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Induction Examples Question 1. Prove using mathematical induction that for all n 1, 1+4+7++(3n 2) = n(3n 1) 2: Solution. For any integer n 1, let Pn be the statement that 1+4+7++(3n 2) = n(3n 1) 2: Base Case. The statement P1 says that 1 = 1(3 1) 2; which is true. Inductive Step. Fix k 1, and suppose that Pk holds, that is, 1+4+7++(3k 2) = k(3k 1) 2:

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The Principle of Mathematical Induction with Examples and ...

Problem 1 Use mathematical induction to prove that 1 + 2 + 3 + ... + n = n (n + 1) / 2 for all positive integers n. Solution to Problem 1: Let the statement P (n) be 1 + 2 + 3 + ... + n = n (n + 1) / 2 STEP 1: We first show that p (1) is true. Left Side = 1 Right Side = 1 (1 + 1) / 2 = 1 Both sides of the statement are equal hence p (1) is true.

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Induction: Problems with Solutions

Xn r=1. r(r+1) = 1 3 n(n+1)(n+2) 8. Xn r=1. r(r+1)(r+2) = 1 4 n(n+1)(n+2)(n+3) Can you see how the results from numbers 6-8 could be used to obtain the results mentioned in 1-3. Numbers 6-8 suggest a general pattern. This too could be proved by induction. 9* Xn r=1.

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Xn r=1. r(r +1) = 1 3 n(n+1)(n+2) 8. Xn r=1. r(r +1)(r +2) = 1 4 n(n+1)(n+2)(n+3) Can you see how the results from numbers 6-8 could be used to obtain the results mentioned in 1-3. Numbers 6-8 suggest a general pattern.

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numbers, just to test it out. Remember our property: n3 + 2n n 3 + 2 n is divisible by 3 3.

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Solution. Observe that for k>0.1 k ? 1 k+1 = k+1?k k(k+1) = 1 k(k+1): Hence 1.2 + 1.2

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