

ALG 2 & Trig Lesson 97

Aim: How do we find the probability of an "at least" scenario?

HW: Green Book Test 1 Pg 10 - 13
#1-27 should be done by Wed.
Worksheet

Do Now: 1) A fair coin is tossed 5 times. What is the probability of each:

$${}_n C_r P^r Q^{n-r}$$

- a) exactly 3 heads.
- b) exactly 4 heads.
- c) exactly 5 heads.
- d) at least 3 heads.

2.

Regents Problem Jan., 2002

Team *A* and team *B* are playing in a league. They will play each other five times.

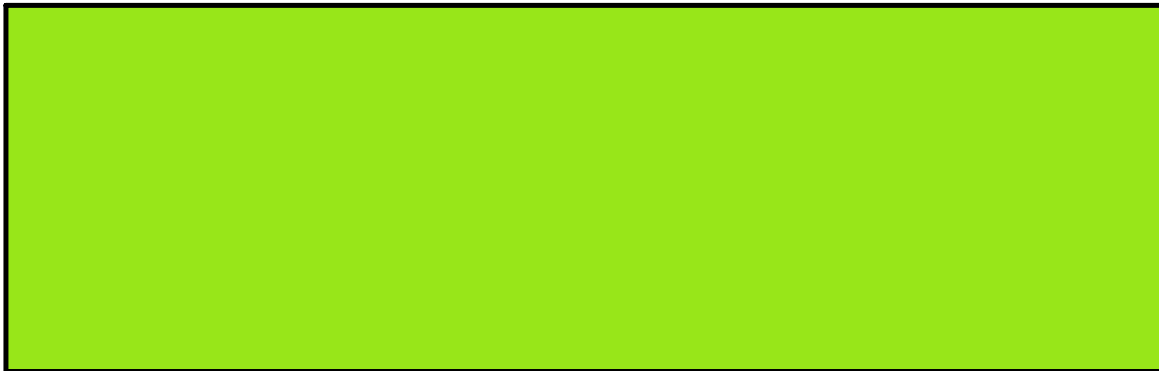
If the probability that team *A* wins a game is $\frac{1}{3}$, what is the probability that team *A* will win *at least* three of the five games?

P =

Q =

Number of trials(n)

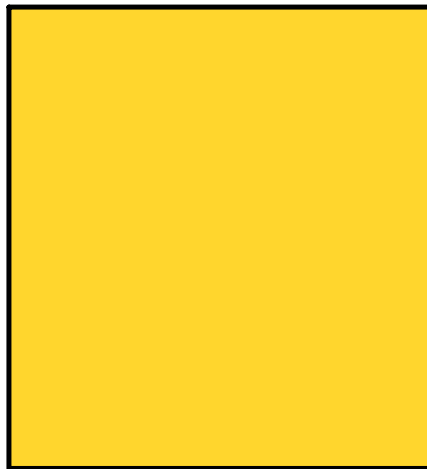
Number of successes (r)



$${}_n C_r P^r Q^{(n-r)}$$

3. A family with 5 children is selected at random. What is the probability that the family has at most 2 boys?

n =



n = 5

r =

r = 2 or 1 or 0

P =

P = 1/2

Q =

Q = 1/2

$${}_5 C_2 (1/2)^2 (1/2)^3 = 10 * 1/4 * 1/8 = 10/32$$

$${}_5 C_1 (1/2)^1 (1/2)^4 = 5 * 1/2 * 1/16 = 5/32$$

$${}_5 C_0 (1/2)^0 (1/2)^5 = 1 * 1/1 * 1/32 = 1/32$$

$$\Sigma 16/32$$

or 50% or .5

Remember: At Most 2 Successes is the compliment of At Least 3 Successes!!!

4. A landscape company will replace any shrub that they plant that fails to grow. They estimate that the failure to grow is .02 (or 2%). What is the probability that, of the 200 shrubs planted this week, at most 3 must be replaced?

n =		n = 200
r =		r = 3 or 2 or 1 or 0
P =		P = .02
Q =		Q = 1 - .02 = .98

$${}_{200}C_3 P^3 Q^{197} = .1963$$

$${}_{200}C_2 P^2 Q^{198} = .1458$$

$${}_{200}C_1 P^1 Q^{199} = .0718$$

$${}_{200}C_0 P^0 Q^{200} = .0176$$

$$\text{Sum} = .4315$$

Calculator Application

 <http://mathbits.com/MathBits/TISection/Statistics2/binomialAtMost.htm>

