

Lesson 10.3a Experimental and Theoretical Probability

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Theoretical probability - when all possible outcomes are equally likely

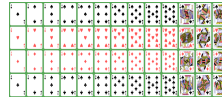
$$P(\text{event}) = \frac{\text{\# of favorable outcomes}}{\text{\# of possible outcomes}}$$

Experimental probability - probability based on repeated trials of an experiment

$$P(\text{event}) = \frac{\text{\# of times the event occurs}}{\text{\# of total trials}}$$

Chance - probability as a %

Ex. 1 Deck of Cards



Theoretical prob.:

Experimental prob.:

a) Jack: $\frac{4}{52} = \boxed{\frac{1}{13}}$

$\frac{1}{13}$

b) red: $\frac{26}{52} = \boxed{\frac{1}{2}}$

$\frac{1}{2}$

c) heart: $\frac{13}{52} = \boxed{\frac{1}{4}}$

$\frac{0}{4}$

d) Spade or diamond: $\frac{13}{52} + \frac{13}{52} = \frac{26}{52} = \boxed{\frac{1}{2}}$ $\frac{1}{2}$

Ex. 2 It rains 2 out of the last 12 days in March. If this trend continues, how many rainy days would you expect in April?

$\frac{2}{12} = \frac{1}{6}$ $\frac{1}{6} \cdot 30 \text{ days} = \boxed{5 \text{ days}}$

Ex. 3 Flip a coin 10 times

Theoretical prob.:

$P(\text{heads}) = \frac{5}{10} = \boxed{\frac{1}{2}}$ $P(\text{tails}) = \frac{5}{10} = \boxed{\frac{1}{2}}$

Experimental prob.:

H T H H H H H H T T
 $P(\text{heads}) = \boxed{\frac{7}{10}}$ $P(\text{tails}) = \boxed{\frac{3}{10}}$

HW: p. 417 #1-33 odd, 37