

# Normalverteilung

## Normierung von Binomialverteilungen

| n = 25<br>p = 0,24<br>E(X) = 6<br>σ = 2,1354 |        |                |            | n = 25<br>p = 0,6<br>E(X) = 15<br>σ = 2,4495 |        |                |            | n = 50<br>p = 0,2<br>E(X) = 10<br>σ = 2,8284 |        |                |            | n = 50<br>p = 0,7<br>E(X) = 35<br>σ = 3,2404 |        |                |            |
|--|--------|----------------|------------|--|--------|----------------|------------|--|--------|----------------|------------|--|--------|----------------|------------|
| k  | P(X=k) | (k - E(X)) / σ | σ * P(X=k) | k  | P(X=k) | (k - E(X)) / σ | σ * P(X=k) | k  | P(X=k) | (k - E(X)) / σ | σ * P(X=k) | k  | P(X=k) | (k - E(X)) / σ | σ * P(X=k) |
| 0  | 0,0010 | -2,8098        | 0,0022     | 0  | 0,0000 | -6,1237        | 0,0000     | 0  | 0,0000 | -3,5355        | 0,0000     | 0  | 0,0000 | -10,8012       | 0,0000     |
| 1  | 0,0083 | -2,3415        | 0,0177     | 1  | 0,0000 | -5,7155        | 0,0000     | 1  | 0,0002 | -3,1820        | 0,0005     | 1  | 0,0000 | -10,4926       | 0,0000     |
| 2  | 0,0314 | -1,8732        | 0,0669     | 2  | 0,0000 | -5,3072        | 0,0000     | 2  | 0,0011 | -2,8284        | 0,0031     | 2  | 0,0000 | -10,1840       | 0,0000     |
| 3  | 0,0759 | -1,4049        | 0,1621     | 3  | 0,0000 | -4,8990        | 0,0000     | 3  | 0,0044 | -2,4749        | 0,0124     | 3  | 0,0000 | -9,8754        | 0,0000     |
| 4  | 0,1318 | -0,9366        | 0,2815     | 4  | 0,0000 | -4,4907        | 0,0000     | 4  | 0,0128 | -2,1213        | 0,0363     | 4  | 0,0000 | -9,5668        | 0,0000     |
| 5  | 0,1749 | -0,4683        | 0,3734     | 5  | 0,0000 | -4,0825        | 0,0001     | 5  | 0,0295 | -1,7678        | 0,0835     | 5  | 0,0000 | -9,2582        | 0,0000     |
| 6  | 0,1841 | 0,0000         | 0,3930     | 6  | 0,0002 | -3,6742        | 0,0006     | 6  | 0,0554 | -1,4142        | 0,1566     | 6  | 0,0000 | -8,9496        | 0,0000     |
| 7  | 0,1578 | 0,4683         | 0,3369     | 7  | 0,0009 | -3,2660        | 0,0023     | 7  | 0,0870 | -1,0607        | 0,2461     | 7  | 0,0000 | -8,6410        | 0,0000     |
| 8  | 0,1121 | 0,9366         | 0,2394     | 8  | 0,0031 | -2,8577        | 0,0076     | 8  | 0,1169 | -0,7071        | 0,3307     | 8  | 0,0000 | -8,3324        | 0,0000     |
| 9  | 0,0669 | 1,4049         | 0,1428     | 9  | 0,0088 | -2,4495        | 0,0217     | 9  | 0,1364 | -0,3536        | 0,3858     | 9  | 0,0000 | -8,0238        | 0,0000     |
| 10   | 0,0338 | 1,8732         | 0,0721     | 10   | 0,0212 | -2,0412        | 0,0520     | 10   | 0,1398 | 0,0000         | 0,3955     | 10   | 0,0000 | -7,7152        | 0,0000     |
| 11   | 0,0145 | 2,3415         | 0,0311     | 11   | 0,0434 | -1,6330        | 0,1063     | 11   | 0,1271 | 0,3536         | 0,3595     | 11   | 0,0000 | -7,4066        | 0,0000     |
| 12   | 0,0054 | 2,8098         | 0,0114     | 12   | 0,0760 | -1,2247        | 0,1861     | 12   | 0,1033 | 0,7071         | 0,2921     | 12   | 0,0000 | -7,0980        | 0,0000     |
| 13   | 0,0017 | 3,2781         | 0,0036     | 13   | 0,1140 | -0,8165        | 0,2791     | 13   | 0,0755 | 1,0607         | 0,2135     | 13   | 0,0000 | -6,7893        | 0,0000     |
| 14   | 0,0005 | 3,7463         | 0,0010     | 14   | 0,1465 | -0,4082        | 0,3589     | 14   | 0,0499 | 1,4142         | 0,1410     | 14   | 0,0000 | -6,4807        | 0,0000     |
| 15   | 0,0001 | 4,2146         | 0,0002     | 15   | 0,1612 | 0,0000         | 0,3948     | 15   | 0,0299 | 1,7678         | 0,0846     | 15   | 0,0000 | -6,1721        | 0,0000     |
| 16   | 0,0000 | 4,6829         | 0,0000     | 16   | 0,1511 | 0,4082         | 0,3701     | 16   | 0,0164 | 2,1213         | 0,0463     | 16   | 0,0000 | -5,8635        | 0,0000     |
| 17   | 0,0000 | 5,1512         | 0,0000     | 17   | 0,1200 | 0,8165         | 0,2939     | 17   | 0,0082 | 2,4749         | 0,0231     | 17   | 0,0000 | -5,5549        | 0,0000     |
| 18   | 0,0000 | 5,6195         | 0,0000     | 18   | 0,0800 | 1,2247         | 0,1959     | 18   | 0,0037 | 2,8284         | 0,0106     | 18   | 0,0000 | -5,2463        | 0,0000     |
| 19   | 0,0000 | 6,0878         | 0,0000     | 19   | 0,0442 | 1,6330         | 0,1083     | 19   | 0,0016 | 3,1820         | 0,0045     | 19   | 0,0000 | -4,9377        | 0,0000     |
| 20   | 0,0000 | 6,5561         | 0,0000     | 20   | 0,0199 | 2,0412         | 0,0487     | 20   | 0,0006 | 3,5355         | 0,0017     | 20   | 0,0000 | -4,6291        | 0,0000     |
| 21   | 0,0000 | 7,0244         | 0,0000     | 21   | 0,0071 | 2,4495         | 0,0174     | 21   | 0,0002 | 3,8891         | 0,0006     | 21   | 0,0000 | -4,3205        | 0,0001     |
| 22   | 0,0000 | 7,4927         | 0,0000     | 22   | 0,0019 | 2,8577         | 0,0047     | 22   | 0,0001 | 4,2426         | 0,0002     | 22   | 0,0001 | -4,0119        | 0,0003     |
| 23   | 0,0000 | 7,9610         | 0,0000     | 23   | 0,0004 | 3,2660         | 0,0009     | 23   | 0,0000 | 4,5962         | 0,0001     | 23   | 0,0002 | -3,7033        | 0,0007     |
| 24   | 0,0000 | 8,4293         | 0,0000     | 24   | 0,0000 | 3,6742         | 0,0001     | 24   | 0,0000 | 4,9497         | 0,0000     | 24   | 0,0006 | -3,3947        | 0,0019     |
| 25   | 0,0000 | 8,8976         | 0,0000     | 25   | 0,0000 | 4,0825         | 0,0000     | 25   | 0,0000 | 5,3033         | 0,0000     | 25   | 0,0014 | -3,0861        | 0,0047     |
|  |        |                |            |  |        |                |            | 26   | 0,0000 | 5,6569         | 0,0000     | 26   | 0,0032 | -2,7775        | 0,0104     |
|  |        |                |            |  |        |                |            | 27   | 0,0000 | 6,0104         | 0,0000     | 27   | 0,0067 | -2,4689        | 0,0217     |
|  |        |                |            |  |        |                |            | 28   | 0,0000 | 6,3640         | 0,0000     | 28   | 0,0128 | -2,1602        | 0,0415     |
|  |        |                |            |  |        |                |            | 29   | 0,0000 | 6,7175         | 0,0000     | 29   | 0,0227 | -1,8516        | 0,0735     |
|  |        |                |            |  |        |                |            | 30   | 0,0000 | 7,0711         | 0,0000     | 30   | 0,0370 | -1,5430        | 0,1200     |
|  |        |                |            |  |        |                |            | 31   | 0,0000 | 7,4246         | 0,0000     | 31   | 0,0558 | -1,2344        | 0,1807     |
|  |        |                |            |  |        |                |            | 32   | 0,0000 | 7,7782         | 0,0000     | 32   | 0,0772 | -0,9258        | 0,2503     |
|  |        |                |            |  |        |                |            | 33   | 0,0000 | 8,1317         | 0,0000     | 33   | 0,0983 | -0,6172        | 0,3186     |
|  |        |                |            |  |        |                |            | 34   | 0,0000 | 8,4853         | 0,0000     | 34   | 0,1147 | -0,3086        | 0,3717     |
|  |        |                |            |  |        |                |            | 35   | 0,0000 | 8,8388         | 0,0000     | 35   | 0,1223 | 0,0000         | 0,3964     |
|  |        |                |            |  |        |                |            | 36   | 0,0000 | 9,1924         | 0,0000     | 36   | 0,1189 | 0,3086         | 0,3854     |
|  |        |                |            |  |        |                |            | 37   | 0,0000 | 9,5459         | 0,0000     | 37   | 0,1050 | 0,6172         | 0,3403     |
|  |        |                |            |  |        |                |            | 38   | 0,0000 | 9,8995         | 0,0000     | 38   | 0,0838 | 0,9258         | 0,2716     |
|  |        |                |            |  |        |                |            | 39   | 0,0000 | 10,2530        | 0,0000     | 39   | 0,0602 | 1,2344         | 0,1950     |
|  |        |                |            |  |        |                |            | 40   | 0,0000 | 10,6066        | 0,0000     | 40   | 0,0386 | 1,5430         | 0,1251     |
|  |        |                |            |  |        |                |            | 41   | 0,0000 | 10,9602        | 0,0000     | 41   | 0,0220 | 1,8516         | 0,0712     |
|  |        |                |            |  |        |                |            | 42   | 0,0000 | 11,3137        | 0,0000     | 42   | 0,0110 | 2,1602         | 0,0356     |
|  |        |                |            |  |        |                |            | 43   | 0,0000 | 11,6673        | 0,0000     | 43   | 0,0048 | 2,4689         | 0,0155     |
|  |        |                |            |  |        |                |            | 44   | 0,0000 | 12,0208        | 0,0000     | 44   | 0,0018 | 2,7775         | 0,0057     |
|  |        |                |            |  |        |                |            | 45   | 0,0000 | 12,3744        | 0,0000     | 45   | 0,0006 | 3,0861         | 0,0018     |
|  |        |                |            |  |        |                |            | 46   | 0,0000 | 12,7279        | 0,0000     | 46   | 0,0001 | 3,3947         | 0,0005     |
|  |        |                |            |  |        |                |            | 47   | 0,0000 | 13,0815        | 0,0000     | 47   | 0,0000 | 3,7033         | 0,0001     |
|  |        |                |            |  |        |                |            | 48   | 0,0000 | 13,4350        | 0,0000     | 48   | 0,0000 | 4,0119         | 0,0000     |
|  |        |                |            |  |        |                |            | 49   | 0,0000 | 13,7886        | 0,0000     | 49   | 0,0000 | 4,3205         | 0,0000     |
|  |        |                |            |  |        |                |            | 50   | 0,0000 | 14,1421        | 0,0000     | 50   | 0,0000 | 4,6291         | 0,0000     |

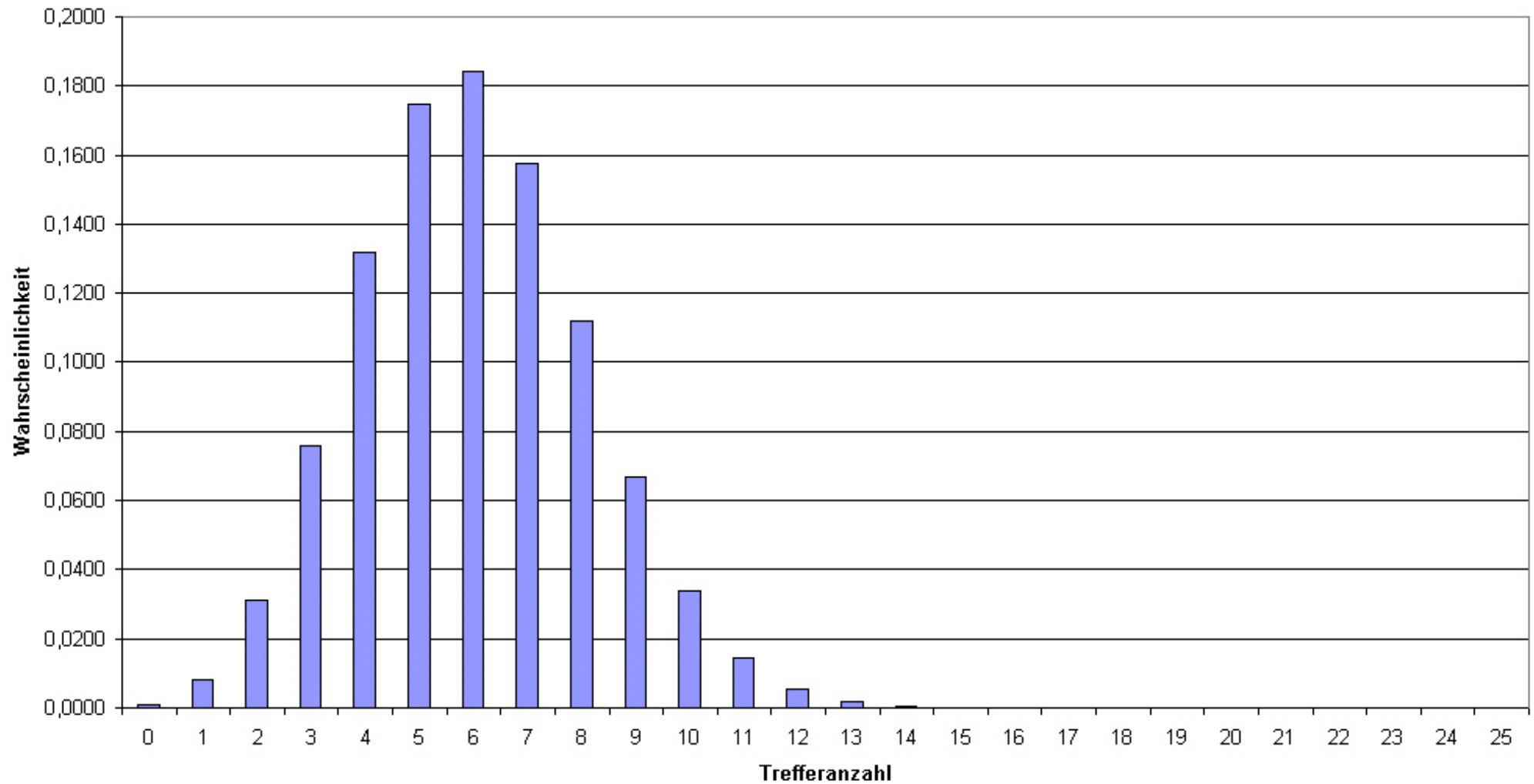
# Normalverteilung

## Normierung von Binomialverteilungen

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1)

Binomialverteilung (  $n=25$ ;  $p=0,24$  )

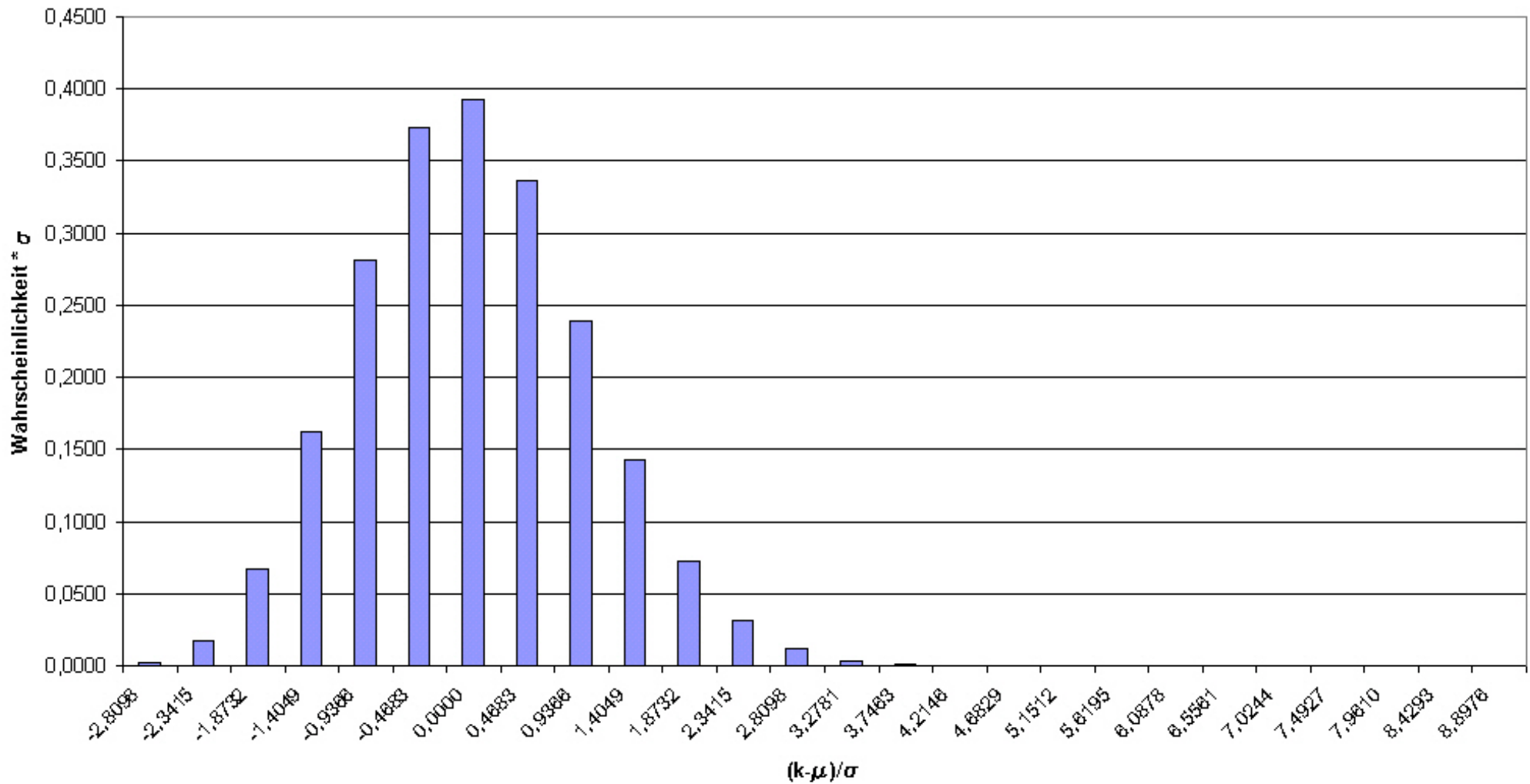


# Normalverteilung

## Normierung von Binomialverteilungen

2)

Normierte Binomialverteilung (n=25; p=0,24)



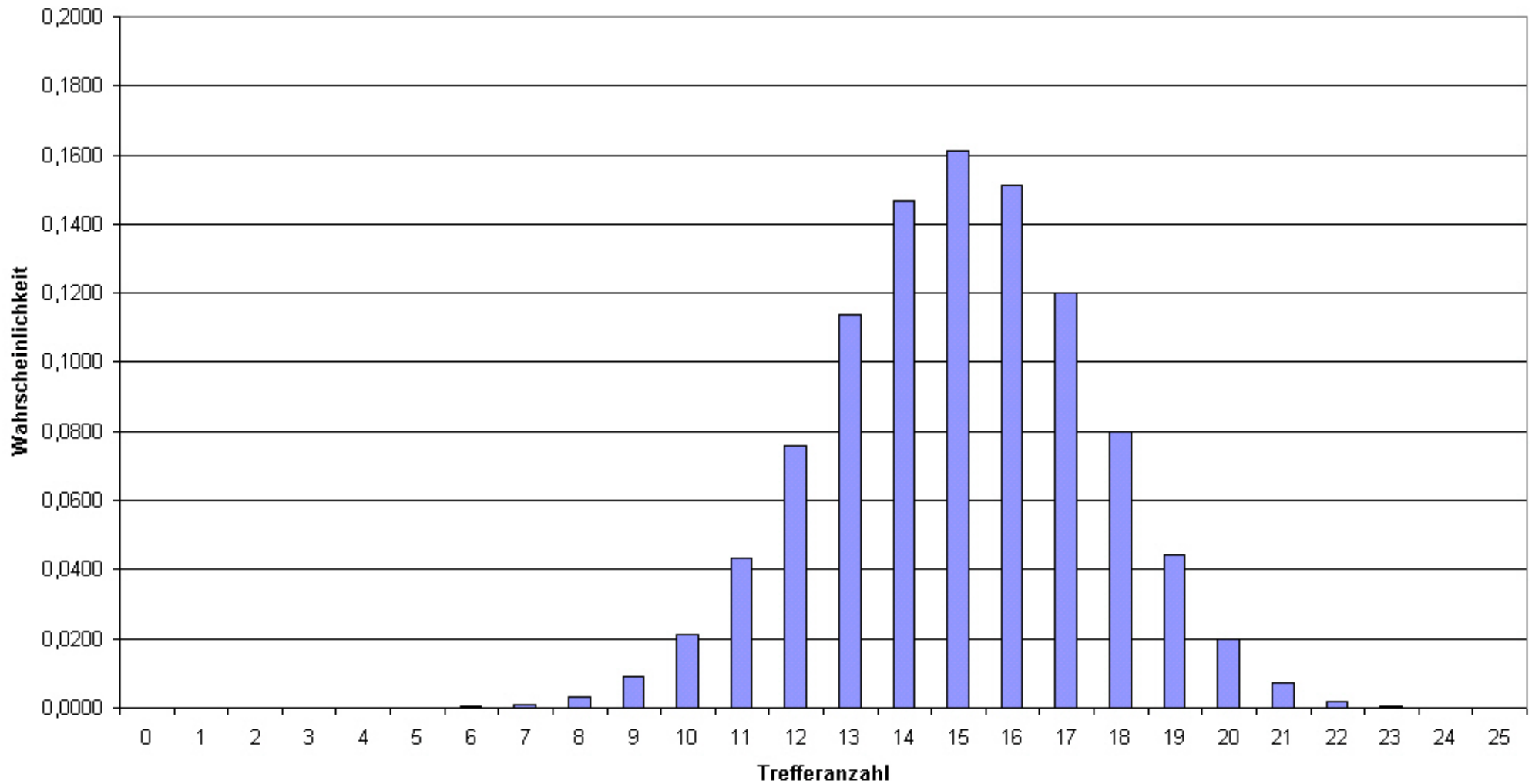
# Normalverteilung

## Normierung von Binomialverteilungen

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3)

Binomialverteilung ( $n=25$ ;  $p=0,60$ )

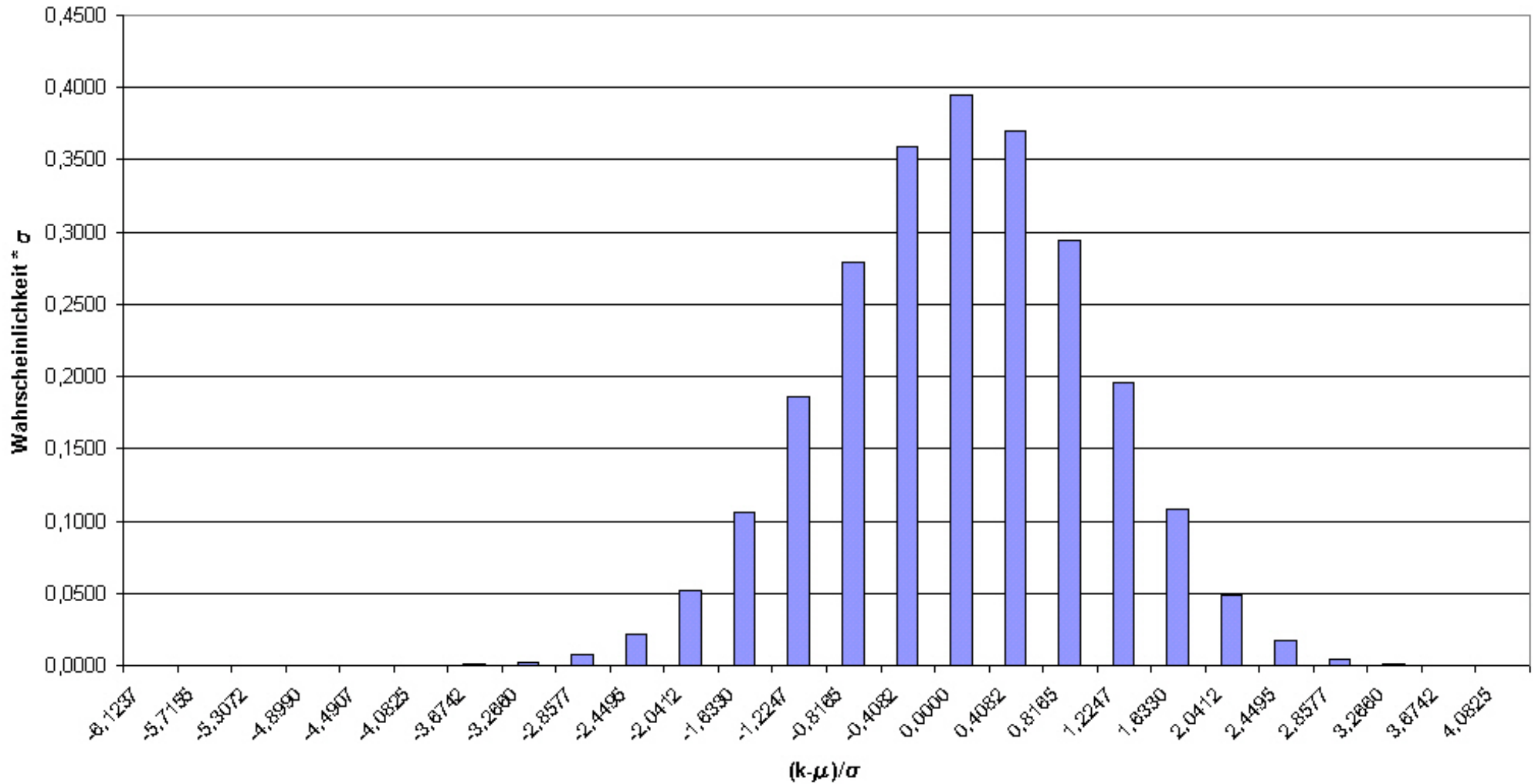


# Normalverteilung

## Normierung von Binomialverteilungen

4)

Normierte Binomialverteilung (n=25; p=0,6)

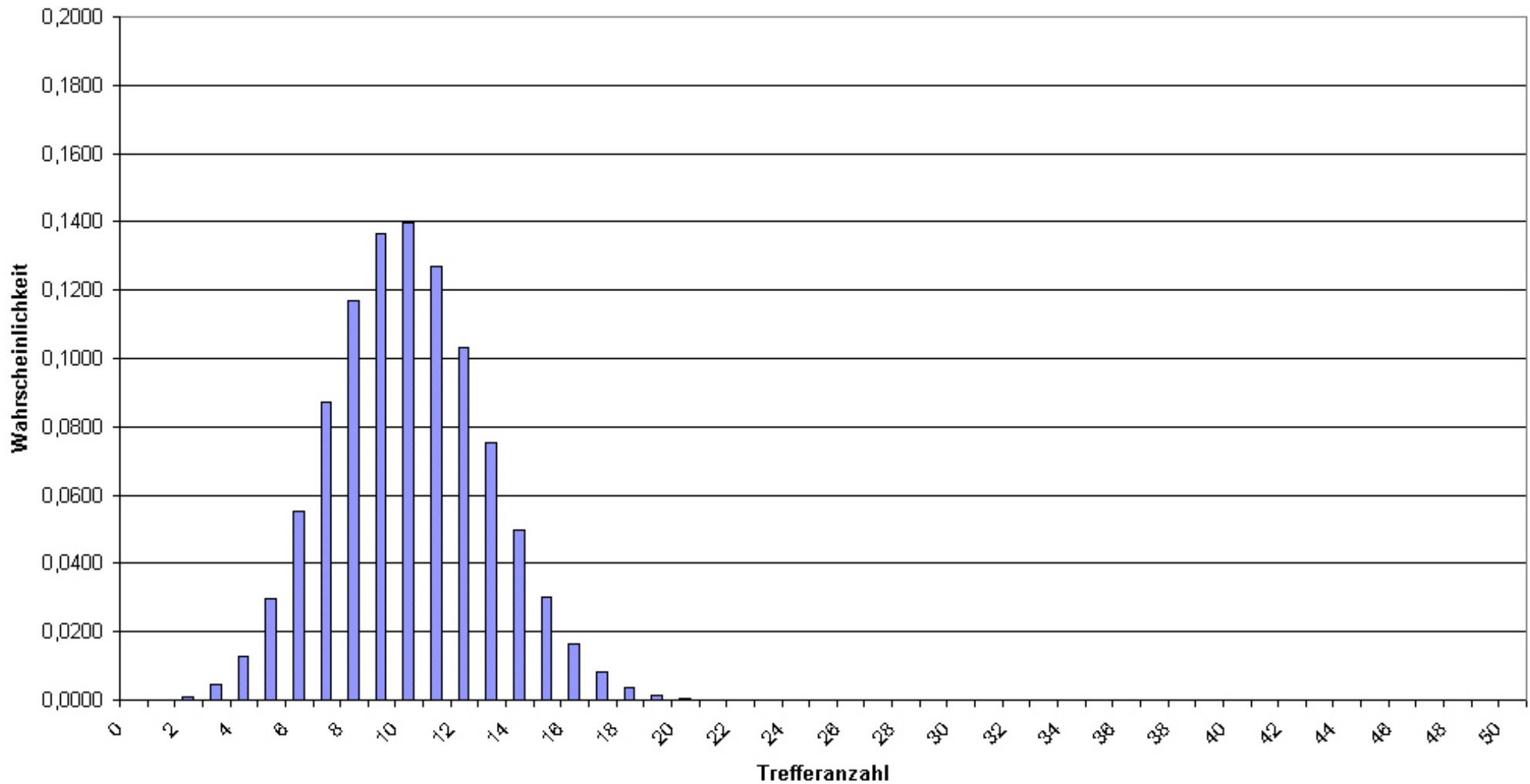


# Normalverteilung

## Normierung von Binomialverteilungen

5)

Binomialverteilung ( $n=50$ ;  $p=0,2$ )

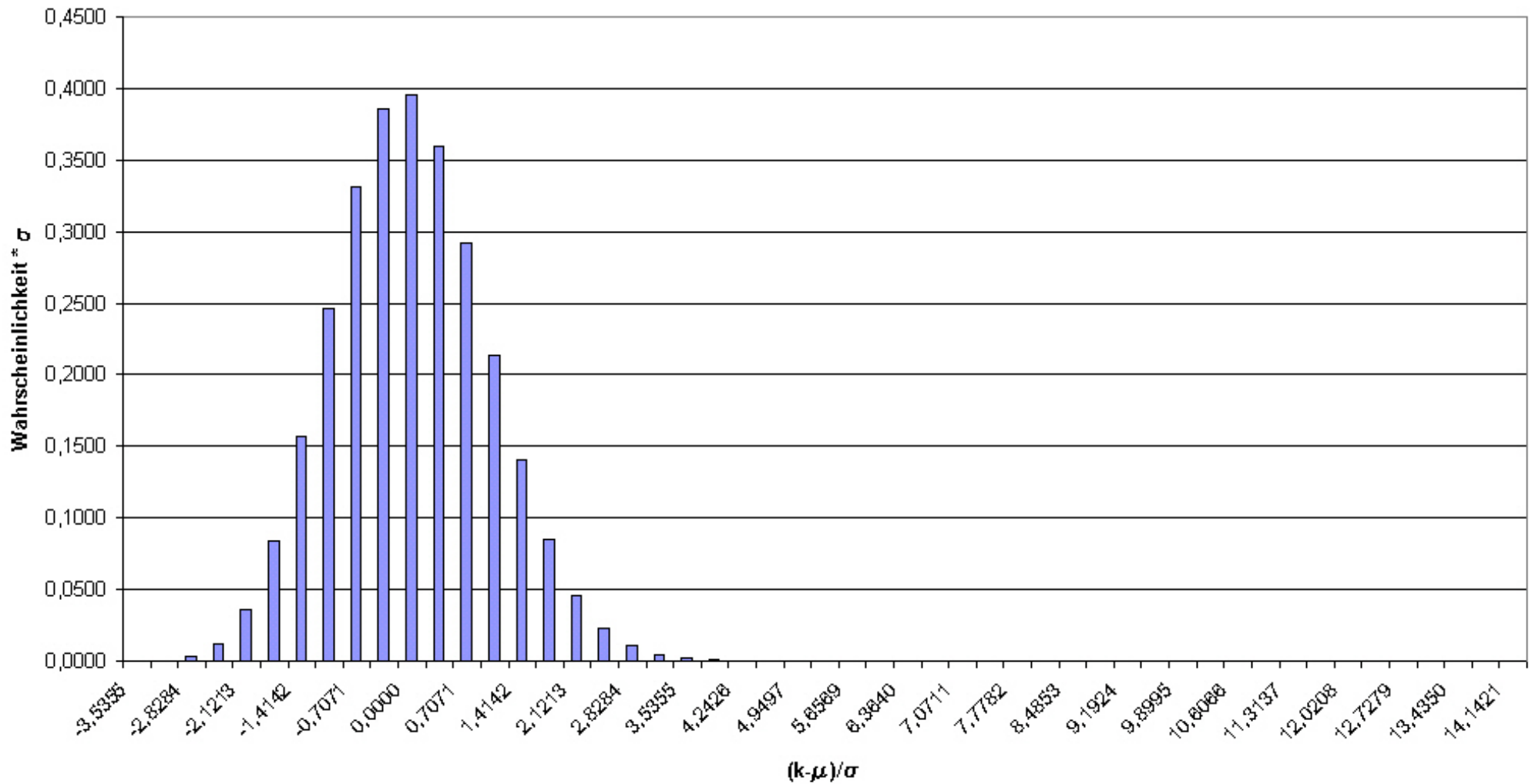


# Normalverteilung

## Normierung von Binomialverteilungen

6)

Normierte Binomialverteilung (n=50; p=0,2)

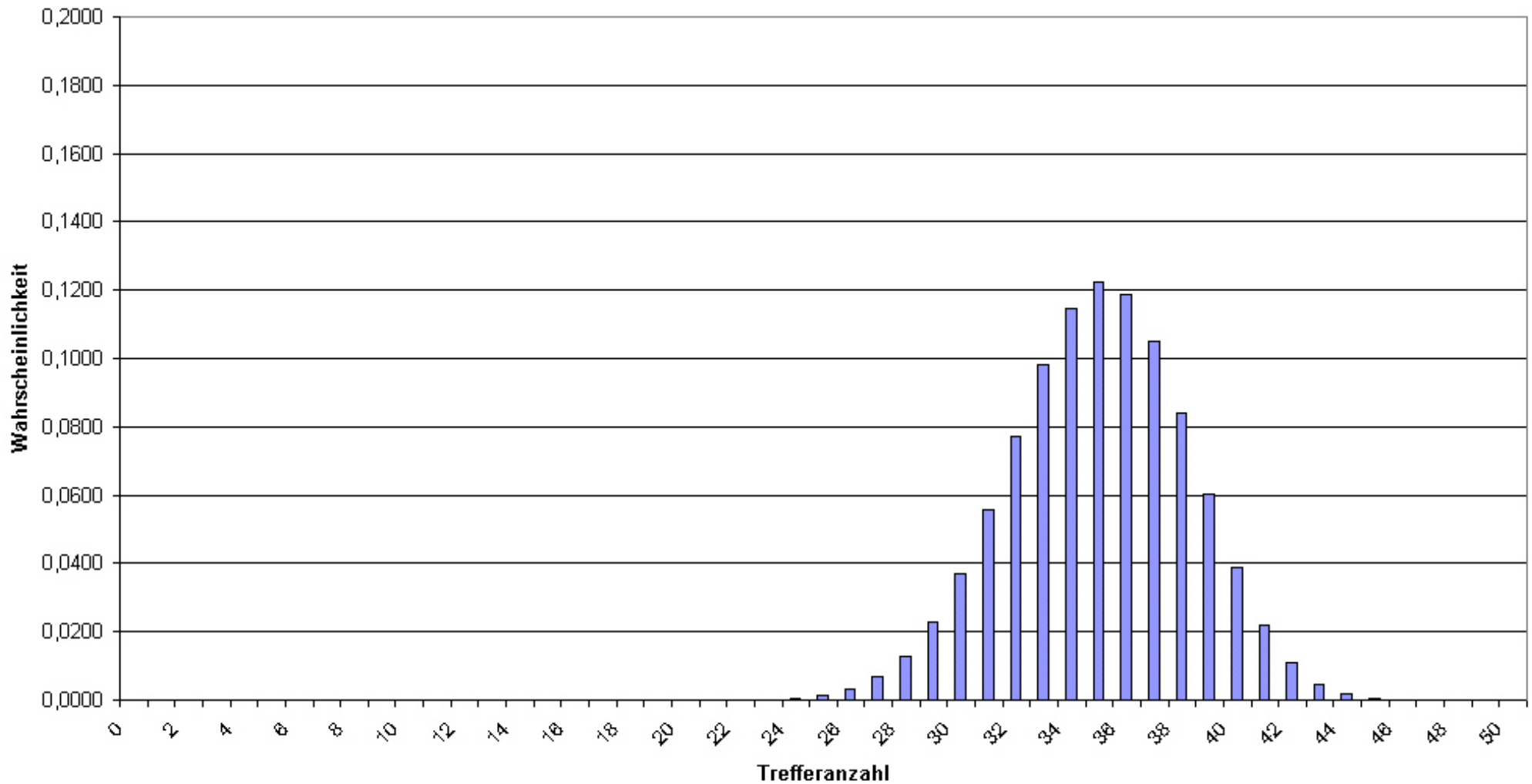


# Normalverteilung

## Normierung von Binomialverteilungen

7)

Binomialverteilung ( $n=50$ ;  $p=0,7$ )



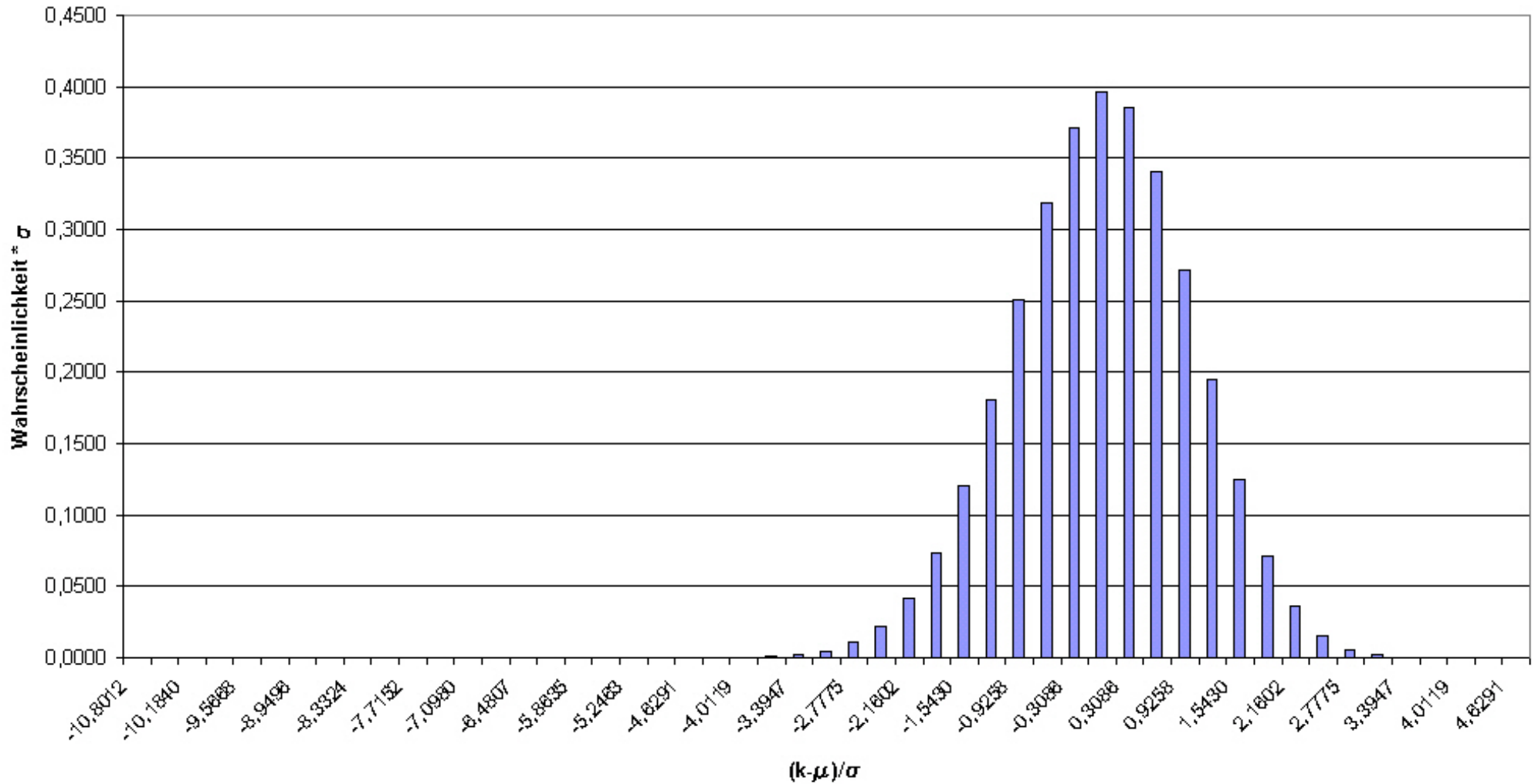


# Normalverteilung

## Normierung von Binomialverteilungen

8)

Normierte Binomialverteilung (n=50; p=0,7)



# Normalverteilung

## Normierung von Binomialverteilungen

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Zeichne bei den Diagrammen mit den normierten Binomialverteilungen eine Ordinate beim Abszissenwert:  $\frac{k-\mu}{\sigma} = 0$  ein. - Lege zuerst die Diagramme 2 und 4, danach die Diagramme 6 und 8, jeweils ausgerichtet an der Ordinate, übereinander. - Halte gegen das Licht und vergleiche!