

Mathematical Induction and Proof of Recursion

10/10/2023

Prove Algebra 2 Math Exam Review (MATH202)

PROVE BY INDUCTION 1.1, 1.2, 1.3, 1.4, 1.5, 1.6

Problem 1.1.1

1.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$  2.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$  3.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$
4.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$  5.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$
6.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$  7.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$
8.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$  9.  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

Problem 1.2

10. Prove using induction:  $(x^n - 1)^2 = (x - 1)^2 (x^{n-1} + x^{n-2} + \dots + 1)^2$
11. Prove using long division:  $(x^n - 1)^2 = (x - 1)^2 (x^{n-1} + x^{n-2} + \dots + 1)^2$

Problem 1.3

12. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$
13. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

Problem 1.4

14. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

n	1	2	3	4	5
$(1+2+\dots+n)^2$	1	9	36	100	225
$1^3 + 2^3 + \dots + n^3$	1	9	36	100	225

15. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

n	1	2	3	4	5
$(1+2+\dots+n)^2$	1	9	36	100	225
$1^3 + 2^3 + \dots + n^3$	1	9	36	100	225

16. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

17. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$

18. Prove by induction:  $(1+2+\dots+n)^2 = 1^3 + 2^3 + \dots + n^3$