Normal Distribution

1) A box contains a large number of biscuits. The weights of biscuits are normally distributed with mean 7 g and standard deviation 0.5 g.

   (a) One biscuit is chosen at random from the box. Find the probability that this biscuit
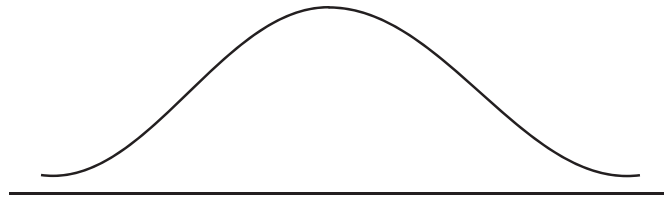
      (i) weighs less than 8 g;

      (ii) weighs between 6 g and 8 g. [4 marks]

   (b) Five percent of the biscuits in the box weigh less than d grams.

      (i) Copy and complete the following normal distribution diagram, to represent this information, by indicating d, and shading the appropriate region.

      (ii) Find the value of d. [5 marks]

2) The heights of certain plants are normally distributed. The plants are classified into three categories.
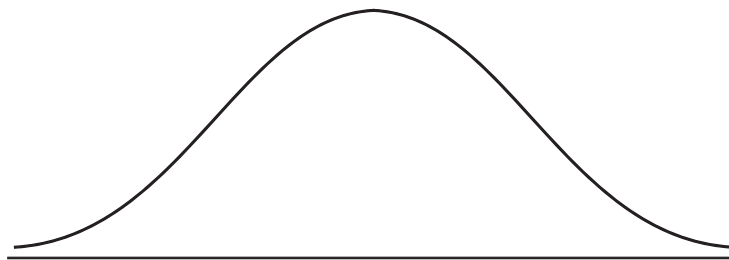
   The shortest 12.92 % are in category A.
   The tallest 10.38 % are in category C.
   All the other plants are in category B with heights between r cm and t cm.

   (a) Complete the following diagram to represent this information. [2 marks]

   (b) Given that the mean height is 6.84 cm and the standard deviation 0.25 cm, find the value of r and of t. [5 marks]

   1012

3) A random variable X is distributed normally with mean 450 and standard deviation 20.

   (a) Find $P(X \le 475)$. [2 marks]

   (b) Given that $P(X > a) = 0.27$, find a. [4 marks]
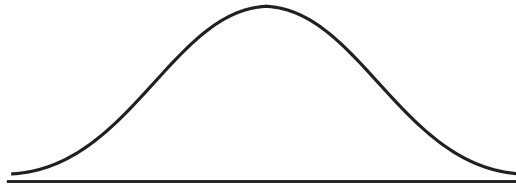
Normal Distribution

4) (non calc)

Let X be normally distributed with mean 100 cm and standard deviation 5 cm.

(a) On the diagram below, shade the region representing $P(X > 105)$. *[2 marks]*

(b) Given that $P(X < d) = P(X > 105)$, find the value of d. *[2 marks]*

(c) Given that $P(X > 105) = 0.16$ (correct to two significant figures), find $P(d < X < 105)$. *[2 marks]*
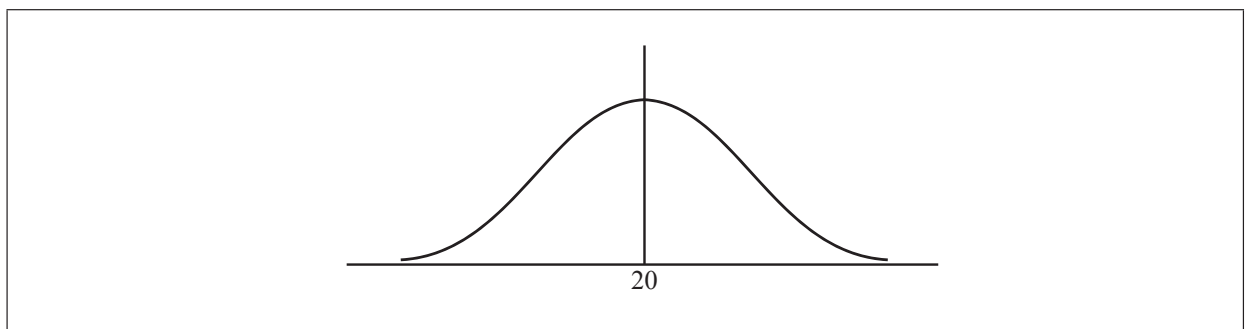
5)

A random variable X is distributed normally with a mean of 20 and variance 9.

(a) Find $P(X \leq 24.5)$. *[3 marks]*

(b) Let $P(X \leq k) = 0.85$.

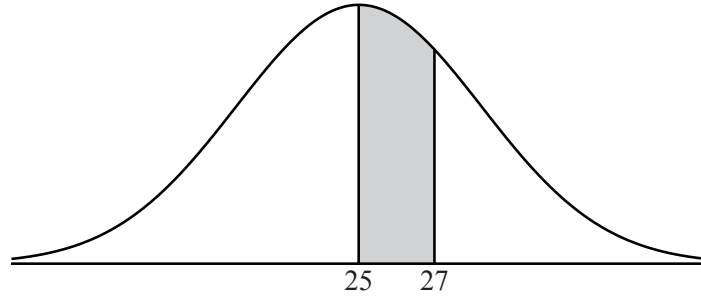 (i) Represent this information on the following diagram.

20

  (ii) Find the value of k. *[5 marks]*

6) Studies don't do part (b)

Let the random variable X be normally distributed with mean 25, as shown in the following diagram.

The shaded region between 25 and 27 represents 30 % of the distribution.

(a)   Find $P(X > 27)$.   *[2 marks]*

(b)   Find the standard deviation of X.   *[5 marks]*