

The Binomial Theorem

A) Find the binomial coefficients.

1. 10
2. 1
3. 15,504
4. 210
5. 4,950

B) Evaluate using Pascal's Triangle.

1. 56
2. 35

C) Use the Binomial Theorem to expand and simplify the expression.

1. $x^4 + 4x^3 + 6x^2 + 4x + 1$
2. $a^4 + 24a^3 + 216a^2 + 864a + 1296$
3. $y^3 - 12y^2 + 48y - 64$
4. $x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$
5. $r^6 + 18r^5s + 135r^4s^2 + 540r^3s^3 + 1215r^2s^4 + 1458rs^5 + 729s^6$
6. $243a^5 - 405a^4b + 270a^3b^2 - 90a^2b^3 + 15ab^4 - b^5$
7. $1 - 6x + 12x^2 - 8x^3$
8. $x^8 + 20x^6 + 150x^4 + 500x^2 + 625$
9. $\frac{1}{x^5} + \frac{5y}{x^4} + \frac{10y^2}{x^3} + \frac{10y^3}{x^2} + \frac{5y^4}{x} + y^5$
10. $2x^4 - 24x^3 + 113x^2 - 246x + 207$

D) Expand the binomial using Pascal's Triangle to determine the coefficients.

1. $32t^5 - 80t^4s + 80t^3s^2 - 40t^2s^3 + 10ts^4 - s^5$
2. $x^5 + 10x^4y + 40x^3y^2 + 80x^2y^3 + 80xy^4 + 32y^5$

E) Use the Binomial Theorem to expand and simplify the expression.

1. $x^2 = 12x^{\frac{3}{2}} + 54x + 108x^{\frac{1}{2}} + 81$
2. $8t^{\frac{3}{2}} - 12t + 6\sqrt{t} - 1$
3. $40u^{\frac{9}{5}} + 80u^{\frac{6}{5}} + 80u^{\frac{3}{5}} + 10u^{\frac{12}{5}} + u^3 + 32$

Precalculus Problem Session #16- Solutions

F) Expand the binomial in the difference quotient and simplify.

The difference quotient is as follows: $\frac{f(x+h)-f(x)}{h}$

1. $3x^2 + 3xh + h^2$
2. $\frac{1}{h}(-\sqrt{x} + \sqrt{h+x})$
3. $4x^3 + 6x^2h + 4xh^2 + h^3$