

Problem Set 1.

(1a) $\binom{n}{n} = \frac{n!}{n!(n-n)!} = \frac{1}{(n-n)!} = \frac{1}{0!} = \boxed{1}$

(1b) $\binom{10}{2} = \frac{10!}{2!(10-2)!} = \frac{1 \times 2 \times 3 \dots \times 10}{2 \times 1 \times 8!} = \frac{3,628,800}{2(40,320)}$
 $3,628,800 / 80,640 = \boxed{45}$

(1c) $\binom{1}{2} = \frac{1!}{2!(1-2)!} = \frac{1}{2(-1)!} = \frac{1}{-2} = \boxed{-1/2}$
 $\rightarrow n \text{ not } \geq m$

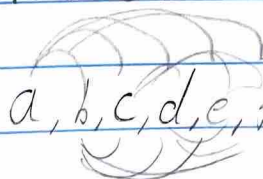
(2) $\binom{22}{2} = \frac{22!}{2!(22-2)!} = \frac{22!}{2(20)!}$

(3) $\binom{c}{2} = \frac{c!}{2!(c-2)!}$

(4) Python Code:

```
names = ['Chris', 'Frank', 'Eli', 'Beatrice', 'Amy', 'Dan']
names_in_order = ['Amy', 'Beatrice', 'Chris', 'Dan', 'Eli', 'Frank']
print(names_in_order)
```

(5) $\binom{6}{2} = \frac{6!}{2!(6-2)!} = \frac{720}{2(4)!} = \frac{720}{48} = 15 \text{ possible pairs}$

 a, b, c, d, e, f ab, ac, ad, ae, af, bc, bd, be, bf, cd, ce, cf, de, df, ef

Python Code: 01, 02, 03, 04, 05, 12, 13, 14, 15, 23, 24, 25, 34, 35, 45

letters = ['a', 'b', 'c', 'd', 'e', 'f']

pairs = []

n = 0

n2 = 1

.....

Problem Set 1

(5) (continued code.....)

for e in letters:

Indent →

if $n2 \leq 5$:

→

`pairs.append(letters[n]+letters[n2])`

`n2=n2+1`

`n=1`

`n2=2`

for e in letters:

→

if $n2 \leq 5$:

→

`pairs.append(letters[n]+letters[n2])`

`n2=n2+1`

`n=2`

`n2=3`

for e in letters:

→

if $n2 \leq 5$:

→

`pairs.append(letters[n]+letters[n2])`

`n2=n2+1`

`n=3`

`n2=4`

for e in letters:

→

if $n2 \leq 5$:

→

`pairs.append(letters[n]+letters[n2])`

`n2=n2+1`

`n=4`

`n2=5`

for e in letters:

→

if $n2 \leq 5$:

→

`pairs.append(letters[n]+letters[n2])`

`n2=n2+1`

`print(pairs)`

Problem Set 1

(6) Terms 20-30, Fibonacci Sequence

20: 6,765	$\sqrt{\quad}$ [17,711 28,657] Sqrtbet.	[Sum of all square roots thesum]
21: 10,946		
22: 17,711		
23: 28,657		
24: 46,368		
25: 75,025		
26: 121,393		
27: 196,418		
28: 317,811		
29: 514,229		
30: 832,040		

fib

Python Code:

```
fib = [6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811, 514229, 832040]
Sqrtbet = []
thesum = 0
```

```
for e in fib:
```

```
    => Sqrtbet.append(math.sqrt(e))
```

```
for e in Sqrtbet:
```

```
    -> thesum = thesum + e
```

```
print(thesum)
```