Pre-Calculus Practice Test C (Sums/Pascals Triangle/Partial Fractions)

Prove the sum by using the Sums of Powers of Integers Formulas. SHOW ALL YOUR WORK.

1. $\sum_{n=1}^{20} n^5$

2. $\sum_{n=1}^{30} 3n^4 - 5n^3$

Determine the limit of the following sequences. Use limit notation to show your answer.

3. $a_n = \frac{6n^3+5n-3}{3n^5-3n+2}$

4. $a_n = \frac{7n^2+5n-3}{5n^2-3n+2}$

5. $a_n = \frac{8n-3}{6n^2-3n+2}$

6. $a_n = \left(\frac{7n^3+4n-1}{2n^3-5n+2}\right)\left(\frac{2n^4+8n-3}{5n^4-6n+2}\right)$

7. $a_n = \frac{9n^3+8n-1}{3n^5-7n+2} + \frac{8n^5+9n-1}{9n^5-5n+2}$

8. Use the following series to complete part a and b.

$$\sum_{n=1}^{\infty} \frac{(-5)^{n-1}}{n} x^n$$

a. Write the First 6 Terms of the following series.

b. Use the answer from part (a) to substitute x^2 into the series. Simplify your answer.

Use Pascals Triangle to expand the binomial.

9. $(3x - 4y)^6$

10. $(5x + 3y)^7$

Find the coefficient of the given term in the binomial expansion

11. Term: x^4 of $(2x + 5)^8$

12. Term: x^3y^6 of $(3x + 2y)^9$

Find the partial fraction decomposition.

13. $\dfrac{5}{x^2-8x}$

14. $\dfrac{x-4}{x^2+9x+8}$

15. $\dfrac{3x-2}{x^2-25}$