MATH 0200: Preparation for Scientific Calculus

Polynomial Bonus

Problem 1 [2 pts]

(a) How many polynomials of degree 1 (up to multiplication by a number) have **ONLY** $x = -1$ and $x = 1$ as zeros?

(b) Make a list of all polynomials of degree 2 (up to multiplication by a number) that have **ONLY** $x = -1$ and $x = 1$ as zeros?

(c) Make a list of all polynomials of degree 3 (up to multiplication by a number) that have **ONLY** $x = -1$ and $x = 1$ as zeros?

(d) Make a list of all polynomials of degree 5 (up to multiplication by a number) that have **ONLY** $x = -1$ and $x = 1$ as zeros?

(e) Make a list of all polynomials of degree 10 (up to multiplication by a number) that have **ONLY** $x = -1$ and $x = 1$ as zeros?

Problem 2 [2 pts]

(a) How many polynomials of degree ≤ 2 (up to multiplication by a number) have **ONLY** $x = -1$, $x = 0$ and $x = 1$ as zeros?

(b) Make a list of all polynomials of degree 3 (up to multiplication by a number) that have **ONLY** $x = -1$, $x = 0$ and $x = 1$ as zeros?

(c) Make a list of all polynomials of degree 5 (up to multiplication by a number) that have **ONLY** $x = -1$, $x = 0$ and $x = 1$ as zeros?

(d) Make a list of all polynomials of degree 6 (up to multiplication by a number) that have **ONLY** $x = -1$, $x = 0$ and $x = 1$ as zeros?

Problem 3 **[2 pts]** Consider the two friends Michelangelo  and Leonardo  . They love to eat pizzas. You have n pizzas and must give each of them at least one. How many ways are there to distribute the pizzas among the two friends?

(a) $n = 1$.

(b) $n = 2$.

(c) $n = 3$.

(d) $n = 5$.

(e) $n = 10$.

Problem 4 **[2 pts]** Now Raphael  joined the party. How many ways are there to distribute n pizzas among the three friends?

(a) $n \leq 2$.

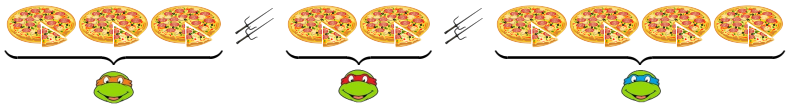
(b) $n = 3$.

(c) $n = 5$.

(d) $n = 6$.

Problem 5 **[2 pts]** Compare your answers to Problem 1 and 2. Can you explain the pattern that you observe?

Problem[⋆1] How is the picture below related to the problems above and what is a general formula (any number n, three turtles)?



[1] Award: slice of pizza of your choice for full explanation!