Assignment -1 in LaTeX

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Problem 10.13.3.21:

Two dice are thrown together. Find the probability that the product of the numbers on the top of the dice is

1) 6
2) 12
3) 7

Solution:

x = Outcome of the first dice

y = Outcome of the second dice

Since random variables x,y are independent

$$\Pr(x,y) = \Pr(x) \times \Pr(y) = \frac{1}{6} \times \frac{1}{6} = \frac{1}{36} \quad (1)$$

1) Product = 6

$xy = 6$ for $(x,y) = \{(1,6),(2,3),(3,2),(6,1)\}$

No. of events for product to be 6 = 4

$$\Pr(xy = 6) = 4 \times \frac{1}{36} = \frac{1}{9} \quad (2)$$

2) Product = 12

$xy = 12$ for $(x,y) = \{(2,6),(3,4),(4,3),(6,2)\}$

No. of events for product to be 12 = 4

$$\Pr(xy = 12) = 4 \times \frac{1}{36} = \frac{1}{9} \quad (3)$$

3) Product = 7

$xy = 7$ for $(x,y) = \{\}$

$$\Pr(xy = 7) = 0 \quad (4)$$