

## Probability

1. If we roll a dice, there are 6 possible outcomes. If  $X$  represents the value of the outcome, find the following probabilities:

a)  $P(X=1)=\dots$       b)  $P(X>1)=\dots$       c)  $P(1<X<4)=\dots$

2. A fair coin is tossed twice. List the possible outcomes! .....

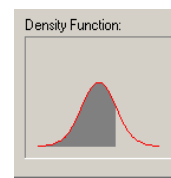
Find the probability of getting two tails.....

3. A penny is tossed once and a dice is rolled once. The possible outcomes are H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6. Find the probabilities of the following outcomes:

- a) tossing a head and rolling a 5.....
- b) tossing a head or rolling a 5.....
- c) tossing a head and rolling an even number.....
- d) tossing a head or rolling an even number.....
- e) rolling either a 4 or a 6.....
- f) rolling a 6.....
- g) rolling a head.....

### Standard normal distribution

x	$\Phi(x)$ : proportion of area to the left of x
-4.00	0.00003
-3.00	0.0013
-2.58	0.0049
-2.33	0.0099
-2.00	0.0228
-1.96	0.0250
-1.65	0.0495
-1.00	0.1587
0.00	0.5
1.00	0.8413
1.65	0.9505
1.96	0.975
2.00	0.9772
2.33	0.9901
2.58	0.9951
3.00	0.9987
4.00	0.99997



1. For a standard normal distribution, find the following probabilities:

$P(X<0)=\dots$        $P(X>0)=\dots$        $P(X<1)=\dots$        $P(X>1)=\dots$

2. Find the area under the standard normal curve between the given values, that is, find the following probabilities:

- a)  $P(-1<X<1)=\dots$
- b)  $P(-1.96<X<1.96)=\dots$
- c)  $P(-2<X<2)=\dots$

3. For a standard normal distribution, find  $x$  value such that the area to the left of  $x$  is

- a) 0.025    b) 0.5

4. The results in a certain blood test performed in a medical laboratory are known to be normally distributed with  $N(60,10)$ .

Sketch the graph of this distribution!

- a) What percentage of the results are below 60?  $P(X < 60) = \dots$
- a) What percentage of the results are above 60?  $P(X > 60) = \dots$
- c) What percentage of the results are between 40 and 80?  $P(40 < X < 80) = \dots$
- d) What percentage of the results are below 40?  $P(X < 40) = \dots$
- e) What percentage of the results are above 80?  $P(X > 80) = \dots$
- f) The "healthy range" falls between 30 and 90. What percentage of the results are between 30 and 90? That is, what is the probability that a blood sample picked at random will have results in the "healthy range" of 30 to 90?  $P(30 < X < 90) = \dots$
- d) What percentage of the results are outside the "healthy range" of 30 to 90?  $\dots$

4. At an urban hospital the weights of new-born infants are normally distributed with  $N(3500,400)$ .

Sketch the graph of this distribution!

Let  $X$  be the weight of a new-born picked at random. Find the following probabilities:

- a)  $P(X < 3500) = \dots$
- b)  $P(3100 < X < 3900) = \dots$