

Turn introductions into the Orange Folder.

### Homework Check

- I will be passing out the solutions.
- Have your HW and a pen out.
- Because of the project Intro, if your HW is not done, the wait to check with the solutions tomorrow (no penalty).

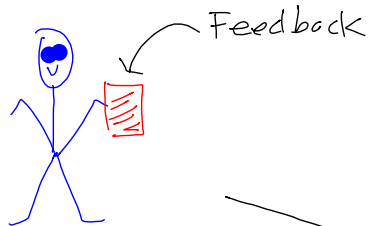
Schedule:

Mon **Tree Diagrams to help with Probability**

Tues **Prob Laws**

Wed **Review**

Thur **Test on Sets, Venn Diag, Probability**  
and a bit of Geometry/Trig



C4  
Writing  
Guide

Revise ✓

Collect data ✓

Describe Data ✓  
Collection ●

Aim

Notes

# Probability using Tree Diagrams

can make some situations of  
chance much easier

## Driving to Work

A driver gets stopped by a traffic light 60% of the time.

At the second light they get stopped 70% of the time.

On a typical day, what is the probability they get stopped by only one of the lights ?

What is the probability they get stopped by only one of the lights ?

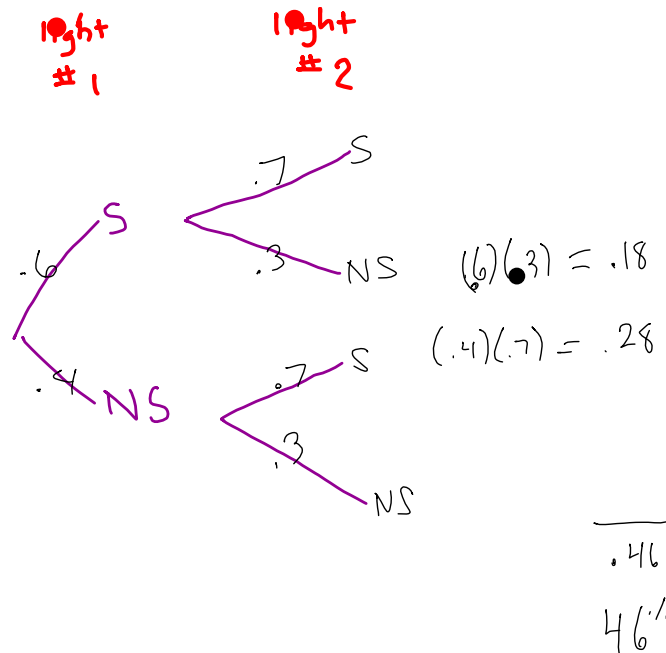
Probabilities are marked on the branches

There are 4

different possible paths

Probabilities are

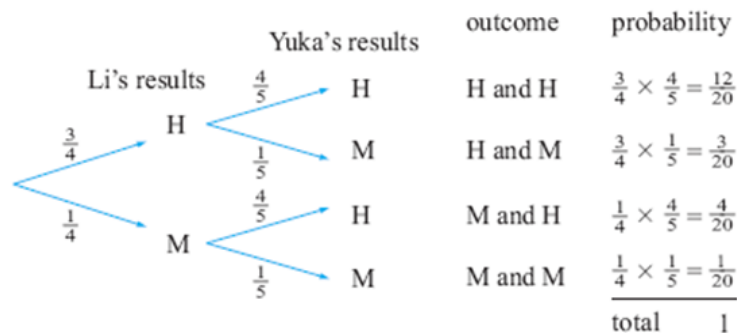
obtained



hand out

Tree Diagrams allow us to answer a variety of easy, **and** not so easy questions.

①



There are 4 different possible paths.

Probabilities are marked on the branches.

Compound Probabilities are obtained by multiplying

Probabilities of each branch always add to 1

Li's results		Yuka's results		outcome	probability
$\frac{3}{4}$	H	$\frac{4}{5}$	H	H and H	$\frac{3}{4} \times \frac{4}{5} = \frac{12}{20}$ ✓
		$\frac{1}{5}$	M	H and M	$\frac{3}{4} \times \frac{1}{5} = \frac{3}{20}$ ✓
$\frac{1}{4}$	M	$\frac{4}{5}$	H	M and H	$\frac{1}{4} \times \frac{4}{5} = \frac{4}{20}$ ✓
		$\frac{1}{5}$	M	M and M	$\frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$
total					1

a)  $P(\text{both hit a bulls eye}) = \frac{12}{20}$

b)  $P(\text{at least one bulls eye is hit}) = \frac{3}{4} \cdot \frac{4}{5} + \frac{3}{4} \cdot \frac{1}{5} + \frac{1}{4} \cdot \frac{4}{5} = \frac{19}{20}$

c)  $P(\text{exactly one hits the bulls eye}) = \frac{3}{4} \cdot \frac{1}{5} + \frac{1}{4} \cdot \frac{4}{5} = \frac{7}{20}$

2 Jason takes the car to school two days a week and the other days he rides his bike. If he has the car the chance that he is late is 10% but if he rides it is 30%.

a Copy and complete the tree diagram.

b What is the probability that on a randomly selected day Jason was:

i riding and not late

ii late?

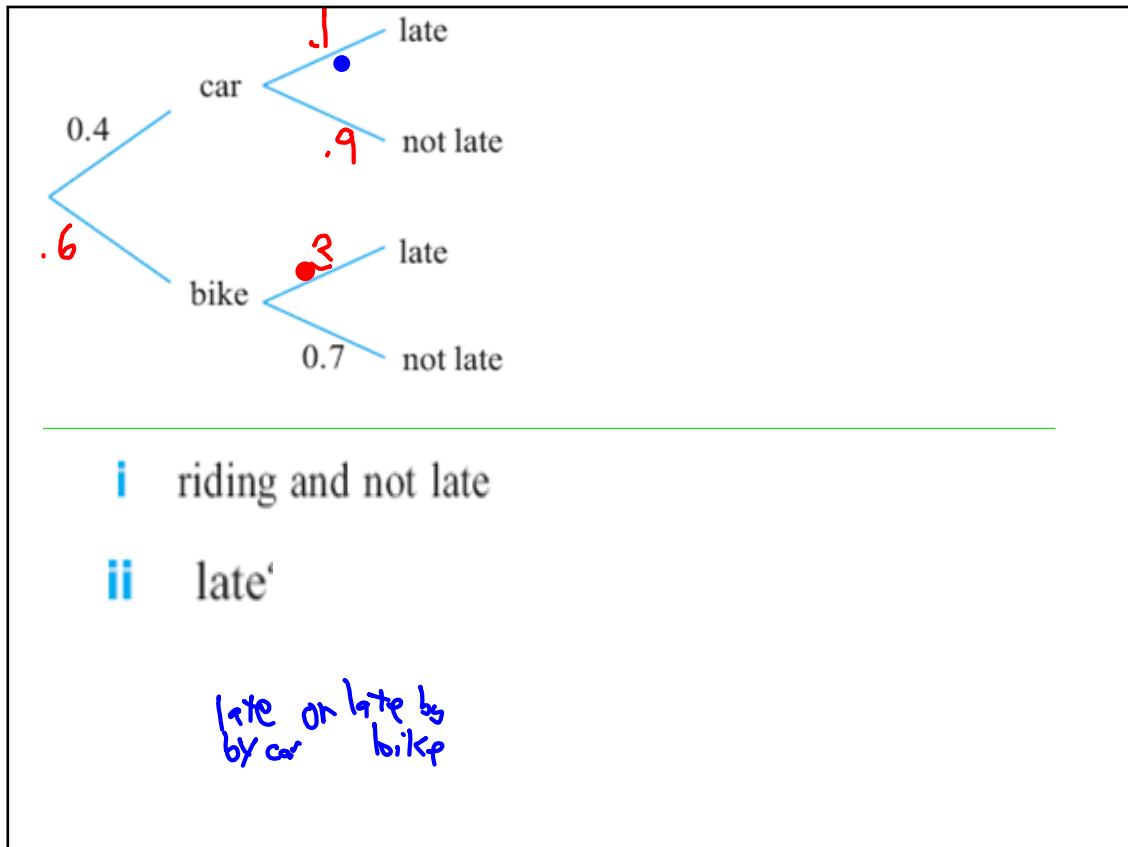
$= (.6)(.7)$

$= .42$

$P(\text{late by car or late by riding})$

$= (.4)(.1) + (.6)(.3)$

$= .04 + .18 = .22$



## Sampling

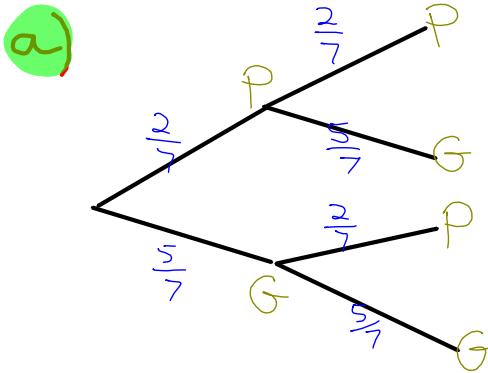
With and Without Replacement

**3** Use a tree diagram to help answer the following:

Two marbles are drawn in succession from a box containing 2 purple and 5 green marbles. Determine the probability that the two marbles are different colours if:

**a** the first is replaced

$P(\text{Purple-Green or Green-Purple})$



$$= \frac{2}{7} \cdot \frac{5}{7} + \frac{5}{7} \cdot \frac{2}{7}$$

$$= \frac{10}{49} + \frac{10}{49}$$

$$= \frac{20}{49}$$

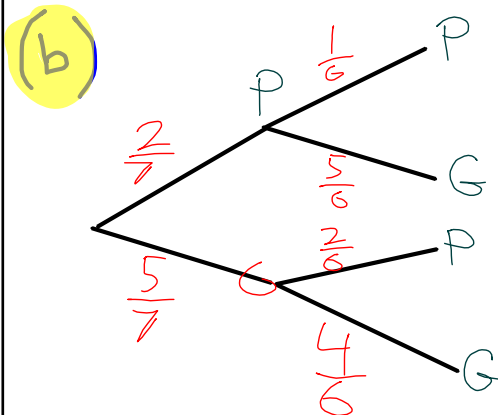
**2** Use a tree diagram to help answer the following:

Two marbles are drawn in succession from a box containing 2 purple and 5 green marbles. Determine the probability that the two marbles are different colours if:

**a** the first is replaced

**b** the first is *not* replaced.

$P(\text{Purple-Green or Green-Purple})$



$$= \frac{2}{7} \cdot \frac{5}{6} + \frac{5}{7} \cdot \frac{2}{6}$$

$$= \frac{20}{42}$$



## Caution

If the two marbles were drawn simultaneously, you would treat that as if they were drawn one after another.

Problems that are not a good match for a tree diagram

# Probabilities from Venn Diagrams

4 In a class of 40 students, 19 play tennis, 20 play netball and 8 play neither of these sports. A student is randomly chosen from the class. Determine the probability that the student:

- a plays tennis  $\frac{19}{40}$
- b does not play netball  $= \frac{20}{40}$
- c plays at least one of the sports  $\frac{32}{40}$
- d plays one and only one of the sports  $= \frac{25}{40}$
- e plays netball, but not tennis  $\frac{13}{40}$
- plays tennis knowing he/she plays netball.  $\frac{7}{20}$



$$\begin{aligned}
 \text{Venn Diagram} &= \text{Circle 1} + \text{Circle 2} - \text{Intersection} \\
 32 &= 19 + 20 - X \\
 X &= 7
 \end{aligned}$$

BB

⑤ **Which bet would you make?**

Consider the following problem and decide which of the suggested bets you would be happiest to put your money on.

- A bag contains 10 counters, 3 red, 2 blue and 5 green ones

- A counter is drawn from the bag and then put back, then another counter is drawn from the bag?

For an even bet (ie, you double your money if you win) would you bet on...

1. Getting 2 greens
2. Getting at least 1 red
3. Getting two the same colour
4. Getting two different colours

Assignment #6 from HH textbook:

p.468....3h

p.471.... 4

p.474... 3, 7

p.478...2

p.482....3, 4, 8

Appropriate  
diagrams and  
work expected

