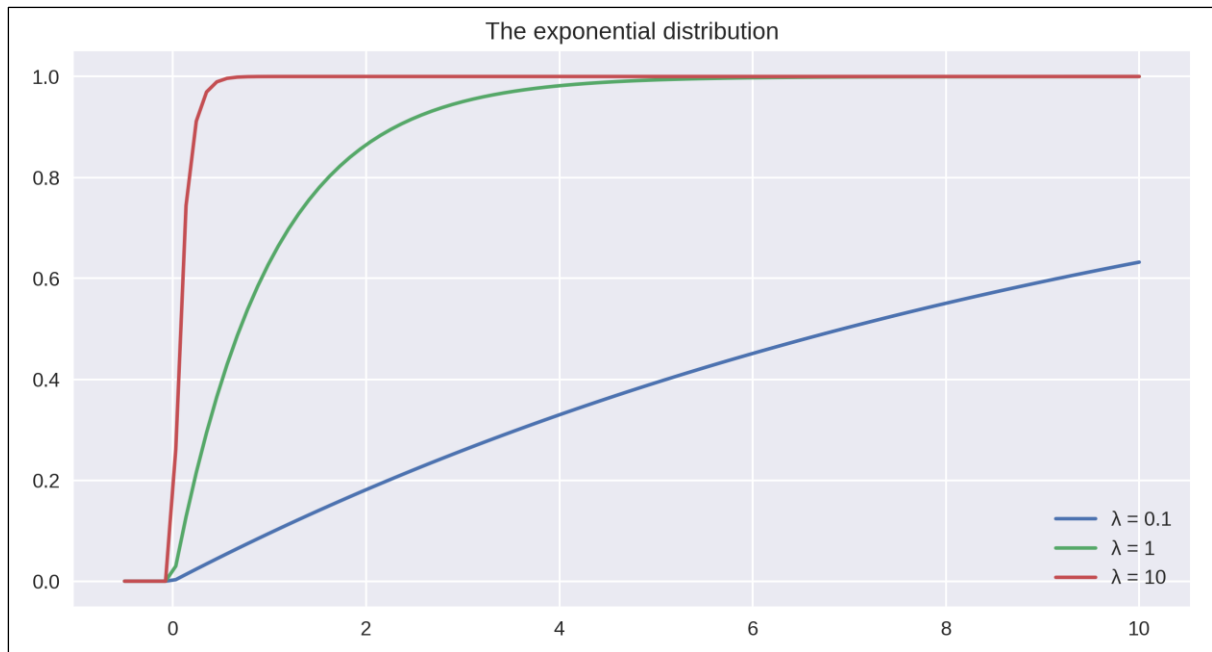
Chapter 19: Random Variables and Distributions

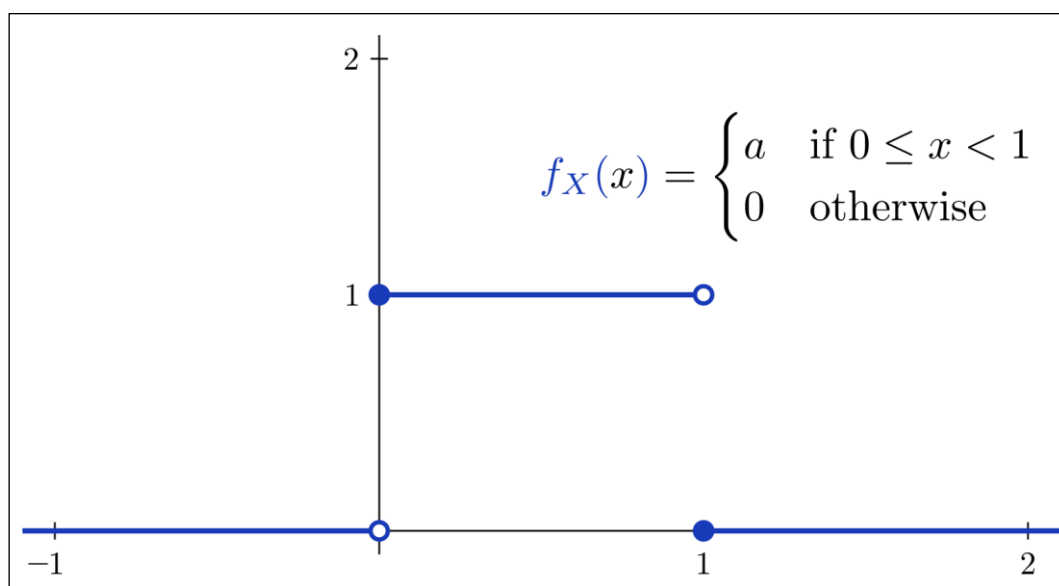
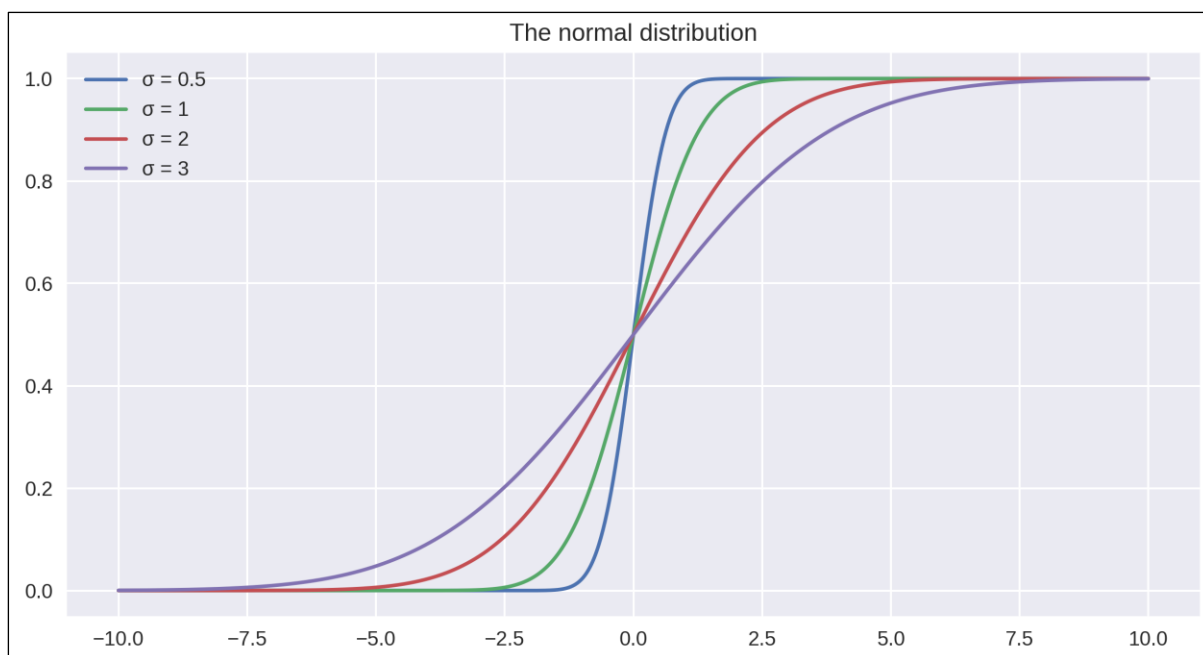


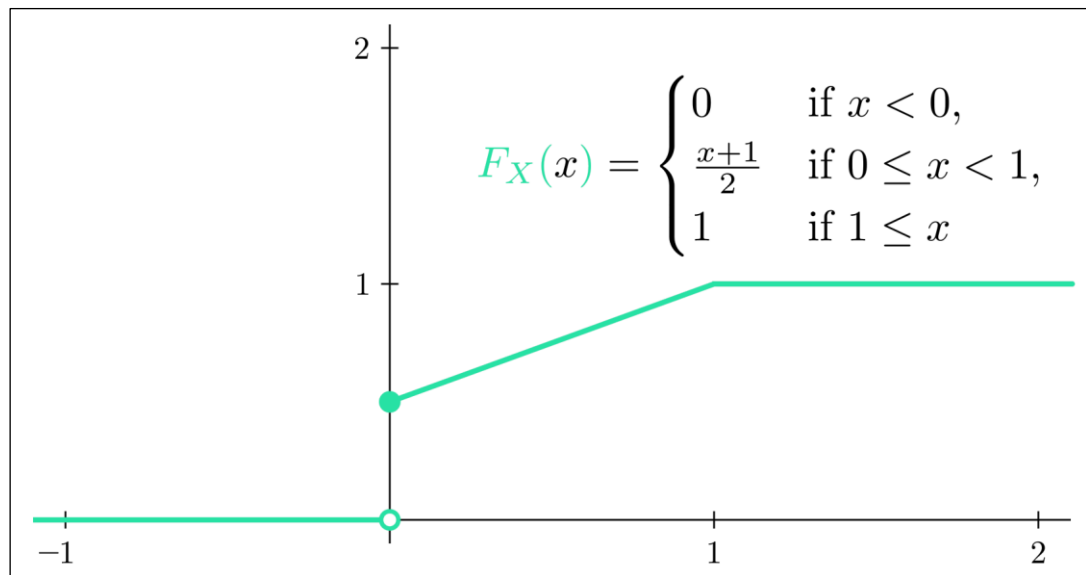
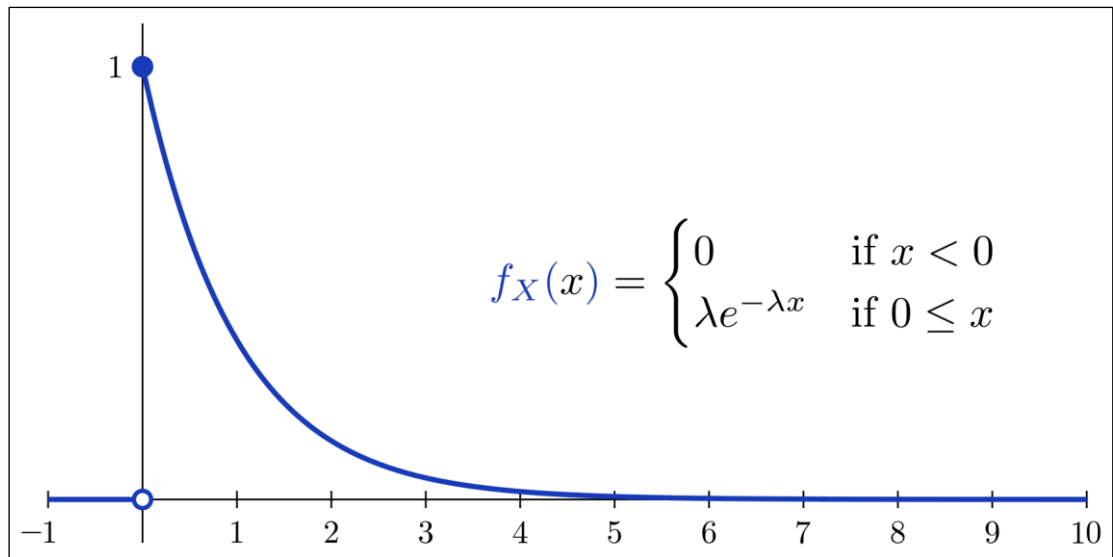












Chapter 20: The Expected Value

the opponent's cards

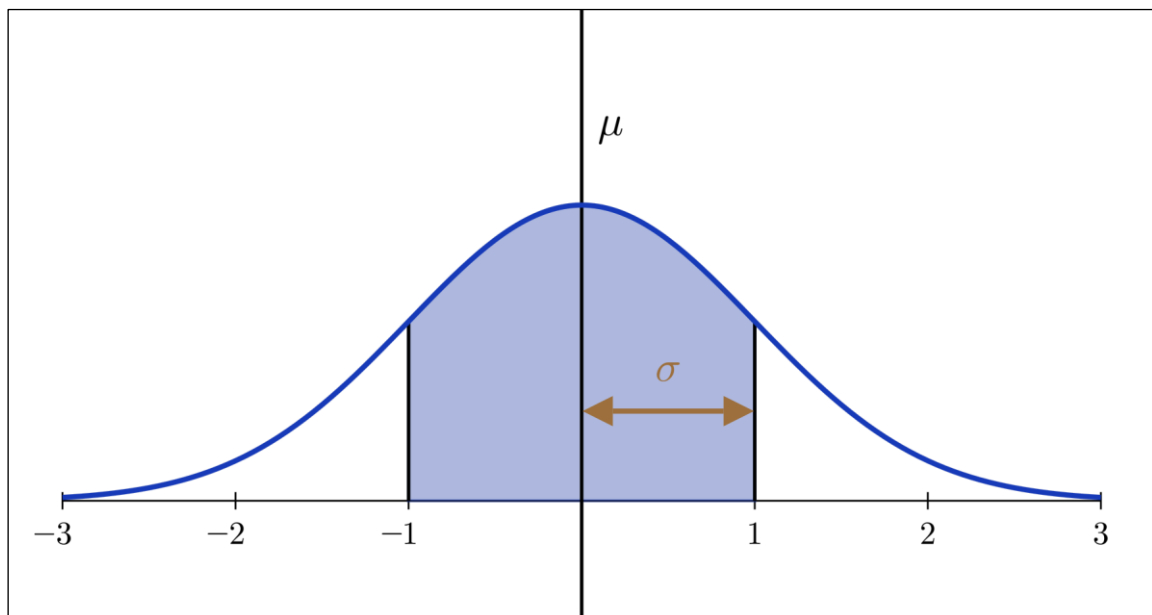
the last card to be revealed

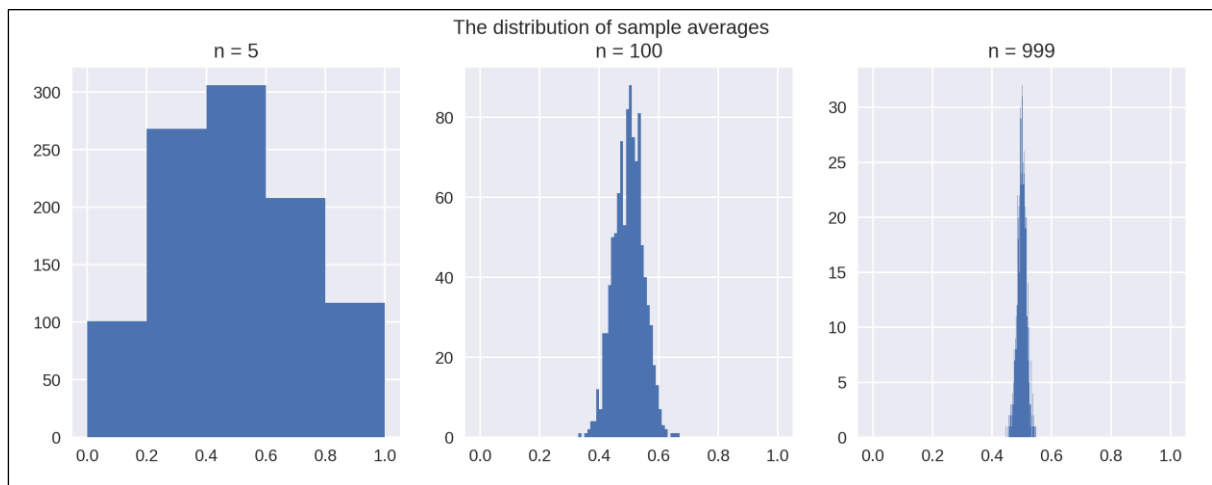
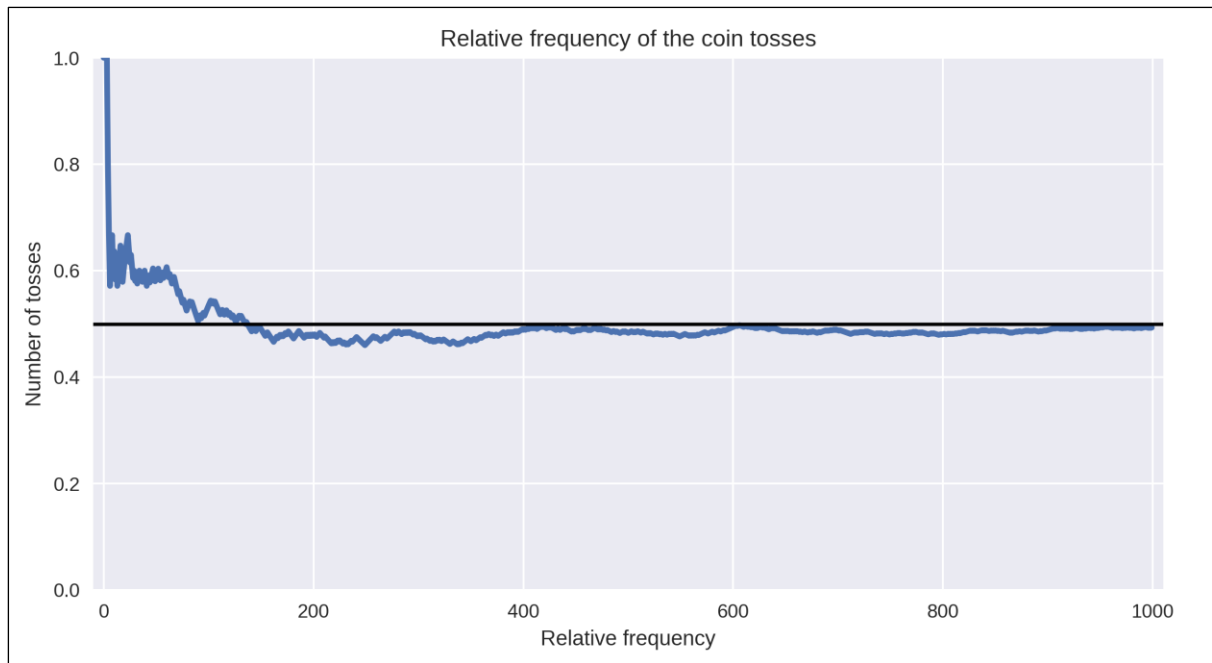
pot

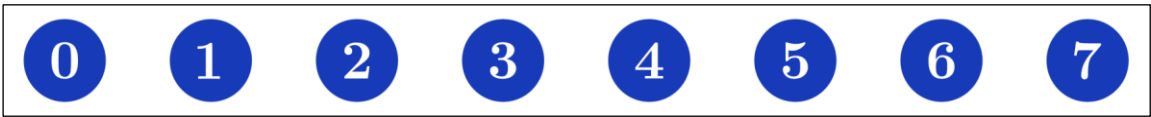
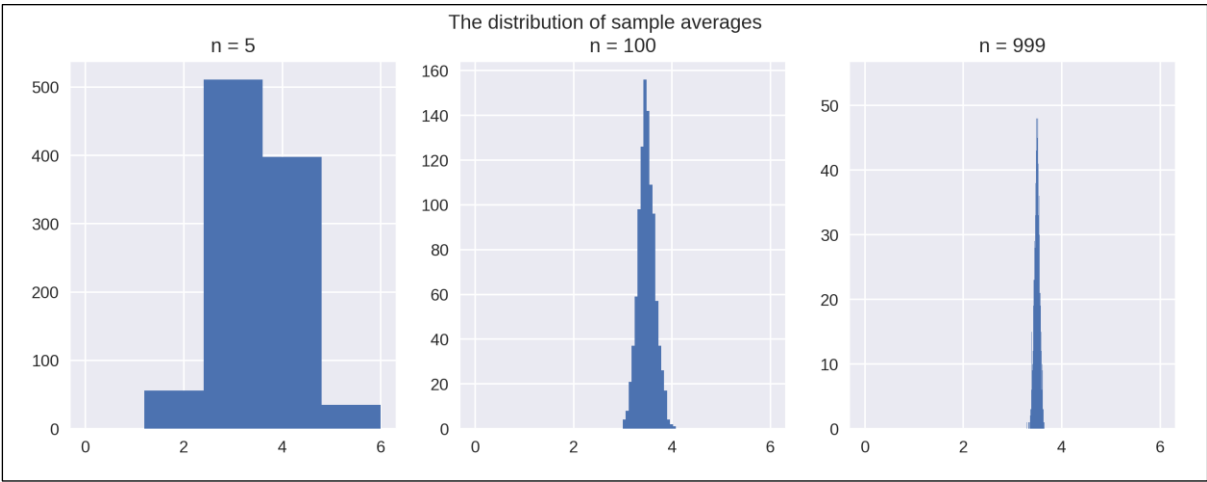
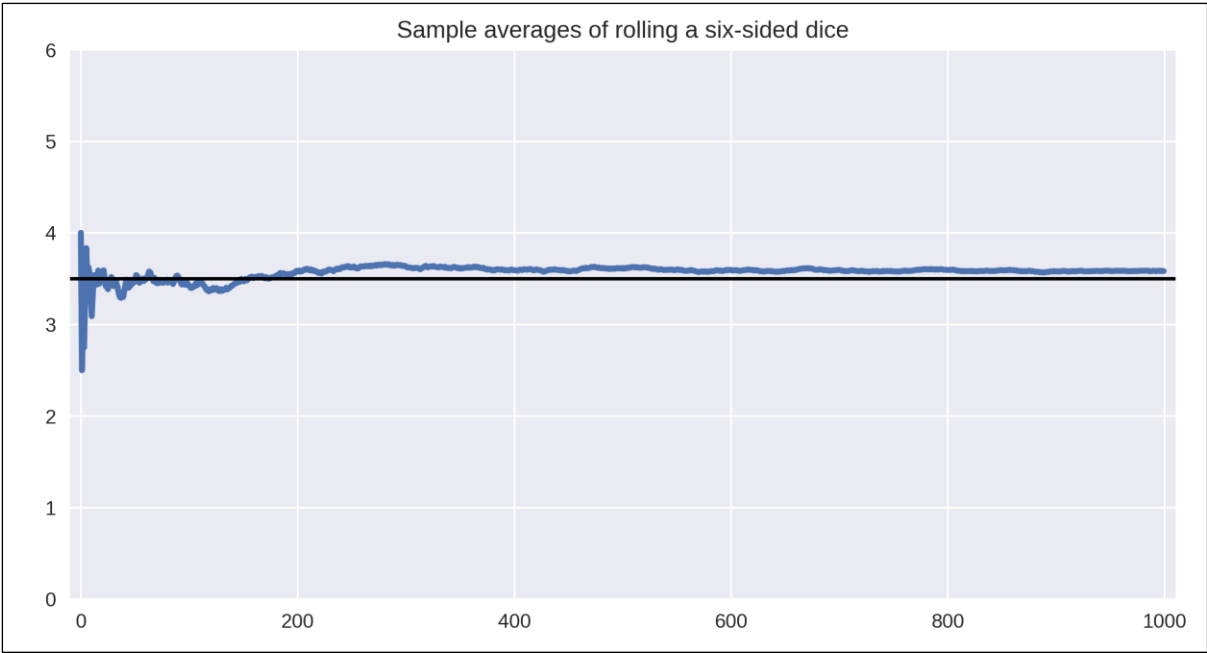
bet to be called

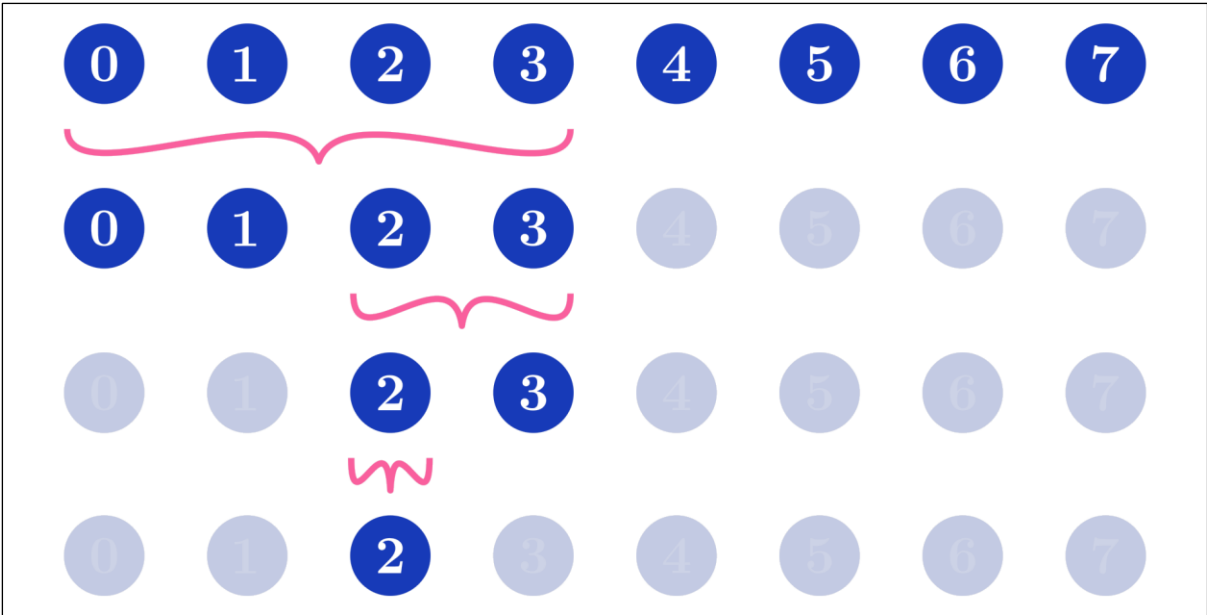
your cards

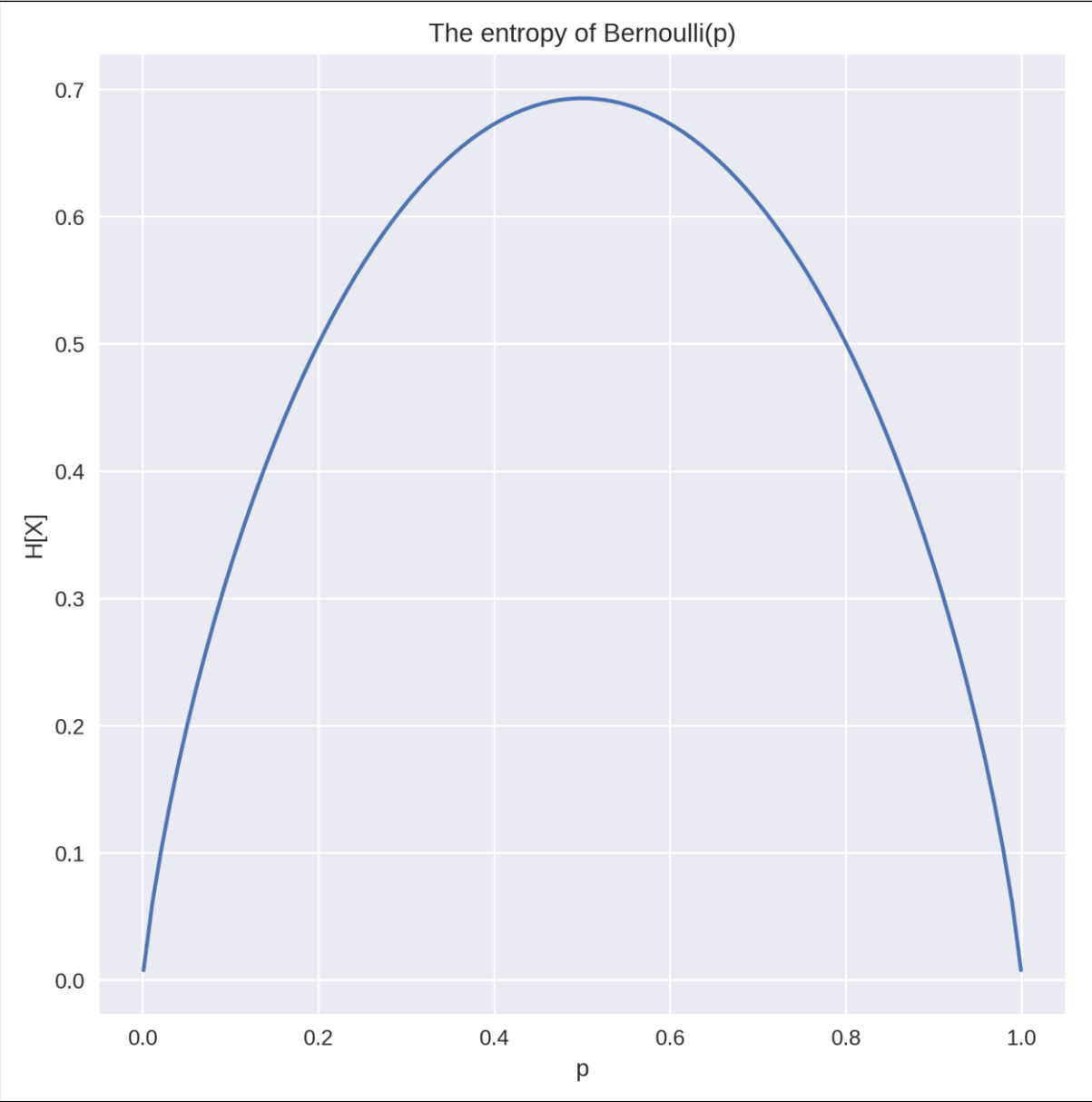
The diagram illustrates a poker hand. At the top, two cards with green question marks represent the opponent's cards. Below them, a red chip icon represents the pot. To the right, a sequence of five cards is shown: 7 of spades, 8 of diamonds, Jack of spades, 10 of clubs, and a card with a green question mark. An arrow points to the last card, labeled 'the last card to be revealed'. Below the pot, a red chip icon is labeled 'bet to be called'. At the bottom, two cards (3 of spades and 3 of hearts) represent 'your cards'.

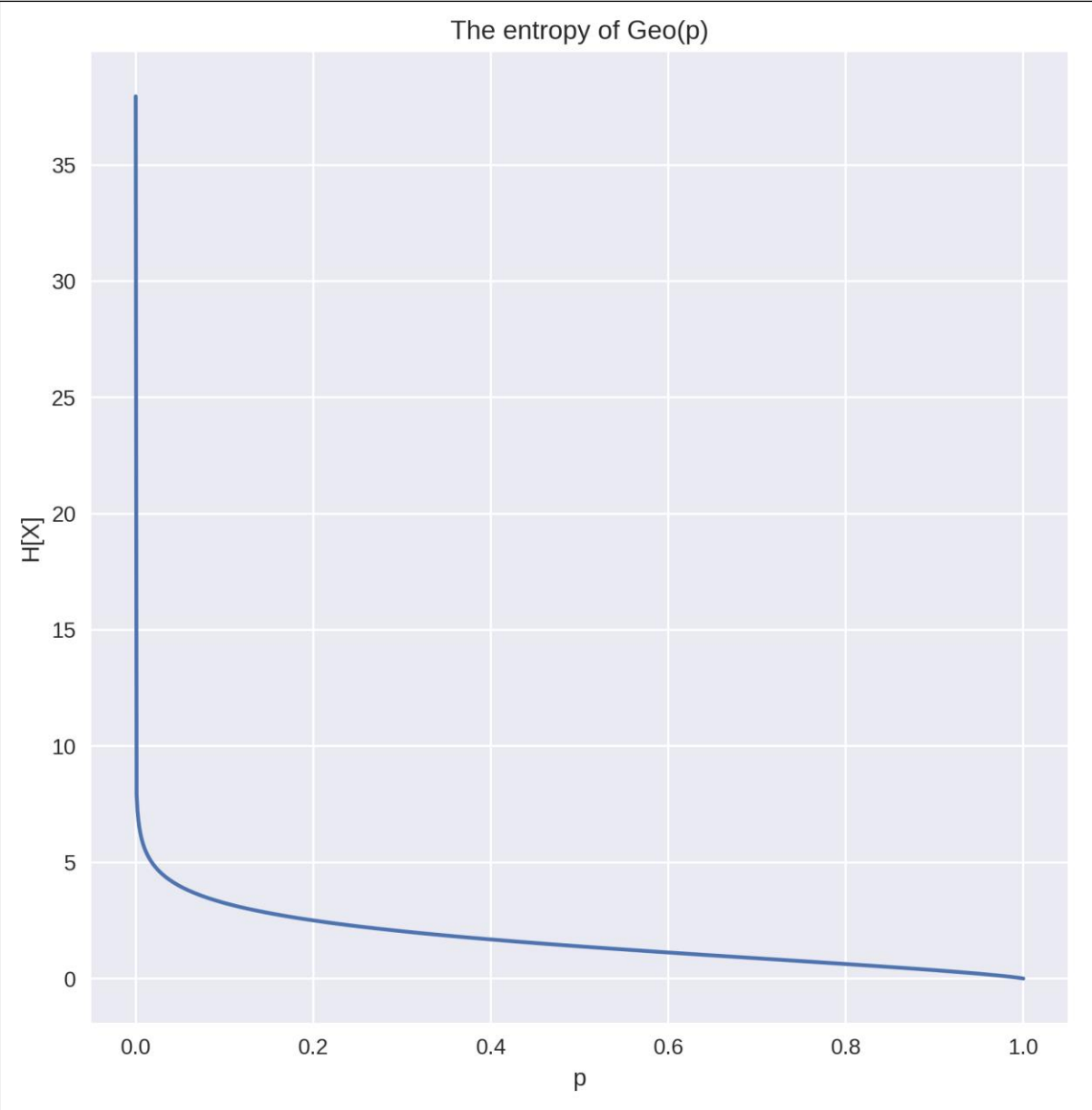




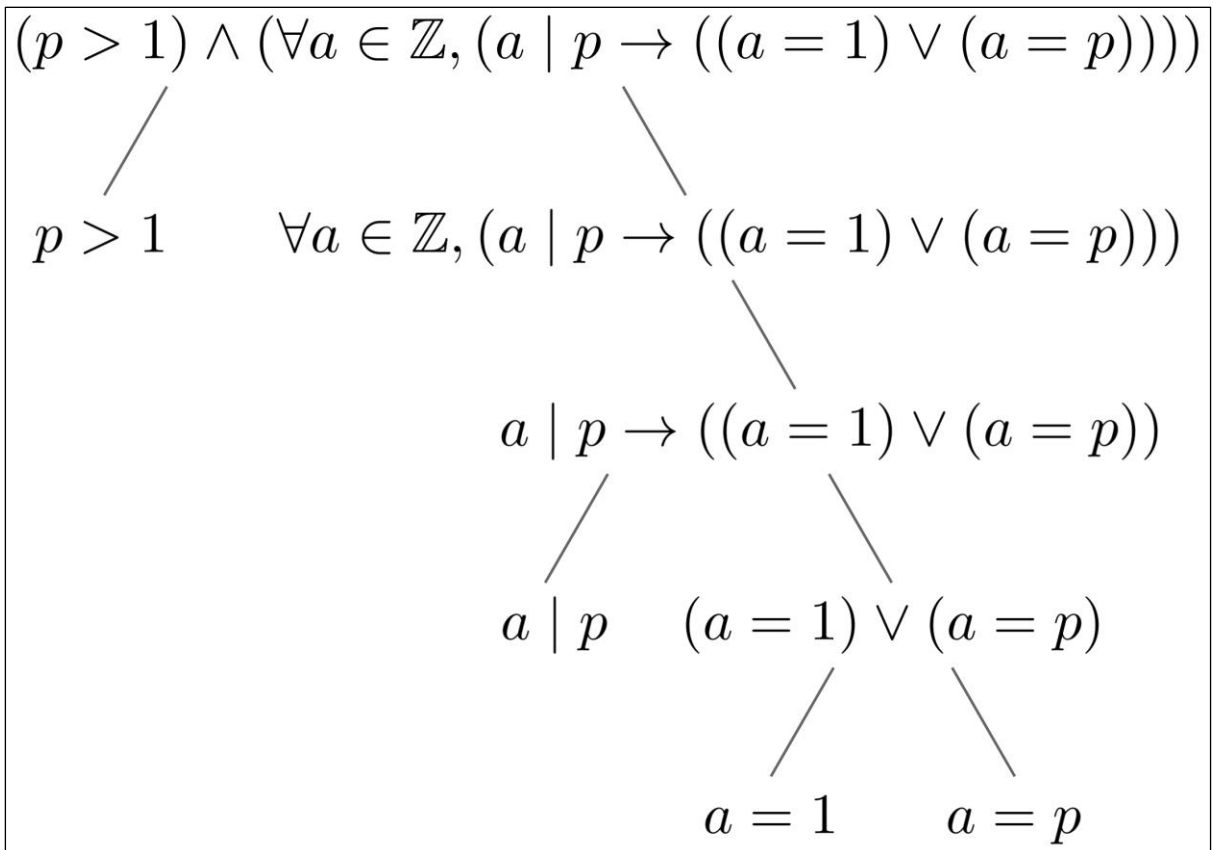




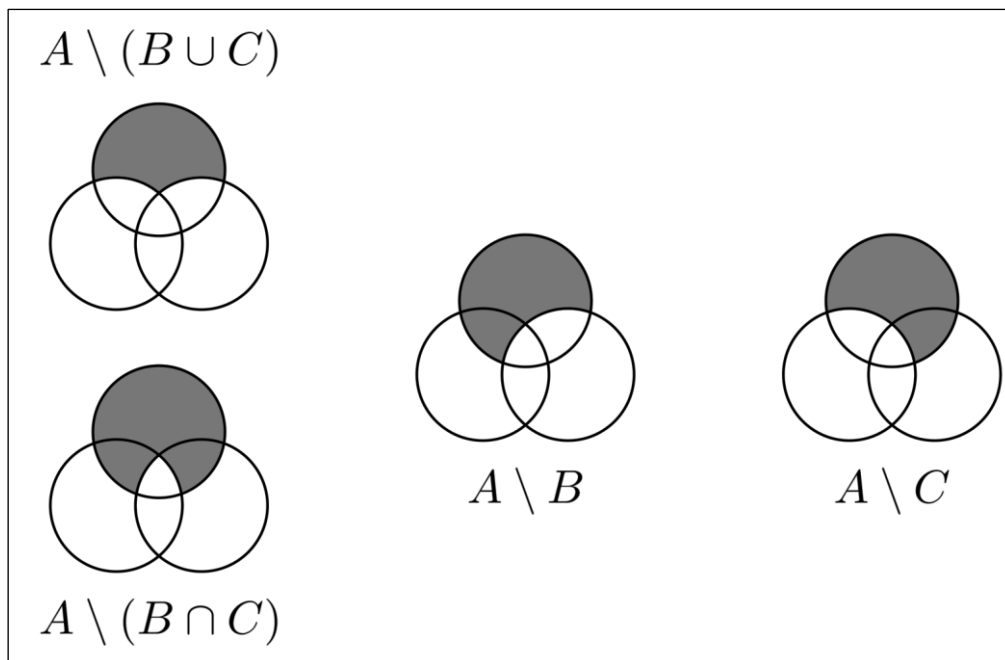
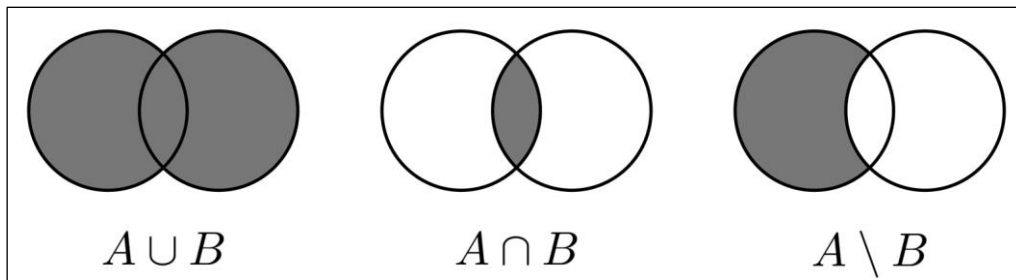


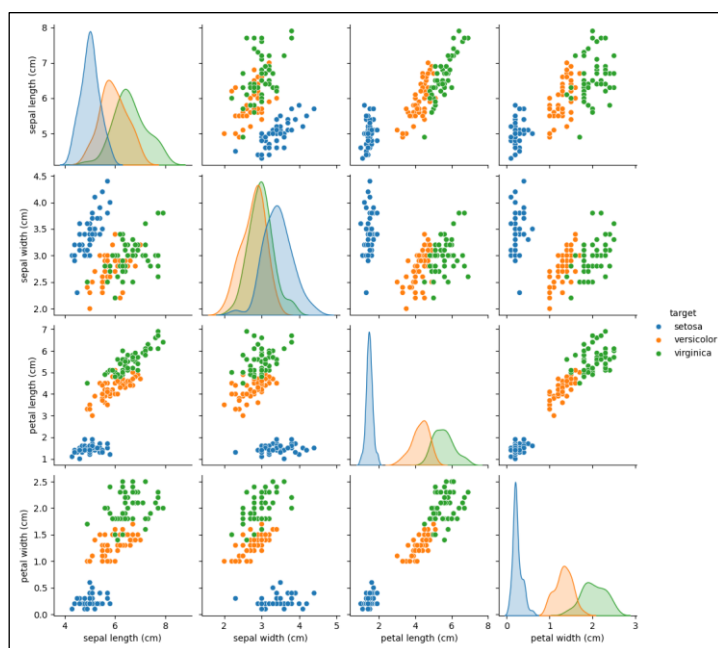
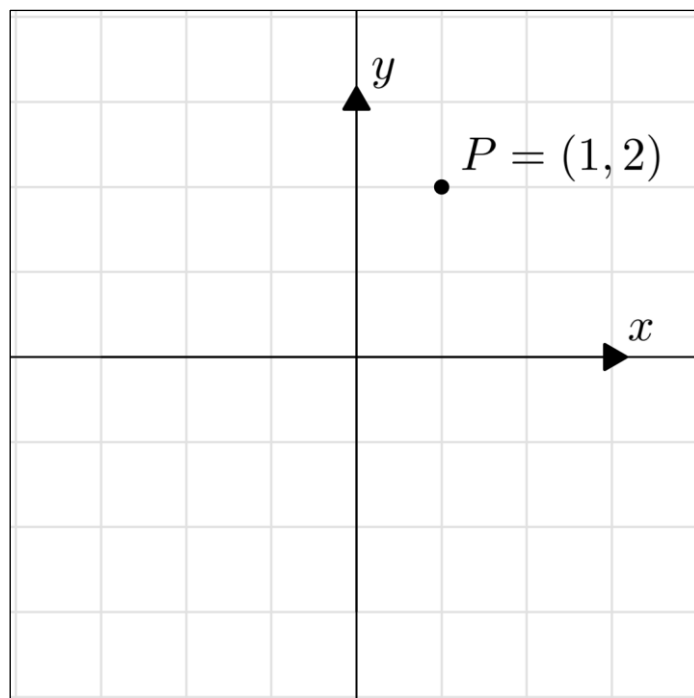


Appendix B: The Structure of Mathematics



Appendix C: Basics of Set Theory





Appendix D: Complex Numbers

