

Midterm Exam II Physics 113 12:50 am - 2:10 am, Nov. 13th

**What to bring:** pencil, ID, calculator, eraser

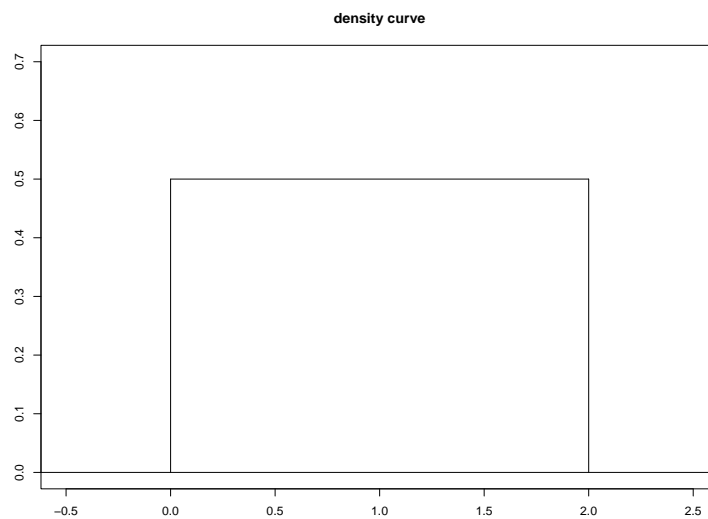
**What to be covered:** Chapters 6, 7, 8, 9.1-9.3

AMS 102.3: Practice Problems for Midterm II

DISCLAIMER: Exam problems will NOT be selected from those problems, they DO NOT have to resemble those.

**There is only one correct answer to each question.**

Use the following graph to answer Question 1-3.



**Question 1** For this density curve, which of the following is true?

- A) It is symmetric.
- B) The median is 1.
- C) The total area under the curve is 1.
- D) All of the above.

**Question 2** For this density curve, what percent of the observation lie above 1.5?

- A) 25%
- B) 50%
- C) 75%
- D) 80%

**Question 3** For this density curve, what percent of the observation lie between 0.5 and 1.5?

- A) 25%
- B) 50%
- C) 75%
- D) 80%

Use the following graph to answer Question 4-7.

Items produced by a manufacturing process are supposed to weight 90 grams. The manufacturing process is such, however, that there is variability in the items produced and they do not all weight exactly 90 grams. The distribution of weights can be approximated by a normal distribution with mean 90 grams and a standard deviation of 1 gram.

**Question 4** What percentage of the items will either weigh less than 87 grams or more than 93 grams?

- A) 6%
- B) 94%
- C) 99.7%
- D) 0.3%

**Question 5** What percentage of the items will either weigh above than 89 grams?

- A) less than 50%
- B) between 50% and 70%
- C) between 70% and 90%
- D) more than 90%

**Question 6** The manufacturer decides not to ship the bottom 1% weighted items. To implement this decision, they will not ship

- A) anything weigh less than 87.67 grams
- B) anything weigh more than 92.33 grams
- C) anything weigh more than 87.67 grams
- D) anything weigh less than 92.33 grams

**Question 7** What is the probability that mean weight of randomly selected 4 items are less than 88 grams?

- A) Less than 0.01.
- B) Between 0.01 and 0.05.
- C) Between 0.05 and 0.10.
- D) above 0.10.

**Question 8** The time to complete a standardized exam is approximately normal with a mean of 70 minutes and a standard deviation of 10 minutes. How much time should be given so that 80% of the students will complete the exam in the time given?

- A) 84 minutes.
- B) 78.4 minutes.
- C) 92.8 minutes.
- D) 79.8 minutes.

**Question 9** I toss a coin and observe which side it lands. Suppose the probability of each side is  $1/2$ . This means

- A) every occurrence of a head must be balanced by a tail in the next toss.
- B) Regardless of the number of flips, half will be heads and half tails.
- C) if I flip the coin many many times the proportion of heads will be approximately  $1/2$ , and this proportion will tend to get closer and closer to  $1/2$  as the number of tosses increases.
- D) All of the above.

Use the following paragraph for problems 10-13

If Tom draw an M&M candy at random from a bag of the candies, the candy he draw will have one of six colors. The probability of drawing each color depends on the proportion of each color among all candies made. The table below gives the probability that a randomly chosen M&M has each color except yellow.

Color	Blue	Red	Yellow	Green	Orange	Brown
Probability	0.3	0.3	?	0.1	0.1	0.1

**Question 10** The probability of drawing a yellow candy is

- A) 0.1.
- B) 0.2.
- C) 0.3.
- D) Impossible to determine form the information given.

**Question 11** The probability that Tom do NOT draw a red candy is

- A) .1.
- B) .3.
- C) .7.
- D) .9.

**Question 12** The probability that Tom draw either a blue OR a green candy is

- A) 0.1.
- B) 0.3.
- C) 0.4.
- D) 0.7.

**Question 13** In a large population of adults, the mean IQ is 112 with a standard deviation of 20. Suppose 100 adults are randomly selected for a market research campaign. The probability that the sample mean IQ is greater than 110 is about

- A) 68%
- B) 32%
- C) 34%
- D) 84%

Use the following paragraph for problems 14-17

The Good Business Bureau conducts a survey of quality offered by 100 auto repair shops on Long Island. The results on **Service** and **Shop Type** are summarized in the following table:

	Good	Questionable
New Car Dealership	18	6
Individual Shop	42	34

**Question 14** What is the probability that randomly selected shop provides good service?

- A) 0.6
- B) 0.4
- C) 0.5
- D) 0.76

**Question 15** Had you known that the randomly selected shop is a new car dealership, what is the conditional probability that this shop provides good service?

- A) 0.18
- B) 0.06
- C) 0.60
- D) 0.75

**Question 16** Had you known that the randomly selected shop does not provide good service, what is the conditional probability that this is a new car dealership?

- A) 0.18
- B) 0.06
- C) 0.15
- D) 0.40

**Question 17** Let event A be “New car dealership”, event B be “good service”. Which of the following statement is true.

- A) A and B are mutually exclusive.
- B) A and B are independent.
- C) A and B are mutually exclusive and independent.
- D) A and B are neither mutually exclusive nor independent.

Use the following paragraph for problems 18-22.

After their football team lost 7 consecutive conference games this season, many alumni of Penn State University feel that it is the time for Joe Paterno, the legendary head coach of the football program, to retire after this season. To learn how much of the alumni have the same feeling, a pool is conducted by the alumni association asked 400 alumni, which is a randomly sample from its 100,000 members, about their opinion on whether “Joe Pa” should return next season, and 240 responded saying that he should not. The alumni association would like to test the hypothesis that more than half of alumni would like to see Joe Paterno retiring after this season.

**Question 18** What is the observed sample proportion in this pool?

- A) 400.
- B) 0.04.
- C) 240.
- D) 0.6

**Question 19** What should be the null and the alternative hypothesis?

- A)  $H_0 : p > 0.6$  vs  $H_1 : p = 0.6$
- B)  $H_0 : p = 0.5$  vs  $H_1 : p > 0.5$
- C)  $H_0 : p > 0.5$  vs  $H_1 : p = 0.5$
- D)  $H_0 : p = 0.6$  vs  $H_1 : p > 0.6$

**Question 20** What is the direction of extreme of the hypothesis test?

- A) left
- B) right
- C) towards both ends
- D) towards middle.

**Question 21** What is the observed test statistics for this test?

- A) 1.0
- B) 2.0
- C) 3.0
- D) 4.0

**Question 22** What is the P-value for this hypothesis test?

- A) larger than 0.1
- B) between 0.05 and 0.1
- C) between 0.01 and 0.05
- D) below 0.01.