Example - Normal table

\[ X \sim N(0, 1) \]

Calculate:

a) \[ P(X \leq 0.13) \]

b) \[ P(X < -0.2) \]
c) $P(-1 < X \leq 0.4)$

d) $P(-1.5 \leq X \leq -1)$
Example - Normal Table

Say $Z \sim N(0, 1)$. If $P(Z > a) = 0.2$ find $a$.

What if $P(Z > a) = 0.6$?
Example - Grading

Suppose that a professor finds a way to transform the grades in his class so that their distribution is $N(0, 1)$. Suppose he then gives the final mark according to the following system:

<table>
<thead>
<tr>
<th>Range</th>
<th>$X &gt; 1.5$</th>
<th>$0.5 &lt; X \leq 1.5$</th>
<th>$-1 &lt; X \leq 0.5$</th>
<th>$-2 &lt; X \leq -1$</th>
<th>$X \leq -2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>F</td>
</tr>
</tbody>
</table>

a) What percentage of students will get A?

b) What percentage of the students will get C?

c) What percentage of the students will fail?
Example - Standardized normal

Say $X \sim N(\mu, 2)$. If $P(X \leq 0.5) = 0.8$ find $\mu$. 
Example - Normal approximation of a Binomial

Binomial(100, 0.2)

N(20, 16)
Example - Normal approximation of a Binomial

A factory which produces light bulbs estimates that the probability of a light bulb lighting continuously more than a week is 36%. What is the chance that out of 100 bulbs tested, the number of bulbs still working after a week is between 24 and 42 inclusive.
Example - Normal approximation of a Binomial

A batch of $n = 80$ items is taken from a manufacture process. The process creates a fraction $p = 0.16$ of defectives. What is the probability that a batch with 80 independent items will contain exactly 20 defectives?