Normal Distribution problems

Forwards problems

where you are asked to find a probability

- State the problem
- Draw a diagram
- Calculate $Z = \frac{X - \mu}{\sigma}$
- Look up the z value in the Normal distribution tables
- Use your diagram to decide if the probability (area) you are trying to find is less than a half or not.
- If it is less than 0.5 then then you need to subtract the probability in the tables from 1 otherwise you do not.
- You do not need to worry about whether the z value is positive or negative, this method works in any case.

Backwards problems

where you are **given** a probability and asked to find something else (a value of X, or the mean or the standard deviation).

- State the problem
- Draw a Normal distribution diagram showing the given probability and 1 minus it.
- p is the largest of these two probabilities
- Look up this probability in the Normal distribution tables (backwards) to find the z value.
- Use your diagram to decide if z should be positive or negative:
  if its on the right (above the mean) it's positive, if its on the left (below the mean) it's negative.
- Put all the known values into the formula $z = \frac{x - \mu}{\sigma}$ or $x = \mu + z\sigma$ and solve for the unknown.