MAT 1372 Stat w/ Prob classwk 16 Spring 2012

**6.2 CONTINUOUS RANDOM VARIABLES**

If the outcomes from an experiment form an interval (finite  or infinite), then the distribution is given by a nonnegative curve (stays above x-axis) such that total area under the curve is 1.

It is no longer possible to ask for the probability of a single outcome. Instead, we find the probability of intervals.

**Example:** Suppose that the distribution function is a line between 0 and 4 with a uniform height h and 0 everywhere else.

1. What is the height h?
2. What is the probability that an outcome is between 1 and 2?

P[1<X<2]=P{[1,2]}

1. What is the probability that an outcome is more than 2.5,? P[X>2.5]=P{ }

**Solution:**

1. The total area under the curve must be 1. Hence the height must be .25.
2. P{[1,2]} is .25 since the figure under the curve is a smaller rectangle whose base is 1 and height is .25.
3. P{ } is .375=3/8 since the figure under the curve is a smaller rectangle whose base is 1.5 and height is .25.

**4.** You are to meet a friend at 2 p.m. However, while you are always exactly on time, your friend is always late and indeed will arrive at the meeting place at a time uniformly distributed between 2 and 3 p.m. Find the probability that you will have to wait

**(a)** At least 30 minutes

**(b)** Less than 15 minutes

**(c)** Between 10 and 35 minutes

**(d)** Less than 45 minutes

**8.** It is now 2 p.m., and Joan is planning on studying for her statistics test

until 6 p.m., when she will have to go out to dinner. However, she knows

that she will probably have interruptions and thinks that the amount of

time she will actually spend studying in the next 4 hours is a random

variable whose probability density curve is as follows:



**(a)** What is the height of the curve at the value 2? (*Hint*: You will have

to recall the formula for the area of a triangle.)

**(b)** What is the probability she will study more than 3 hours?

**(c)** What is the probability she will study between 1 and 3 hours?