9. $b(15, 8; 0.80) = \binom{15}{8}(0.80)^8(0.2)^7 = (6435)(0.16777)(1.28\times10^{-5}) = 0.01382$

25. $n = 8,\ p = 0.30$

The probability P of at least 5 successes is the probability of 5 or 6 or 7 or 8 successes. Since the events are mutually exclusive we can add the probabilities.

$$P = b(8, 5; 0.30) + b(8, 6; 0.30) + b(8, 7; 0.30) + b(8, 8; 0.30)$$
$$= \binom{8}{5}(0.30)^5(0.70)^3 + \binom{8}{6}(0.30)^6(0.70)^2 + \binom{8}{7}(0.30)^7(0.70)^1 + \binom{8}{8}(0.30)^8(0.70)^0$$
$$= 0.0467 + 0.0100 + 0.0012 + 0.0001 = 0.058$$

28. $n = 8,\ k = 2;\ p = 0.5$

$$P(\text{exactly 2 heads}) = b(8, 2; 0.5) = \binom{8}{2}(0.5)^2(0.5)^6 = 0.109375$$

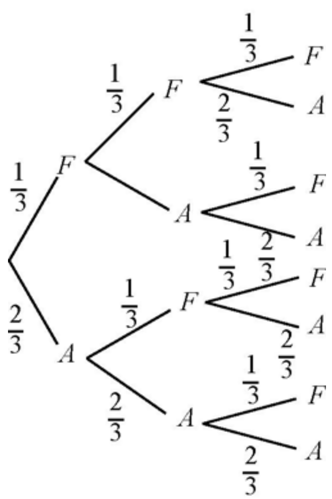
30. $n = 8,\ p = 0.5$

$$P(\text{at most 2 tails}) = P(\text{exactly 0 tail}) + P(\text{exactly 1 tail}) + P(\text{exactly 2 tails})$$
$$= b(8, 0; 0.5) + b(8, 1; 0.5) + b(8, 2; 0.5) = 0.1445$$

33. The probability of rolling a sum of 7 with two dice is $\frac{1}{6}$. So we have $n = 5,\ k = 2,\ p = \frac{1}{6}$.

$$P(\text{exactly 2 sums of 7}) = b(5, 2; \tfrac{1}{6}) = 0.1608$$

36. (a)



(b) The probability of one success and two failures occur on branches *FFA*, *FAF*, *AFF*.

$$P(FFA) = \frac{1}{3}\cdot\frac{1}{3}\cdot\frac{2}{3} = \frac{2}{27}$$
$$P(FAF) = \frac{1}{3}\cdot\frac{2}{3}\cdot\frac{1}{3} = \frac{2}{27}$$
$$P(AFF) = \frac{2}{3}\cdot\frac{1}{3}\cdot\frac{1}{3} = \frac{2}{27}$$

So the probability of 1 success and 2 failures is

$$P(\text{1 success; 2 failures}) = \frac{2}{27} + \frac{2}{27} + \frac{2}{27} = \frac{6}{27} = \frac{2}{9}$$

(c) Using formula (2), with $n = 3;\ k = 1;\ P(A) = \frac{2}{3}$,

$$b(n,k;p) = b\left(3,1;\frac{2}{3}\right) = \binom{3}{1}\left(\frac{2}{3}\right)^1\left(\frac{1}{3}\right)^2$$
$$= 3\cdot\frac{2}{3}\cdot\frac{1}{9} = \frac{2}{9}$$

37. $n = 8$, $p = 0.05$

(a) P(exactly 1 is defective) = $b(8, 1; 0.05) = 0.2793$

(b) P(exactly 2 are defective) = $b(8, 2; 0.05) = 0.0515$

(c) P(at least 1 is defective) = 1 – P(none are defective)
$= 1 - b(8, 0; 0.05)$
$= 1 - 0.6634 = 0.3366$

(d) P(fewer than 3 defective) = P(no defective) + P(1 defective) + P(2 defective)
$= b(8, 0; 0.05) + b(8, 1; 0.05) + b(8, 2; 0.05) = 0.9942$

44. $n = 10$; $p = 0.01$

(a) $P(k = 0) = b(10, 0; 0.01) = 0.9044$

Probability that none of the ten were audited is 0.9044.

(b) $P(k = 1) = b(10, 1; 0.01) = 0.0914$

Probability that exactly one of the 10 returns were audited is 0.0914.

(c) P(more than 1 audited) = $P(k > 1) = 1 - [P(k=0) + P(k=1)]$
$= 1 - b(10, 0; 0.01) - b(10, 1; 0.01)$
$= 1 - 0.9044 - 0.0914$
$= 0.0042$

There is a probability of 0.0042 that more than 1 of the 10 returns were audited.