

Get ready for quiz

Grab a calculator

If two dice are thrown, what is the probability of getting a sum of 8?

5/36

Outcomes for Two Dice

	1	2	3	4	5	6
1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
2	(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
4	(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
5	(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Binomial Probability Distribution

Two Options :
Success or Failure

Binomial Probability for One x Value

to compute the binomial probability for **one particular number of successes**, use the `binompdf` function.

Keystrokes	[2nd VARS <i>makes</i> DISTR] [▲ 6 times] [STO] [2nd STO → LIST]
Format	<code>binompdf(n, p, x) → list</code>

Example 1: Larry's batting average is .260. If he's at bat four times, what is the probability that he gets exactly two hits?

Solution:

$$n = 4, p = 0.26, x = 2$$

Note: Some textbooks use r for number of successes, rather than x .

$$\text{binompdf}(4, .26, 2) = 0.2221$$

$$\begin{aligned} n &= 4 \\ p &= .260 \\ r \text{ } x &= 2 \end{aligned}$$

Problem 1: In a school survey 68% of the students have an Android device. What is the probability that 12 of a selecting of 20 have Android devices?

Solution:

$n = 20$ (20 classmates)

$x = 12$ (The amount of people who own an android)

$p = .68$ (probability that they are an Android user is a success, because that is what we care about)

$q = .32$ (probability that the users does not own an android)

Reminder: $Q=1-p$ and $p=1-q$ thus $q=1-.68=.32$

```
binompdf(20, .68,  
12)  
.1353860472
```

Problem 2: What is the probability that out of 14 classmates that exactly 8 use iphones?

PDF

Solution:

$$n = 14$$

$x = 8$ (The amount of people who own an iphone)

$p = .32$ (Probability that they are an users is the success, because that is what we care about)

$q = .68$ (Probability that they do not own an iphone)

When looking for and exact value use binomial pdf on your TI-84 and TI-83 calculator.

`binompdf(14,.32,8)` is approximately .0326

[2ND] | [VARS] | [0] | [1] | [4] | [.] | [.] | [3] | [2] | [.] | [8] | [ENTER]

```
binompdf(14,.32,
8
.0326443958
■
```

Problem: What is the probability that out of 32 students 26 or less pass?

CDF

$$N = 32$$

$x = 26$ (Number of students who passed)

$p = .95$ (Probability of passing)

$q = .05$ (Probability of failing)

Note $P=1-Q$ and $Q=1-P$.

thus $1-.95 = .05 = Q$

When finding a ranged of values use the binomcdf function.

[2ND] | [VARS] | [ALPHA] | [MATH] | [3] | [2] | [1] | [1] | [9] | [5] | [1] |

[2] | [6]

```
binomcdf(32,.95,  
26)  
.0045997456
```

Problem: What is the probability that from our sample of 32 a minimum of 3 students fail?

$N = 32$

$x = 2$ (The amount of people we think will fail)

$p = .05$ (Probability of failing, which is what we want to know about)

$q = .95$ (Probability of Success)

n = number of trials

x - number of success that happen during n trials

p = Probability of success [Note: If given the q then ($p = 1 - q$)]

q = Probability of failure [Note: If given q then ($q = 1 - p$)]

Note: The probability that 3 or more students will fail is the same as $1 -$ the probability of 2 or less failing. With this fact we can use the $\text{binomcdf}(n,p,x)$ to solve the problem.

$1 - \text{binomcdf}(32, .05, 2)$

$\sqrt{[1] | [-] | [2ND] | [VARS] | [ALPHA] | [MATH] | [3] | [2] | [,] | [,] | [0] | [5] | [,] | [2]}$

$1 - \text{binomcdf}(32, .05, 2)$
= .2138855271

