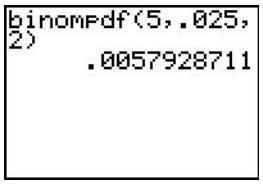
Binomial Distribution

Worksheet

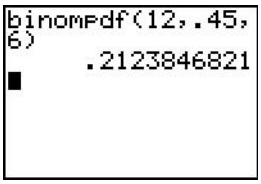
binompdf(n,p,x)

(1) Compute the probability of X successes, using the binomial formula.

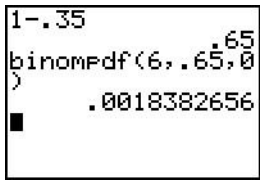
(a) n = 5, X = 2, p = 0.025



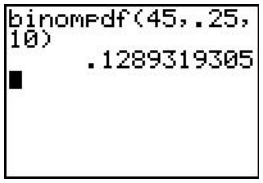
(b) n = 12, X = 6, p = 0.45



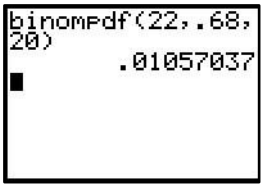
(c) n = 6, X = 0, q = 0.35



(d) n = 45, X = 10, p = 0.25

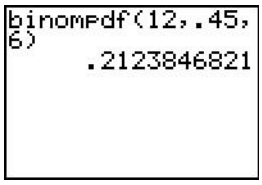


(e) n= 22, X = 20, p = 0.68



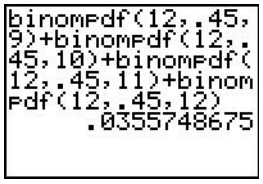
(2) Compute the probability of X success given n = 12 and p = .45 using the binomial formula.

(a) P(X = 6)



(b) P (X≥9)

P(9) + P(10) + P(11) + P(12)

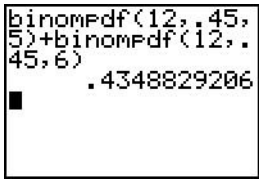


(c) P (X< 4)

P(0) + P(1) + P(2) + P(3)

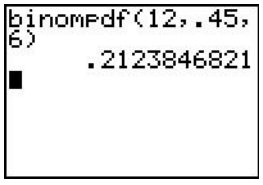
(d) P (4<X<7)

P(5) + P(6)



(e) P (5<X<7)

P(6)



(3) A student randomly guesses at 10 multiple choice questions. Each question has four possible answers with only one being correct, and each is independent of every other question.
n=10 p = ¼ = .25

(a) Find the probability that the student guesses EXACTLY 4 correct.
binompdf(10,.25,4) = 0.145998

(b) Find the probability of guessing less than 3 correctly.
P(0) + P(1) + P(2) = 0.5255928

(c) Find the probability of guessing 8 or more.
P(8) + P(9) + P(10) = 4.1×10^{-4} = .00041

(d) Find the probability of guessing between 4 and 6 inclusively.
P(4) + P(5) + P(6) = 0.2206192

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(a)
```
binompdf(10,.25,
4)
      .1459980011
```

(b)
```
binompdf(10,.25,
0)+binompdf(10,.
25,1)+binompdf(1
0,.25,2)
       .525592804
```

(c)
```
binompdf(10,.25,
8)+binompdf(10,.
25,9)+binompdf(1
0,.25,10)
   4.15802002E-4
```

(d)
```
binompdf(10,.25,
4)+binompdf(10,.
25,5)+binompdf(1
0,.25,6)
      .2206192017
```

(4) In a Gallop Poll conducted January 30 – February 2, 2008, 43% of 18-29 year olds said that they were worried about retirement. Find the probability that out of 15 college students aged 18 – 29.

(a) Exactly 1 is worried about retirement.
P(1) = binompdf(15,.43,1) = 0.0024648

(a)
```
binompdf(15,.43,
1)
      .0024649476
```

(b) Fewer than 5 are worried about retirement.
P(0) + P(1) + P(2) + P(3)+ P(4) = 0.1545517

(c) At least 10 are worried about retirement.
P(10) + P(11) + P(12)+ P(13) + P(14) + P(15) =0.056459

(d) Between 8 and 10 inclusively are worried about retirement.
P(8) + P(9) + P(10)= 0.272356

(b)
```
binompdf(15,.43,
0)+binompdf(15,.
43,1)+binompdf(1
5,.43,2)+binompd
f(15,.43,3)+bino
mpdf(15,.43,4)
      .1545517468
```

(c)
```
binompdf(15,.43,
10)+binompdf(15,
.43,11)+binompdf
(15,.43,12)+bino
mpdf(15,.43,13)+
binompdf(15,.43,
14)+binompdf(15,
.43,15)
```

```
.43,11)+binompdf
(15,.43,12)+bino
mpdf(15,.43,13)+
binompdf(15,.43,
14)+binompdf(15,
.43,15)
      .0564591584
```

(d)
```
binompdf(15,.43,
8)+binompdf(15,.
43,9)+binompdf(1
5,.43,10)
      .2723560899
```

(5) In Gallop Poll, 35% of 30-49 year olds stated they believed in ghosts. Find the probability that out of 16 college students aged 30-49

(a) Exactly 5 said they believed in ghost.
P(5) = binompdf(16,.35,5) = 0.200756

(b) Exactly 5 said they do not believe in ghosts.
1-0.35 = 0.65
P(5) = binompdf(16,.65,5) = 0.0048932

(c) At least 4 believe in ghosts.
P(0)+ P(1) + P(2) + P(3) = 0.13385965
P(X≥4) = 1 - 0.13385965 = 0.86614035

(d) At least 4 do not believe in ghosts.
P(0)+ P(1) + P(2) + P(3) = 2.3854 x 10^{-4} = 0.00023854
P(X≥4) = 1 - 0.00023854 = 0.9997614587

(a)
```
binompdf(16,.35,
5)
      .2007565735
```

(b)
```
binompdf(16,.65,
5)
      .0048932556
```

(c)
```
binompdf(16,.35,
0)+binompdf(16,.
35,1)+binompdf(1
6,.35,2)+binompd
f(16,.35,3)
       .13385965
```

(d)
```
binompdf(15,.65,
0)+binompdf(15,.
65,1)+binompdf(1
5,.65,2)+binompd
f(16,.65,3)
  2.385412877E-4
```