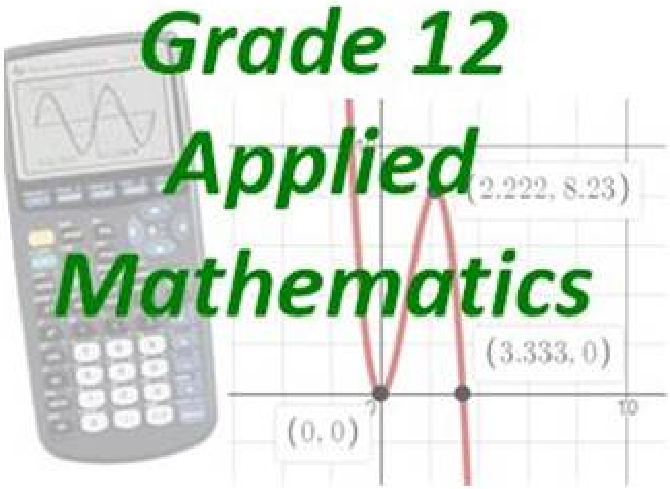


Grade 12 Applied

Quiz DEBRIEF

WEEK 2

2 Feb 2023

GRADE 12 APPLIED
WEEKLY QUIZ WEEK 2

Name: ______________
Date: ______________

STANDARD ASSESSMENT INSTRUCTIONS

Use your single sheet 'study notes' (cheat sheet). You may use **open book** this *one last final time.*

No more Open Book!

Make liberal use of graphic organizers to focus your thoughts.
Use technology to its full effect. (eg: fractions on the calculator)
No social media during assessments if using your own device!
Round any decimal answers (including percentages) to nearest 0.01
Each individual question is worth two marks unless otherwise indicated.

SHOW WORK FOR BEST MARK

(To allow for 'b/f's and 'f/t's and to help you organize your thoughts & readily check your answer)

Individual questions are two marks each unless otherwise indicated
Tick the box at right if you read these instructions, ☐. (1 Mark)

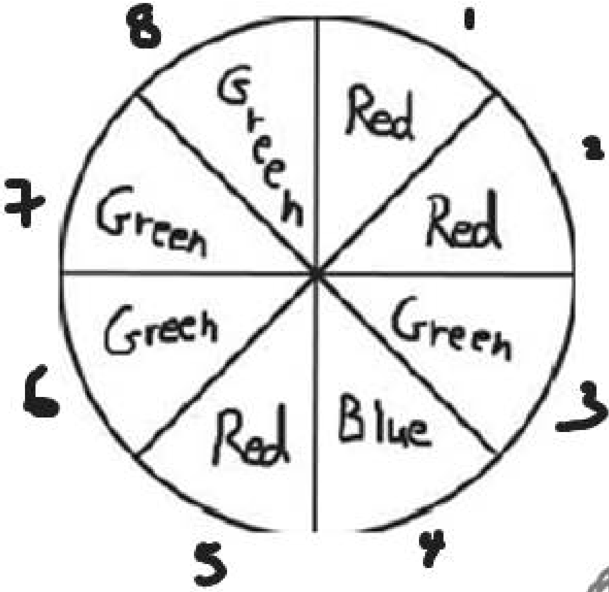
b/f ≡ brain fart

f/t ≡ I followed thru with your bogus b/f number to see if your method is right

OMG! Half the students did not tick the box!!

I didn't take off any marks

1. For the fair spinner at the right:



a. Determine how many equally likely outcomes there are:

→ 8

b. Calculate the probability of spinning a **GREEN**; P(GREEN)?

50% or 1/2

→ c. If you were to spin the spinner 200 times, calculate the number of times, on average, you *expect* to get **GREEN**, n(GREEN).

100 times we can "expect" to get a green

might get 96 or 103 or 94 but the average if we do it lots of times is 100 greens

[Express answers as % and as reduced fractions]

a) There are 8 equally likely sectors (outcomes)

b) $P(\text{Green}) = \dfrac{\#\text{ of Green}}{\text{Total possible outcomes}} = \dfrac{4}{8} = \dfrac{1}{2} = 50\%$

c) $\dfrac{1}{2}$ ← 1 Green, ← Every 2 spins

greens → $\dfrac{1}{2} = \dfrac{x}{200}$ ← Greens
spins → ← Spins

$\dfrac{1}{2} \quad \dfrac{x}{200}$

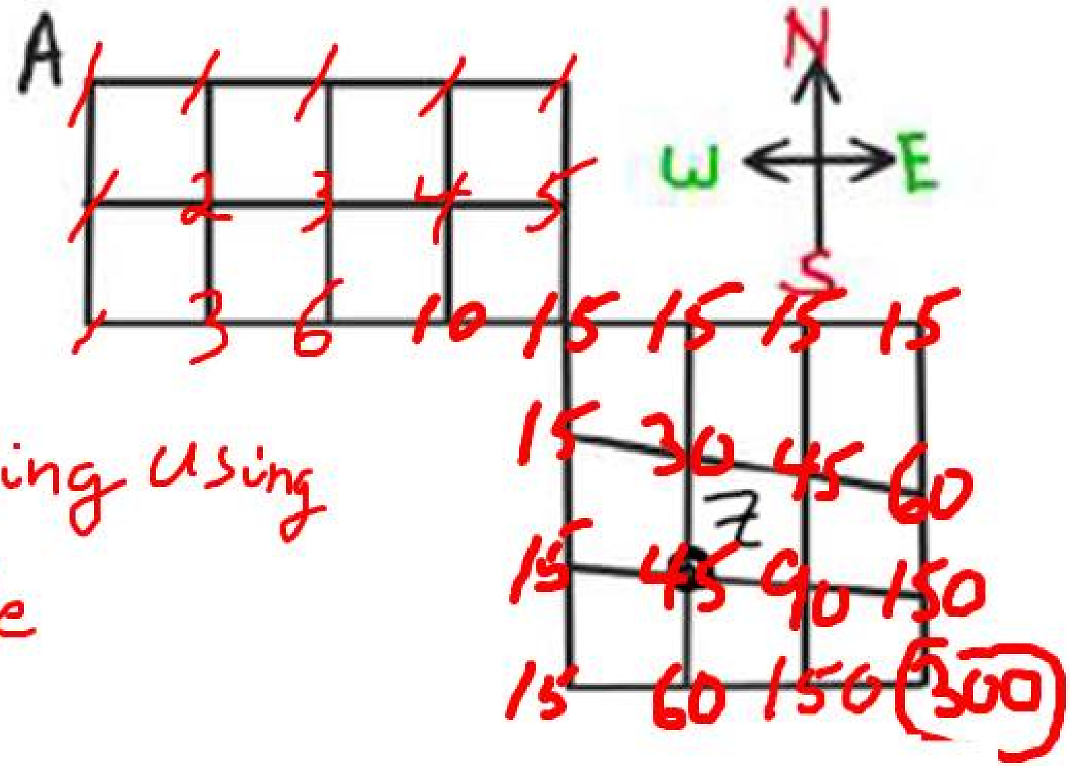
$\boxed{100 \text{ times green}} = \dfrac{200}{2} = x$

Use the Pascal Triangle method

2. Pathways

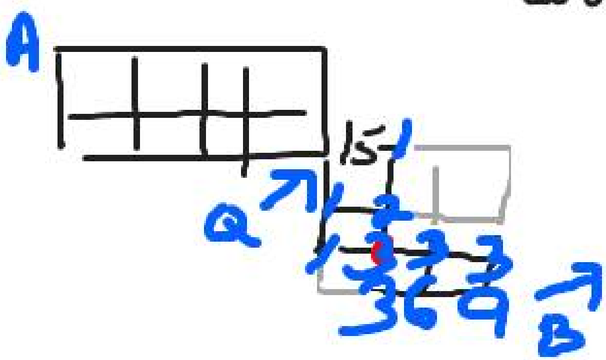
a. Determine the number of different routes (paths) you can get from **A** to **B.** (you must always advance towards destination)

300 ways counting using Pascal triangle



b. determine the **probability** you happen to randomly wander past point **Z**. on the way to B

$$P\left(\begin{matrix}\text{Path goes}\\ \text{thru Z}\end{matrix}\right) = \frac{\#\text{ of paths thru Z}}{\text{total \# of possible paths}} = \frac{135}{300} = \boxed{\frac{9}{20} = 45\%}$$



15 WAYS A → Q
9 ways Q → B

FCP Fundamental Counting Principle

$15 \cdot 9 = 135$ paths thru Z

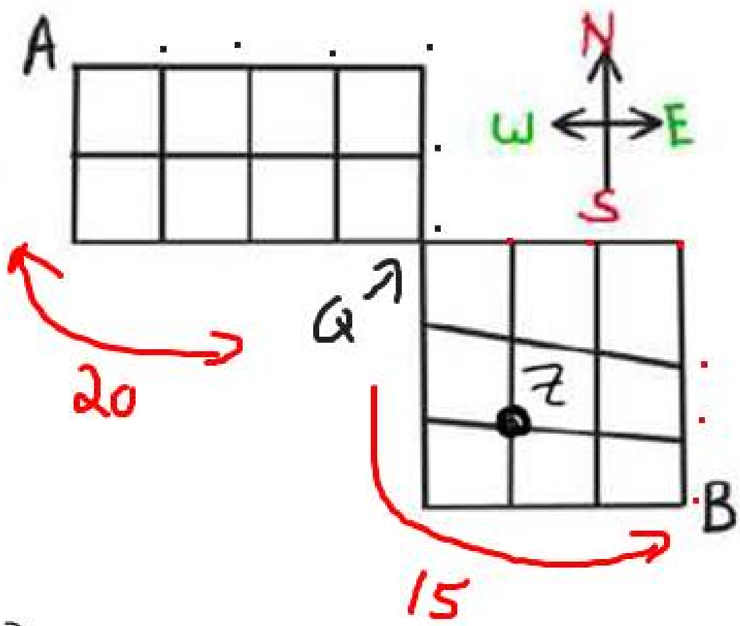
2. **Pathways**

a. Determine the number of different routes (paths) you can get from **A** to **B.** (you must always advance towards destination)

$$\frac{6!}{(4!\cdot 2!)}\cdot\frac{6!}{(3!\cdot 3!)} = 300$$

b. determine the **probability** you happen to randomly wander past point **Z.**

$$\frac{\left(\frac{6!}{(4!\cdot 2!)}\cdot\frac{3!}{(2!\cdot 1!)}\cdot\frac{3!}{(1!\cdot 2!)}\right)}{\left(\frac{6!}{(4!\cdot 2!)}\cdot\frac{6!}{(3!\cdot 3!)}\right)} = 45\%$$ lol



How about using distinguishable arrangements idea!

Maybe the Pascal counting method is better? lol

EESEES ← to go from P → Q you need 6 "moves", 4 East, 2 South

How many ways distinguably arrange EESEES? $\frac{6!}{(4!\cdot 2!)} = 15$

Now how many paths that go Q → B? $\frac{6!}{(3!\cdot 3!)} = \frac{6\cdot 5\cdot 4\cdot \cancel{3\cdot 2\cdot 1}}{\cancel{3\cdot 2\cdot 1}\cdot 3\cdot 2\cdot 1} = 20$

So FCP: $15\cdot 20 =$ 300 Paths A → B

How many paths Q → B thru Z?

$$\frac{3!}{(2!\cdot 1!)}\cdot\frac{3!}{(1!\cdot 2!)} = 3\cdot 3 = 9 \qquad 15\cdot 9 = 135$$

As Before $\frac{135}{300} = \frac{9}{20} = 45\%$

Do Question 3 or 4, but not both

3. Tony is having breakfast. He has a choice of three cereals: **Shreddies ('S')**, **Fruit Loops ('F')**, or **Rice Crispies ('R')**. He has a choice of juices: **Apple ('A')** or **Orange('O')**. [1 mark each]

Won't always be generous!

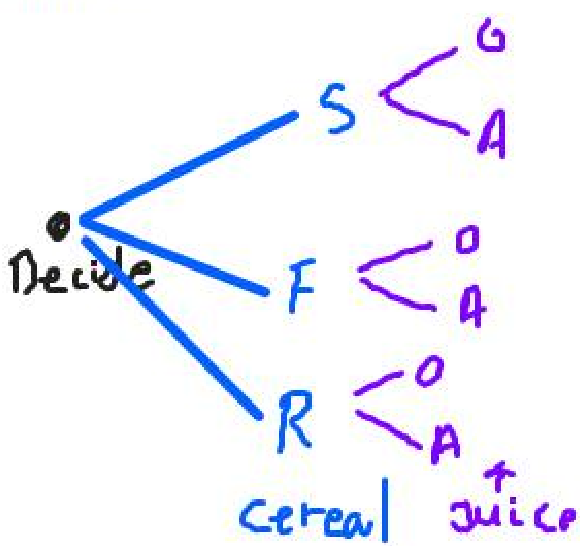
a. Draw the outcome tree (graphic organizer).

b. State the set of outcomes, ie: the sample space **{SA, *etc*.....}**.

c. Determine [assuming of course that he randomly chooses] the **probability** he has **Shreddies** and **Apple Juice**.

d. Determine the probability he does **NOT** have Orange Juice with breakfast.

a)



b) {SO, SA, FO, FA, RO, RA}

c) $P(S, A) = \frac{1}{6}$

d) $P(\text{Any cereal}, \text{NOT ORANGE}) = \frac{3}{6} = \frac{1}{2} = 50\%$

4. Mr F has 10 students in the class. He has three coupons for Timmies: **Coffee**, **Sandwich**, and **Donut**. He puts everyone's name in a hat. When he draws names he does not replace them. Determine the three different individual cases below:

a. Determine the number of possible ways MrF can handout the three coupons if randomly drawing names from a hat.

b. Determine instead the number of possible ways MrF can handout the three coupons when drawing the names from the hat if he cheats and makes sure that when he draws he selects Malcolm to get the Donut coupon.

logic

$_{10}P_3 = 720$ Draw it!

~~Some~~ many said $10!$ or 3,628,800 How does that make any sense?

a) $\underset{C}{\underline{10}} \cdot \underset{S}{\underline{9}} \cdot \underset{D}{\underline{8}} = 720$ ← count choices

only one Malcolm

b) $\underset{C}{\underline{9}} \cdot \underset{S}{\underline{1}} \cdot \underset{D}{\underline{8}} = 72$ ways to hand out the three coupons if Malcolm gets the sandwich

← choices

must be Malcolm

FCP Fundamental Counting

Do Question 5 *or* 6, Not Both. Generous

5. **State** (ie: no need to show work; unless you need to of course because you have no calculator that does these) the value of the following Permutations:

a. ${}_7P_2 = 42$

```
7 nPr 2
                42
```

or ${}_nP_r = \frac{n!}{(n-r)!}$

${}_7P_2 = \frac{7!}{(7-2)!} = \frac{7 \cdot 6 \cdot \cancel{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}}{\cancel{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}} = 42$

b. **P(10, 0)** ie ${}_{10}P_0$ ← There is one way to pick nothing!

$\mathrm{nPr}(10,0)$

$= 1$

```
10 nPr 0
                 1
```

6. State in a grammatically correct sentence words the difference between Probability and Odds.

Probability is a comparison of favourable events to all possible events.
Odds For something is a comparison of favourable events to the not favourable events (generally using a ':')
Odds Against an event a comparison of not favourable events : favourable events (generally using a ':')

Eg: $P(A) = \frac{\#\text{'A'}}{\#\text{Total}} = \frac{3}{5}$ Odds for $A = \#A : \#\text{Not } A$
$3 : 2$

7. Determine how many ways you can make *distinguishable* arrangements of all the letters in the word: **BANANA**

6 objects. If they were all different $\underline{6}\cdot\underline{5}\cdot\underline{4}\cdot\underline{3}\cdot\underline{2}\cdot\underline{1}$ 720 arrangements

$B\,A_1N_1A_2N_2A_3$

$$\frac{6!}{(3!\cdot 2!)} = \frac{720}{(6\cdot 2)} = \frac{720}{12} = 60$$ distinguishable arrangements

The three A's can be swapped around 3! or 6 different ways
The two N's can be swapped around 2! or 2 different ways

8. **Odds**. If the probability of an event, A, occurring is 75%, what are the **Odds in Favour** of event A?

$$P(A) = \frac{75}{100} = \frac{3}{4}$$

75 ← Happens, 100 ← Tries; 3 ← Happens, 4 ← Tries

Odds in Favour of "A" happening 3 : 1

Happens : Doesn't Happen

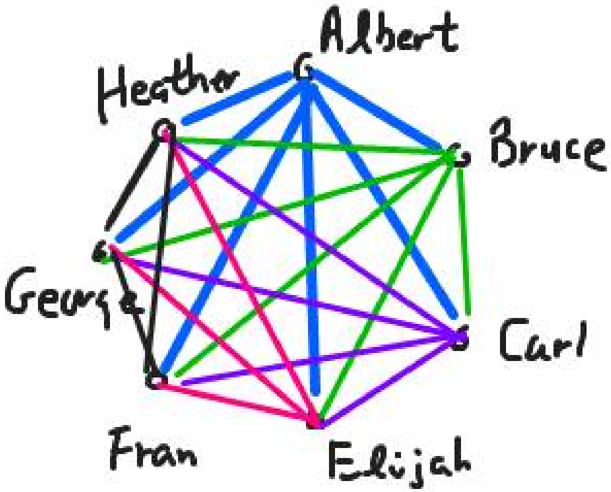
3+1=4 l.o.l

10. **Bonus**. Determine how many ways seven people at a conference shake hands with each other? [1 mark]

logic?

Shake!

Did this multiple times in Grade 10 and Grade 11.
Half dozen ways to do it! Doesn't have to be
Probability methods!!



$$\begin{array}{r} 6 \\ 5 \\ 4 \\ 3 \\ 2 \\ +\ 1 \\ \hline 21 \end{array}$$

ways

can't shake your own hand

? They already shook!

$$\begin{array}{r} 6 \\ 5 \\ 4 \\ 3 \\ 2 \\ +\ 1 \\ \hline 21 \end{array}$$

	A	B	C	D	E	F	G	
A	✗	✓	✓	✓	✓	✓	✓	6
B	✗	✗	✓	✓	✓	✓	✓	5
C	✗	✗	✗	✓	✓	✓	✓	4
D	✗	✗	✗	✗	✓	✓	✓	3
E	✗	✗	✗	✗	✗	✓	✓	2
F	✗	✗	✗	✗	✗	✗	✓	1
G	✗	✗	✗	✗	✗	✗	✗	

21 WAYS

Aren't handshakes an un-ordered arrangement?? l.o.l.

$$\boxed{{}_7C_2 = \boxed{21}}$$

ON ONE OF THE ASSIGNMENTS

many said it was 5,040 handshakes!
Seriously!
How does that make sense? l.o.l

BONUS (1 mark each) Show work!)

It is time for Grad Photos.

a. How many ways can we put five grads in a line for a photo?

b. If there are three boys and two girls how many ways can we p
the five grads in a line if it must alternate boy, girl

c. how many ways can we line up the grads if the two tallest boy:
have to be at either end?

← 2 possible answers depending how you read it

a) $\underline{5}\cdot\underline{4}\cdot\underline{3}\cdot\underline{2}\cdot\underline{1}$ choices $= 5! = {}_5P_5 = 120$

an ordered arrangement of all 5

b) $\underset{B}{\underline{3}}\cdot\underset{G}{\underline{2}}\cdot\underset{B}{\underline{2}}\cdot\underset{G}{\underline{1}}\cdot\underset{B}{\underline{1}} = 12$ ways or arrangements

FCP

c) $\underset{\text{Tall}}{\underline{2}}\cdot\underset{\text{Any}}{\underline{3}}\cdot\underset{\text{Any}}{\underline{2}}\cdot\underset{\text{Any}}{\underline{1}}\cdot\underset{\text{Tall}}{\underline{1}} = 12$ ways

$\underset{\text{Tall boy}}{\underline{2}}\ \underset{G}{\underline{2}}\ \underset{B}{\underline{1}}\ \underset{G}{\underline{1}}\ \underset{\text{Tall boy}}{\underline{1}} = 4$ ways alternating

2 possible answers depending how you read it

ON TIME! ON Target!

First in, Last out

we carry the load!

LOAD CLEAR

Determined to Deliver Baby!