

## Chapter 13 / Example 4

# Binomial probabilities

For each situation, state if the random variable is distributed binomially. If so, find the probability asked for.

- a** A coin is biased so that the probability of a head is 0.74. The coin is tossed 7 times.  $A$  is the number of tails. Find  $P(A = 5)$ .
- b** A bag contains 12 white chocolates and 7 dark chocolates. A chocolate is selected at random and its type noted and then eaten. This is repeated 5 times.  $B$  is the number of dark chocolates eaten. Find  $P(B = 7)$ .
- c** A bag contains 10 red, 1 blue and 7 yellow dice. A dice is selected at random and its colour noted and replaced. This is repeated 12 times.  $C$  is the number of yellow dice recorded. Find  $P(C \leq 6)$ .
- d** In a multiple-choice test of 20 questions, students must select the correct answer from 5 different options. Valentina guesses each of the 20 answers.  $D$  is the number of correct answers Valentina guesses. Find  $P(D \geq 10)$ .
- e** Ciaran plays a lottery in which the probability of buying a winning ticket is 0.001.  $E$  is the number of tickets Ciaran buys until he wins a prize. Find  $P(E < 7)$ .

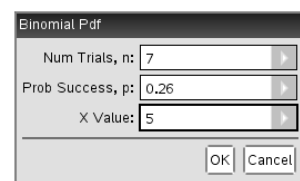
$A \sim B(7, 0.26)$ . Find  $P(A = 5)$ .

Open a new document and add a Calculator page.

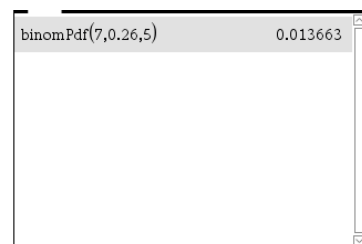
Press **menu** 5:Probability | 5:Distributions | A:Binomial Pdf...

Enter 7 as the number of trials, 0.26 as the probability of success and 5 as the X value.

Press **enter** or click OK with the touchpad.



The GDC displays the solution  $P(A = 5) = 0.0137$ .



$B$  is not binomially distributed.

<Instructions: step 3>

# Chapter 13 / Example 4

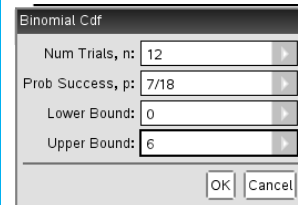
## Binomial probabilities

$C \sim B\left(12, \frac{7}{18}\right)$ . Find  $P(C \leq 6)$ .

Press **menu** 5:Probability | 5:Distributions | B:Binomial Cdf...

Enter 12 as the number of trials,  $7 \div 18$  as the probability of success, 0 as the lower bound and 6 as the upper bound.

Press **enter** or click OK with the touchpad.

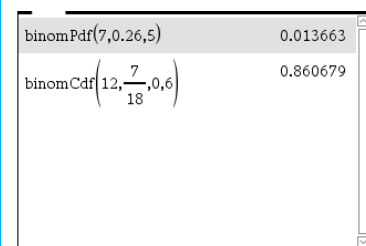


Binomial Cdf

Num Trials, n:	12
Prob Success, p:	7/18
Lower Bound:	0
Upper Bound:	6

OK Cancel

The GDC displays the solution  $P(C \leq 6) = 0.861$ .



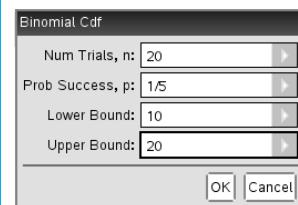
binomPdf(7,0.26,5)	0.013663
binomCdf(12, 7/18, 0, 6)	0.860679

$D \sim B\left(20, \frac{1}{5}\right)$ . Find  $P(D \geq 10)$ .

Press **menu** 5:Probability | 5:Distributions | B:Binomial Cdf...

Enter 20 as the number of trials,  $1 \div 5$  as the probability of success and 10 as the lower bound and 20 as the upper bound.

Press **enter** or click OK with the touchpad.

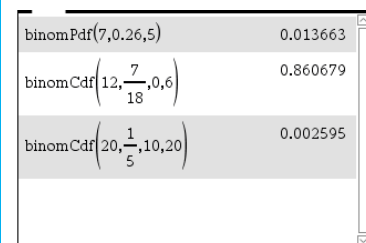


Binomial Cdf

Num Trials, n:	20
Prob Success, p:	1/5
Lower Bound:	10
Upper Bound:	20

OK Cancel

The GDC displays the solution  $P(D \geq 10) = 0.00259$ .



binomPdf(7,0.26,5)	0.013663
binomCdf(12, 7/18, 0, 6)	0.860679
binomCdf(20, 1/5, 10, 20)	0.002595

$E$  is not binomially distributed.