S12 - 3.9 - Binomial/Stats Children Mean St Dev Notes

Tree diagram with branch probabilities 0.5 leading to outcomes:
BBB → 0.125 ← $p(3b) = 0.125$
BBG → 0.125
BGB → 0.125 — $p(2b) = 0.375$
BGG → 0.125
GBB → 0.125
GBG → 0.125 — $p(1b) = 0.375$
GGB → 0.125
GGG → 0.125 ← $p(0b) = 0.125$
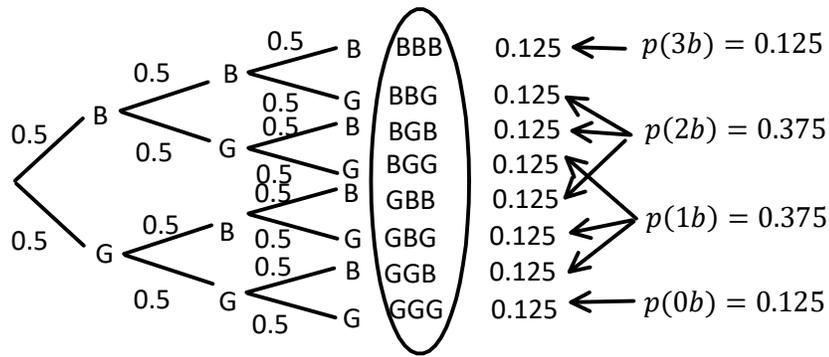
x # of boys	$p(x)$	$xp(x)$	$(x - \mu)^2 p(x)$
0	0.125	$0 \times 0.125 = 0$	$(0 - 1.5)^2 \times 0.125 = 0.28125$
1	0.375	$1 \times 0.375 = 0.375$	$(1 - 1.5)^2 \times 0.375 = 0.09375$
2	0.375	$2 \times 0.375 = 0.75$	$(2 - 1.5)^2 \times 0.375 = 0.09375$
3	0.125	$3 \times 0.125 = 0.375$	$(3 - 1.5)^2 \times 0.125 = 0.28125$
		$\mu = \Sigma x_i p_i(x) = \boxed{1.5}$	$\sigma^2 = \Sigma((x - \mu)^2 p(x)) = \boxed{0.75}$

$$\sigma = \sqrt{0.75} = \boxed{0.866}$$

$p(0B) = {}_3C_0 (0.5)^0 (0.5)^{3-0}$ 2nd [DISTR] [binompdf] @A $\mu = np = 3 \times 0.5 = \boxed{1.5}$

$p(0B) = 1(1)(0.125)$

$\boxed{p(0B) = 0.125}$ $binomialpdf(3, 0.5, 0) = \boxed{0.125}$ $\sigma^2 = npq = 3(0.5)(0.5) = \boxed{0.75}$

$$\sigma = \sqrt{\sigma^2} = \sqrt{0.75} = \boxed{0.866}$$

$p(\leq 1B) = p(0B) + p(1B)$

$p(\leq 1B) = 0.125 + 0.375$ [2nd] [DISTR] [binomcdf] @B

$\boxed{p(\leq 1B) = 0.5}$ $binomialcdf(3, 0.4, 1) = \boxed{0.5}$