Math-42 Sections 01, 02, 05

Homework #13 Solutions

Problems

You have an urn that contains 3 red balls and 5 blue balls. You randomly select 4 balls from the urn with no replacement. What is the probability that you will end up with exactly 2 red balls?

There are $C(4,2) = 6$ possible selections. The probability of each is as follows:

POSSIBLE	$p(1)$	$p(2\|1)$	$p(3\|12)$	$p(4\|123)$	p
$RRBB$	$\frac{3}{3+5}$	$\frac{2}{2+5}$	$\frac{5}{1+5}$	$\frac{4}{1+4}$	0.0714
$RBRB$	$\frac{3}{3+5}$	$\frac{5}{2+5}$	$\frac{2}{2+4}$	$\frac{4}{1+4}$	0.0714
$RBBR$	$\frac{3}{3+5}$	$\frac{5}{2+5}$	$\frac{4}{2+4}$	$\frac{2}{2+3}$	0.0714
$BRRB$	$\frac{5}{3+5}$	$\frac{3}{3+4}$	$\frac{2}{2+4}$	$\frac{4}{1+4}$	0.0714
$BRBR$	$\frac{5}{3+5}$	$\frac{3}{3+4}$	$\frac{4}{2+4}$	$\frac{2}{2+3}$	0.0714
$BBRR$	$\frac{5}{3+5}$	$\frac{4}{3+4}$	$\frac{3}{3+3}$	$\frac{2}{2+3}$	0.0714

All the possibilities have the same probability. Thus, the probability of exactly two red is:

$$p(2R) = 6(0.0714) = 0.4286$$