ex1

Calculate the probability for each event:

a) A standard normally distributed variable is larger than 2?

$$Pr\{N(0,1) \geq 2\} = \int_2^{\infty} \phi(x, \mu=0, \sigma=1)\, dx = 0,0228$$

b) A normally distributed variable with mean = 40 and variance equal to 9 is smaller than 34

$$Pr\{N(40, \sqrt{9}) \leq 34\} = \int_{-\infty}^{34} \phi(x, \mu=40, \sigma=\sqrt{9})\, dx = 0,0228$$

c) Getting 9 sucesses out of 10 in a binomial trial with $p=0.8$

$$\phi_{binom}(x, n, p) = \binom{n}{x} p^x (1-p)^{n-x}$$

$$Pr\{Bin(x, n=10, p=0.8) = 9\} = \binom{10}{9} 0,8^9 (1-0,8)^1 = 0,268$$

d) $X > 6.2$ in a χ^2-distribution with 2 degrees of freedom.

$$\phi_{\chi^2}(x, k) = \frac{1}{2^{k/2}\,\Gamma(k/2)}\, x^{k/2-1}\, e^{-x/2}$$

$$Pr\{\chi^2(x, 2) > 6.2\} = \int_{6.2}^{\infty} \phi_{\chi^2}(x, 2)\, dx = 0,045$$