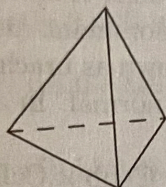situation,

$$F_B(X) \approx F_N\left(\frac{X + 0.5 - np}{\sqrt{np(1-p)}}\right),$$

where F_B and F_N are the cumulative binomial and normal distributions, respectively.

3.7 Problems

1. Some games use tetrahedral dice that have four triangular faces that are numbered 1 through 4. Assume each face is equally likely to land face down.

mass

(a) Determine the probability density function f for the total number (X) on the down faces of 2 such tetrahedron-shaped dice thrown together.

(b) Calculate the cumulative distribution function of X.

(c) Using expected values, find the mean and variance of X.

(d) Find $f(7)$.

(e) Find $F(7)$.

(f) Describe in complete sentences the meaning of $f(7)$ and $F(7)$.

(g) Find $P(3 < X \le 7)$.

(h) Find $P(3 \le X \le 7)$.

(i) Find $P(X > 6)$.

2. In a certain population of koala, *Phascolarctos cinereus*, the heights of individuals are distributed as indicated by the density curve shown below. Areas under the curve are shown in the figure. Let X represent the length of an individual koala chosen at random from the population. Find the following.
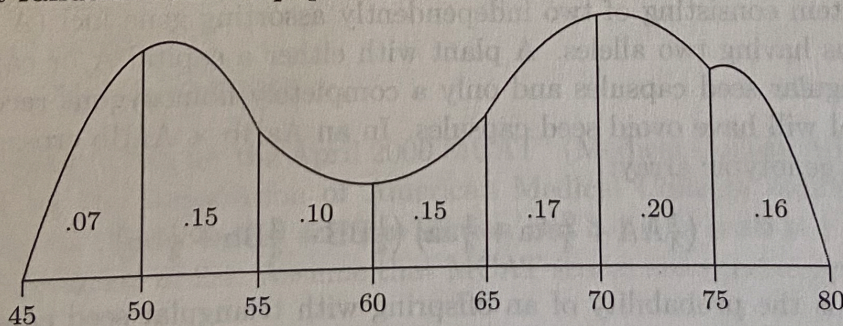
(a) $P(X < 55)$

(b) $P(55 < X \le 65)$

(c) $P(X = 55)$

(d) $F(65)$

(e) $P(X > 65)$

(f) Why do you think the density is bimodal for this population?