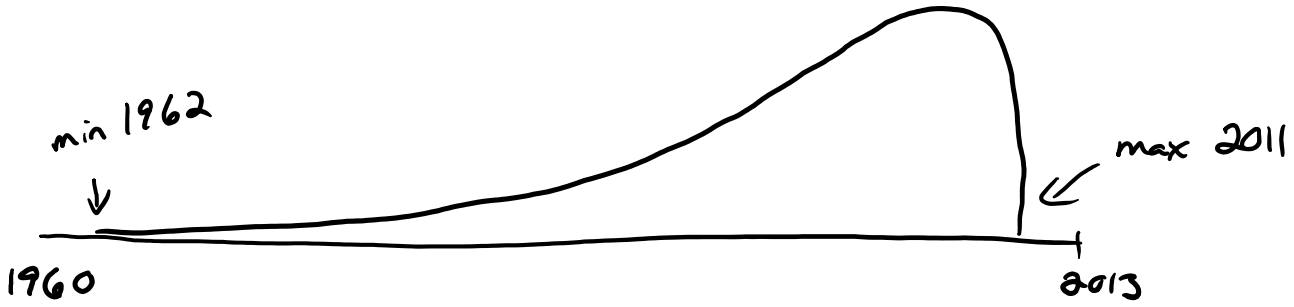
Section 5.2: Cont'd

Thursday, February 22, 2018 12:33 PM

the great Canadian penny demo



individual pennies

average year for 10 pennies

notice that the sample means are clustered more tightly around the centre of the distribution

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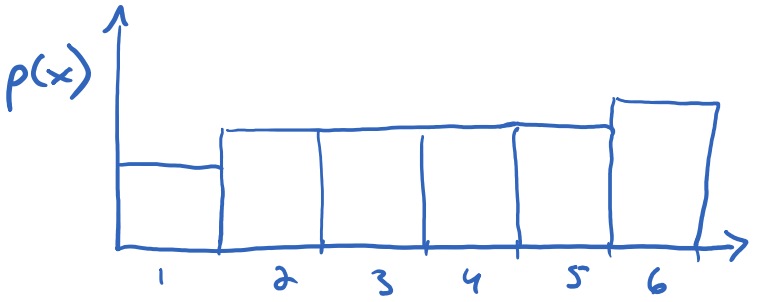
example: A handful of six-sided dice are <u>loaded</u> - the probability of rolling a six is significantly higher (and

therefore the probability of rolling a one is significantly lower) than the other four numbers.

a) describe the probability distribution of the number rolled on a single die (you can sketch it if you prefer).



b) describe the probability distribution for the sum of fifty such dice

because $n \geq 30$, the distribution will look approximately normal

(since the sums are discrete, won't be perfectly normal but will look like that shape)

Example: The weight of luggage checked by airline passengers is a random variable with a mean of 50 lbs and a standard deviation of 30 lbs. The total baggage limit for 100

randomly selected passengers is 5750 lbs.

What is the probability that the baggage limit will be exceeded?

The sum of the weights of luggage will be normally distributed because $n \geq 30$

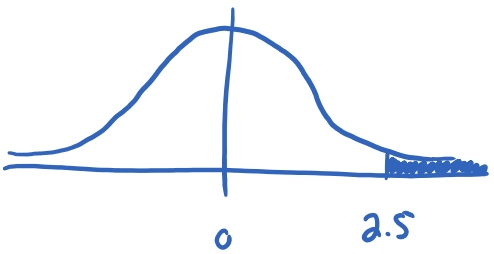
$$\mu_{sum} = n\,\mu_{individual}$$

$$= 100\,(50) = 5000$$

$$\sigma_{sum} = \sigma\sqrt{n} = 30\sqrt{100} = 300$$

$$z = \frac{x - \mu_{sum}}{\sigma_{sum}} = \frac{5750 - 5000}{300}$$

$$= 2.5$$



area = 0.4938

$P(z > 2.5) = 0.5 - 0.4938$

$= 0.0062$

$= 0.6\%$ chance