

## PRECALCULUS PROBLEM SESSION #16- PRACTICE PROBLEMS

### The Binomial Theorem

A) Find the binomial coefficients.

1.  ${}_5C_3$

2.  ${}_{12}C_0$

3.  ${}_{20}C_{15}$

4.  $\binom{10}{4}$

5.  $\binom{100}{98}$

B) Evaluate using Pascal's Triangle.

1.  $\binom{8}{5}$

2.  ${}_7C_4$

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

1.  $(x + 1)^4$

2.  $(a + 6)^4$

3.  $(y - 4)^3$

4.  $(x + y)^5$

5.  $(r + 3s)^6$

6.  $(3a - b)^5$

7.  $(1 - 2x)^3$

8.  $(x^2 + 5)^4$

9.  $\left(\frac{1}{x} + y\right)^5$

10.  $2(x - 3)^4 + 5(x - 3)^2$

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

1.  $(2t - s)^5$

2.  $(x + 2y)^5$

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

1.  $(\sqrt{x} + 3)^4$

2.  $(2\sqrt{t} - 1)^3$

3.  $\left(u^{\frac{3}{5}} + 2\right)^5$

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

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

1.  $f(x) = x^3$

2.  $f(x) = \sqrt{x}$

3.  $f(x) = x^4$