

/20

Name: _____

Date: _____

**GR12 APPLIED
PROBABILITY
EXPERIMENTAL AND THEORETICAL PROBABILITY**

Show work, how you calculated your answer! Answers to *two decimal* places or as fractions

6

1. Write your answers as fractions reduced to lowest terms **and** as percents.
 - a. What is the probability that a woman will win the Oscar Award for Best Actress?
 - b. What is the probability that a 7 shows when rolling a normal six-sided die?
 - c. What is the probability, in one draw, that a king is drawn from a normal deck of 52 cards? [Hopefully you are playing with a full deck!]

2

2. A bag contains eight blue and five white marbles. In one draw, what is the probability of randomly selecting a white marble? [*Random means each outcome is equally likely*]

2

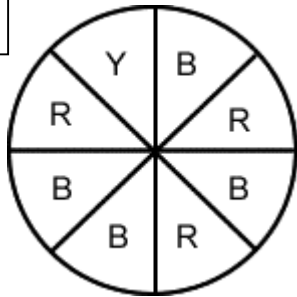
3. A bag contains five red, four green, and three black candies. What is the probability that you **do not** select a black candy if you randomly select one?

2

4. Fred is in a class that has a total of seven boys and 15 girls. The teacher selects pair partners for a project by drawing names from a hat. What is the probability that Fred's partner will be a boy? [*Slight trick!*]

5. What is the probability of spinning each of the following using the spinner shown? The colours on the spinner are red (**R**), yellow (**Y**), and blue (**B**).

2



- a. [Example] $P(\text{red}) = \frac{\text{number favourable}}{\text{total number possible}} = \frac{3}{8} = 37.5\%$
- b. $P(\text{yellow})$
- c. $P(\text{green})$
- d. $P(\text{red, yellow or blue})$
- e. $P(\text{not red})$

EXPERIMENTAL PROBABILITY USING SIMULATION

6. **Example.** Design an experiment using coins to simulate a 10 question true/false test. What is the **experimental** probability of scoring at least 70% on the test if you guess each answer?

I would select a simulation system that randomly generated one of two equally likely answers; flipping a coin; or maybe drawing a card (Red Vs Black) [would this work?]; or using the random number button on my calculator. I would agree that heads are a correct answer. I would then flip ten coins all at the same time (or sequentially, doesn't matter) and count the heads. If I got at least seven heads then I passed the test on that first trial. I would continue the experiment to a total of 20 or 30 trials.

Here is my result for the first 10 trials of my experiment:

Trial	1	2	3	4	5	6	7	8	9	10
Heads	5	8	7	7	4	5	4	6	4	4

So it looks like somewhere around three times out of ten I will get 70% (seven heads) or more. So there is an approximately 30% chance that I will pass the test by just randomly guessing. Of course doing more trials will give a more accurate result as we recall from Statistics Lessons.

Now you try it for **ten** trials: See if you get the same or approximately same result.

Trial	1	2	3	4	5	6	7	8	9	10
Heads										

2

What is the probability **you** will pass with at least 70% by just randomly guessing?

PROB($\geq 70\%$ on test) = _____

btw: the THEORETICAL answer is really 17.19% which we will learn to calculate later.

btw: there exist simulation tools on the TI-83 and many webpages to do this easily!

7. **You try.** Design and **explain** an experiment to simulate doing a five question multiple-choice test; each question has **four** possible answers (a., b., c., or d.) and you are just going to randomly guess each question. What is the **experimental** probability of scoring at least **60%** (that is at least three out of 5 correct) on the test if you randomly guess each answer? Do at least **10** trials in your experiment, more if you are curious. [*Theory says it is about 7% of the time you will pass*]. [The challenge here is to figure out how you will randomly generate one of four possible outcomes; suits in a deck of cards?, random number on your calculator?, spinner on a website, four coloured marbles, four slips of paper (one correct; three incorrect)?]

2