MATH 170: PRACTICE EXAM 02

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Answer the questions in the spaces provided on the question sheets and turn them in at the end of the class period. Unless otherwise stated, all supporting work is required. You may only use a four-function calculator. No graphing calculators or cell phones are allowed.

Name: _____

1. Problems

Consider the following. (Assume that the coins are distinguishable and that what is observed are the faces that face up.) Three coins are tossed; the result is at most one head.

1. *(a) Describe the sample space S of the experiment. Your answer should be in set notation.*

(b) Describe the event E as a set.

2. *Consider the following. Two distinguishable dice are rolled; both numbers are prime. Describe the event E as a set.*

Date: February 28, 2015.

3. *Suppose two dice (one red, one green) are rolled. Consider the following events. A: the red die shows 3; B: the numbers add to 6; C: at least one of the numbers is 3; and D: the numbers do not add to 12. Express the following events in symbols:*

(a) The red die shows 3 and the numbers add to 6.

(b) The numbers add to 12.

(c) Either the numbers add to 12 or the red die shows 3.

(d) Either the numbers add to 6, or the red die shows 3 and the numbers do not add to 12.

4. *Jared randomly picks three marbles from a bag of eight marbles (four red ones, two green ones, and two yellow ones). How many outcomes are there in the event that Jared picks one marble of each color?*

5. *Calculate the relative frequency $P(E)$ using the given information. $N = 400$, $fr(E) = 300$.*

6. *The following table shows the frequency of outcomes when two distinguishable coins were tossed 6,400 times and the uppermost faces were observed.*

Outcome	*HH*	*HT*	*TH*	*TT*
Frequency	*1,700*	*1,550*	*1,800*	*1,350*

What is the relative frequency that heads comes up at least once?

7. *Complete the relative frequency distribution. Check that the resulting distribution satisfies the properties of a relative frequency distribution.*

Outcome	*1*	*2*	*3*	*4*	*5*
Rel. Frequency	*0.4*		*0.1*	*0.1*	

8. *Describe the difference between a relative frequency distribution and a probability distribution. (Hint: When do we say "the probability of an event is" vs. "the relative frequency of an event is"?)*

9. *Complete the following probability distribution table and then calculate the stated probabilities.*

Outcome	a	b	c	d	e
Probability	*0.1*	*0.07*	*0.4*	*0.03*	

(a) $P(\{a, c, e\})$

(b) $P(E \cup F)$*, where* $E = \{a, c, e\}$ *and* $F = \{b, c, e\}$*.*

(c) $P(E')$*, where* E *is as in part (b).*

(d) $P(E \cap F)$*, where* E *and* F *are as in part (b).*

10. *Calculate the (modeled) probability $P(E)$ using the given information, assuming that all outcomes are equally likely.*

$$S = \{1, 3, 5, 7, 9\}, E = \{1, 3\}$$

11. *Find the (modeled) probability of the following event, assuming that the coins are distinguishable and fair, and that what is observed are the faces uppermost. Three coins are tossed; the result is at least one head.*

12. *Find the (modeled) probability of the following event, assuming that the dice are distinguishable and fair, and that what is observed are the numbers uppermost. Two dice are rolled; the numbers add to 8.*

13. *A die is weighted in such a way that each of 2, 4, and 6 is twice as likely to come up as each of 1, 3, and 5. Find the probability distribution. What is the probability of rolling less than a 4?*

14. *Use the given information to find* $P(A)$.

$$A \cap B = \emptyset, P(B) = .8, P(A \cup B) = .8$$

15. *Use the given information to find* $P(A')$.

$$P(A) = 0.6$$

16. *Whenever Suzan sees a bag of marbles, she grabs a handful at random. She has seen a bag containing four red marbles, three green ones, four white ones, and one purple one. She grabs eight of them. Find the probability of the following events, expressing it as a fraction in lowest terms.*

(a) She has at least one green one.

(b) She has all the green ones.

(c) She has two red ones and one of each of the other colors.