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Ex 2-1

1/23/17

(a) **5-letter words**

According to Word Find (<http://www.wordfind.com/5-letter-words/)> there exist 8938 allowable five-letter English words (at least, 8938 English words acceptable in a game of Scrabble).

There are 26 \*\* 5 = 11881376 five-letter strings.

The fraction of five-letter words that are strings is, therefore, 0.0007522697707740249.

Thus, the percentage of five-letter strings that are words is about .08%

The following are the pertaining calculations done in python:

>>> words5=8938

>>> strings5=26\*\*5

>>> strings5

11881376

>>> frac5=words5/strings5

>>> frac5

0.0007522697707740249

>>> percent5=frac5\*100

>>> percent5

0.07522697707740249

(b) **6-letter words**

According to Word Find ([http://www.wordfind.com/6-letter-words/)](http://www.wordfind.com/5-letter-words/)) there exist 15788 allowable six-letter English words (at least, 15788 English words acceptable in a game of Scrabble).

There are 26 \*\* 6 = 308915776 six-letter strings.

The fraction of six-letter words that are strings is, therefore, .00005110778155920402.

Thus, the percentage of six-letter strings that are words is about .005%

The following are the pertaining calculations done in python:

>>> words6=15788

>>> strings6=26\*\*6

>>> strings6

308915776

>>> frac6=words6/strings6

>>> frac6

5.110778155920402e-05

>>> percent6=frac6\*100

>>> percent6

0.005110778155920402

(c) **12-letter words**

According to Word Finder (<http://wordfinder.yourdictionary.com/letter-words/12)> there exist 11,412 allowable twelve-letter English words.

There are 26 \*\* 12 = 95428956661682176 twelve-letter strings.

The fraction of twelve-letter words that are strings is, therefore, .00000000000011958634359231434.

Thus, the percentage of twelve-letter strings that are words is about .00000000001%

The following are the pertaining calculations done in python:

>>> words12=11412

>>> strings12=26\*\*12

>>> strings12

95428956661682176

>>> frac12=words12/strings12

>>> frac12

1.1958634359231434e-13

>>> percent12=frac12\*100

>>> percent12

1.1958634359231434e-11

(d) **20-letter words**

According to litscape.com (http://www.litscape.com/words/length/20\_letters/20\_letter\_words.html) there exist 188 allowable twenty-letter English words.

There are 26 \*\* 20 = 19928148895209409152340197376 twenty-letter strings.

The fraction of twenty-letter words that are strings is, therefore, .000000000000000000000000009433891777333815.

Thus, the percentage of twenty-letter strings that are words is about .0000000000000000000000009%

The following are the pertaining calculations done in python:

>>> words20=188

>>> strings20=26\*\*20

>>> strings20

19928148895209409152340197376

>>> frac20=words20/strings20

>>> frac20

9.433891777333815e-27

>>> percent20=frac20\*100

>>> percent20

9.433891777333815e-25

(e) **Longest word in major English dictionary**

According to the website to the oxford dictionary (<https://en.oxforddictionaries.com/explore/what-is-the-longest-english-word)>, the longest English word is pneumonoultramicroscopicsilicovolcanokoniosis. It is of length 45, and according to the website it is the only word of this length.

There are 26\*\*45 = 4718464138887779754509230339014256179122137026607683635171557376 forty-five-letter strings. Thus, the fraction of 45-letter strings that are words is 2.1193336869054102e-64, and the percentage of 45-letter strings that are words is 2.11933368690541e-62%.

The following are the pertaining calculations done in python:

>>> len('pneumonoultramicroscopicsilicovolcanokoniosis')

45

>>> strings45=26\*\*45

>>> strings45

4718464138887779754509230339014256179122137026607683635171557376

>>> frac45=1/strings45

>>> frac45

2.1193336869054102e-64

>>> percent45=frac45\*100

>>> percent45

2.11933368690541e-62