1. (a) $\mu_X = \frac{45}{11}$

    (b) $\sigma_X^2 = E(X^2) - \mu^2 = \frac{979}{55} - \left(\frac{45}{11}\right)^2 \approx 1.064$

    (c) $\sigma_X \approx 1.032$

2. Let X be a RV with probability density $f(x) = \frac{x}{8}$ for $0 \le x \le 4$

    (a) $\mu_X = \frac{8}{3}$

    (b) $\sigma_X^2 = E(X^2) - \mu^2 = 8 - \left(\frac{8}{3}\right)^2 = \frac{8}{9}$

    (c) $\sigma_X = \frac{\sqrt{8}}{3} = \frac{2\sqrt{2}}{3}$

3. (a) $b(6; 10, 0.6) = \binom{10}{6}(0.6)^6(0.4)^4 \approx 0.2508$

    (b) $\mu_x = 6$

    (c) $\sigma_X^2 = 2.4$

    (d) $\sigma_X \approx 1.549$

4. $1 - P(X = 0) = 1 - \frac{\binom{475}{5}}{\binom{500}{5}}$

5. (a) $p(0; 3) + p(1; 3) \approx 0.0498 + 0.1494 \approx 0.1992$

    (b) $\int_{2/5}^{\infty} 3e^{-3x} \mathrm{d}x = e^{-6/5} \approx 0.3012$

6. 5% of the flash drives coming off a certain assembly line will fail within 10 hours of use. Suppose we look at 20 randomly selected flash drives produced by this assembly line.

    (a) $b(0; 20, 0.05) + b(1; 20, 0.05) = \binom{20}{0}(0.05)^0 0.95)^{20} + \binom{20}{1}(0.05)^1(0.95)^{19} \approx 0.3585 + 0.3774 = 0.7359$

    (b) $n = 20 \ge 20$ and $p = 0.05 \le 0.05$? Yes.

    (c) $p(0; 1) + p(1; 1) = \frac{1^0 e^{-1}}{0!} + \frac{1^1 e^{-1}}{1!} \approx 0.3679 + 0.3679 = 0.7358$

    (d) $np = 1 \ge 5$? No. $[n(1 - p)$ is even smaller, but we slready know we should not use this estimate.]

    (e) Go ahead and do it anyway: don't forget the continuity correction! $P(Z \le \frac{1.5-1}{\sqrt{0.95}}) \approx P(Z \le 0.51) \approx 0.6950$

7. $z \approx 1.96$

8. The weight of coffee in an 8-ounce can of Maria's Best Coffee has normal distribution with mean 8.00 ounces and standard deviation 0.25 ounces.

    (a) $P(X < 7.50) \approx 0.0228$

    (b) $P(7.50 < X < 8.50) \approx 0.9544$