Get out Homework from yesterday and have questions ready!

May 4th 2012

$$n = 6$$

$$r = 3 - 1 = 2$$

$$(a - 2\sqrt{3})^6$$

$$6nCr2 \, (a)^{6-2} (-2\sqrt{3})^2$$

$$15 \cdot a^4 \cdot 12$$

$$\boxed{180 \, a^4}$$

7) 4th term $(2n-3m)^{\textcircled{4}}$

$n=4$

$r=4-1=3$

$4nCr3 \quad k^{n-r}$

$_4C_3 (2n)^1 (-3m)^3$

$4 \cdot 2n \cdot -27m^3$

$-216 nm^3$

$2. \left(4-a\right)^4$

$1\left(4\right)^4\left(-a\right)^0 + 4\left(4\right)^3\left(-a\right)^1 + 6\left(4\right)^2\left(-a\right)^2 + 4\left(4\right)^1\left(-a\right)^3 + 1\left(4\right)^0\left(-a\right)^4$

$-a \cdot -a \qquad -a \cdot -a \cdot -a \qquad -a \cdot -a \cdot -a \cdot -a$

$256 \cdot -a \qquad 6 \cdot 16 \cdot a^2 \qquad 16 \cdot -a^3$

$256 - 256a + 96a^2 - 16a^3 + a^4$

$y^3 \cdot y^6 = y^9 \qquad \left(y^3\right)^6 = y^{18}$

BINOMIAL PROBABILITY DISTRIBUTION

In a binomial experiment, we can compute probabilities of certain outcomes.

For a binomial experiment to occur, these four conditions must be met:

1. There are a fixed number of observations (n).

2. Each observation is independent.
   - Ex: In a situation where tossing a coin, the 5th toss is not dependent on any of the previous 4 tosses. They are independent!

3. Each observation falls into only TWO categories: success and failure.
   - Probability of success is labeled p
   - Probability of failure is labeled 1-p $= q$

4. The probability of success, p, is the same for each of the n observations.

The probability of an event, p, occurring <u>exactly</u> r times:

$$_nC_r \cdot p^r \cdot q^{n-r}$$

n = # of trials

r = # of specific events you wish to obtain (may also be called x)

p = probability of success

q = probability of failure (1-p)

#1

Eight out of every 10 persons who contract a certain viral infection can recover. If a group of 9 people become infected, what is the probability that exactly 5 people will recover?

success $P = 8/10 = .8$

failure $q = 1 - p = 1 - .8 = .2$

$n = 9$

$r = 5$

$RRRRR,DDDD$

$_9C_5 \qquad (.8)^5 \quad (.2)^4$

↑
difference combos

$_9nCr5(.8)^5(.2)^4$

$126 \cdot .327 \cdot .0016$

$\boxed{= .066}$

http://www.mathsisfun.com/data/quincunx.html

In Lisa's art class, 1 out of 5 paintings that she makes will be chosen for an art show. If she is preparing 9 paintings for the competition, what is the probability that exactly 2 of them will be chosen?

$$p = \frac{1}{5} = .2$$

$$q = 1 - .2 = .8$$

$$n = 9$$

$$r = 2$$

$$\underbrace{DD}_{2} \quad \underbrace{NNNNNNN}_{7}$$

$$_9C_2 \underset{\text{success}}{(.2)^2} \underset{\text{failure}}{(.8)^7}$$

$$= .302$$

Assume that 60% of marigold seeds that are sown directly in the ground produce plants. If Big Bird plants 10 seeds, what is the probability that

$$p = .6$$
$$q = .4$$
$$n = 10$$

a) *at least* 7 plants will grow?

$$P(r=7) + P(r=8) + P(r=9) + P(r=10)$$

$$.215 + .12 + .04 + .006 = .381$$

b) *at most* 2 plants will grow?

Finding Binomial Probability Distributions on the Calculator

Work through the worksheet with a partner and ask questions as needed.

Complete the 3 Questions on the notes sheet

- Remember: probability is the decimal approximation of the likelihood of and event occurring.

(i.e. 2 out of 3 is 2/3 = .67)

- **Summary:** binompdf **vs.** binomcdf **commands**
- Here are some useful applications of the binomcdf and binomcdf commands:
- • To find $P(x = k)$, use binompdf(n,p,k)
- • To find $P(x \leq k)$, use binomcdf(n,p,k)
- • To find $P(x < k)$, use binomcdf(n,p,k-1)
- • To find $P(x > k)$, use 1-binomcdf(n,p,k)
- • To find $P(x \geq k)$, use 1-binomcdf(n,p,k-1)
- *Note*: k refers to some number of successes between 0 and n.