Today's assignment:

*12.6 notes

*warm up A-E

*online #1-13 (must show organized work, label each problem, **hand in written work** when finished with online assignment.)

Notes 12.6: Expanding binomials

Binomial: an expression with two terms such as $x+y$ or $2a-5$

Factorial: $4! = (4)(3)(2)(1) \rightarrow 4! = 24$

$n! = n(n-1)(n-2)\cdots(1)$

$0! = 1$ (special definition)

Notes 12.6

Binomial coefficient formula:

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Further details will be given the next time we meet. Today, we will just learn how to simplify the expression.

Binomial coefficient example:

evaluate without a calculator:

A. $\binom{7}{3} = \frac{7!}{3!4!}$

$= \frac{7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{3} \cdot \cancel{2} \cdot 1 \cdot \cancel{4!}}$

$= 35$

or →

$\frac{7654\cancel{321}}{321\cancel{4321}}$

same as 4!

same as 4!

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Binomial coefficient example:

evaluate without a calculator:

A. $\binom{7}{3} = \frac{7!}{3!\,4!}$

$= \frac{7 \cdot 6 \cdot 5 \cdot 4!}{3 \cdot 2 \cdot 1 \cdot 4!}$

$= 35$

B. $\binom{9}{5} = \frac{9!}{5!\,4!}$

$= \frac{9 \cdot 8 \cdot 7 \cdot 6 \cdot 5!}{5! \cdot 4 \cdot 3 \cdot 2 \cdot 1}$

$= 9 \cdot 7 \cdot 2$

$= 63 \cdot 2$

$= 126$

$$\binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Warm-up (put at the top of a new sheet of paper for today's online assignment)

Simplify...no calculator. Show all steps.

A. $\frac{7!}{5!}$ **B.** $\frac{7!}{5!3!}$ **C.** $\frac{10!}{3!7!}$

D. $\frac{100!}{98!}$ **E.** $\frac{20!}{2!18!}$

check answers: (out of order)

7 42 120 190 9900

Previous assignment:

10. Find the 5th term of $(2x - \sqrt{7}y)^6$

$\_\_?\_\_ (2x)^{?}(-\sqrt{7}y)^{?}$

use row 7, count over to 5th term

$15(\ )^2(\ )^4$

$= 15(2x)^2(-\sqrt{7}y)^4$

$= 15 \cdot 4x^2 \cdot 49y^4$

$= \boxed{2940x^2y^4}$

row 1				1						
row 2			1		1					
row 3		1		2		1				
row 4	1		3		3		1			
row 5	1		4		6		4		1	
row 6	1		5		10		10		5	1
row 7	$1a^6b^0$		$6a^5b^1$		$15a^4b^2$		$20a^3b^3$		$15a^2b^4$	$6a^1b^5$	$1a^0b^6$
row 8	1	7		21		35		35	21	7	1
row 9	1	8		28		56		70	56	28	8	1